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The Impact of Vaccination Schedules on Infants' and Children's Physio-Psychological Health: A Qualitative Investigation

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Abstract

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MBA, University of Dallas, 2008

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

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Abstract

Many people may have become increasingly concerned about the risks associated with vaccines. At the same time, there is a lack of qualitative research on the impact of various vaccinations schedules on individuals' physio-psychological health. In addition, "mandatory" versus "nonmandatory, but recommended" vaccines are still under debate in some Western countries. The purpose of this ethnographic study was to provide an in-depth understanding of the beliefs, experiences, and perceptions of adolescents, parents, and health care providers regarding different vaccination schedules. The health belief model was used as the theoretical framework. The sample consisted of adolescents and parents from different vaccination backgrounds, as well as of healthcare providers who were involved with vaccination schedules (N=72). Purposeful sampling strategy was applied and individual interviews were conducted. All interviews were recorded and transcribed verbatim, and the obtained data were analyzed thematically. According to the results of the study, participants' perceptions on vaccination were generally positive, and a mandatory vaccination schedule was mostly recommended. Adolescents who received mandatory vaccination reported that this scheme was appropriate against several diseases. Further, health care members indicated that vaccination side effects were mainly emotional, and they suggested that public health agencies should disseminate more scientifically-sound information on the benefits and risks of vaccination. The findings of this study may be used as the basis for the formulation of an effective public health policy to adopt a nationally-and internationally-accepted vaccination schedule.

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Dedication

This dissertation is dedicated in loving memory of my late mother, Suria Ismail. Her support, encouragement, and constant love had sustained me throughout my life. From an early age she implanted in me a desire to learn and made tremendous sacrifices so I could attain a high quality education. Without her guidance, devotion, and motivation I would never be where I am today.

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Chapter 1: Introduction to the Study

Introduction

One of the greatest success stories in public health has been the reduction of infectious diseases resulting from the use of vaccines. Routine immunization has eradicated smallpox from the globe and led to the near elimination of wild polio virus. Additionally, vaccines have reduced some preventable infectious diseases and reduced the exposure to the devastating effects of measles, pertussis, and other illnesses. Prior to approval by the Food and Drug Administration (FDA), vaccines are tested extensively by scientists to ensure they are effective and safe. However, no vaccine is 100% safe or effective; there is variability in individual immune responses to a vaccine, such as the rare occasions when people experience clinically significant side effects (Centers for Disease Control and Prevention [CDC], 1997; Chen & Hibbs, 1998; Ellenberg & Chen, 1997).

During the last 10 years, many people have become increasingly concerned about the risks associated with vaccines. Furthermore, because vaccination is such a common and memorable event, any illness following immunization tends to be attributed to the vaccine. While some of these reactions may be caused by the vaccine, many of them may be unrelated events that occur after vaccination by coincidence. Therefore, scientific research that attempts to distinguish true vaccine side effects from unrelated, chance occurrences is crucial (Chen & Hibbs, 1998; Ellenberg & Chen, 1997; CDC, 1997).

To reduce the liability of manufacturers and health care providers, the National Childhood Vaccine Injury Act of 1986 established the National Vaccine Injury Compensation Program. This program reimburses individuals who have been injured by vaccines on a "no-fault" basis. No-fault means that people filing claims are not required to prove negligence on the part of either the health care provider or the manufacturer to receive compensation. The program covers all routinely recommended childhood vaccinations. Settlements are based on the Vaccine Injury Table (Appendix A), which summarizes the adverse events caused by vaccines. This table was developed by a panel of experts who reviewed the medical literature and identified the serious adverse events that are reasonably certain to be caused by vaccines. Examples of table injuries include anaphylaxis (severe allergic reaction), paralytic polio, and encephalopathy (general brain disorder; CDC, 2010; Health Resources and Services Administrations, 2010; National Immunization Program, 1998; Chen et al., 1997).

Although the impact of potential side effects of various vaccinations schedules on individuals' health has already been adequately investigated, there is a lack of studies to qualitatively explore this impact. Because "mandatory" versus "nonmandatory, but recommended" vaccination policies are still under debate in most Western countries, I attempted to fill the aforementioned gap by qualitatively investigating the impact of different vaccination schedules on infants' and children's physio-psychological health. Through identification of the differences in health care system in the United States and

the world, this study provided health care professionals the opportunity to focus on the reasons behind these changes and if the new applied systems lead to any differentiation.

Problem Statement

Scientists have discovered over the years the benefits of vaccines especially to pregnant women and children. The World Health Organization (WHO) considers vaccination as an investment in human capital (WHO, 2001). If an unvaccinated woman is exposed to a disease such as influenza during her pregnancy, or if an unvaccinated child develops influenza in his or her first year of life, they are eight times more likely to develop brain damage from the virus (Garret & March, 2009). This is documented from medical records of Americans born in the late 1950s and early 1960s, which has shown this increased risk as that of children later developing schizophrenia (Garret & March, 2009). Additionally, according to the CDC (2012), vaccines are responsible for the reduction of many infectious diseases that were once common in the United States and around the world, including polio, measles, diphtheria, pertussis (whooping cough), rubella (German measles), smallpox, mumps, tetanus, and Haemophilus influenza type b (Hib).

On the other hand, vaccines may cause both minor and, although rare, serious side effects as well. For example, measles vaccine can lead to thrombocytopenia; DPT (diphtheria, tetanus, and pertussis) is linked to chronic encephalopathy; and tetanus-toxoid-containing vaccines has been shown to be related to Gillian-Barre (a serious disorder that leads to nerve inflammation; CDC, 1996). According to the National

Vaccine Information Center (2012), one in 875 DPT shots contribute to collapse/shock reaction, which equates to 18,000 DPT shots causing American children to experience one of these neurological reactions annually.

Individuals and governments have taken certain actions as a result of the known or suspected adverse effects of vaccines. In France, for instance, hepatitis B vaccine was not recommended outlawed after 15,000 citizens filed a class action suit against the government (O'Shea, 2008). Additionally, only one country in Europe still has mandated DPT shots, whereas the United States requires five separate vaccine doses (O'Shea, 2008). Due to an international controversy over the safety of the DTP immunization, DPT shots were limited in many countries in Europe, especially after 36 children in the UK suffered neurological conditions following DTP immunization in 1970s (Kulenkampff et al., 1974).

Japan, one of the most developed countries in the world, has had a completely voluntary vaccination system since 1994 (Omara, 2010). Vaccines were excluded from the Japanese population due to concern among the Japanese public regarding the adverse effects related to vaccines. However, in 2001 the Japanese preventive vaccination law amended influenza vaccinations for the elderly population (65 years or over), because they are a high risk group. During the first18 months of life, the Japanese child receives an average of 14 doses of vaccines while the U.S. child receives more than 33 doses (Omara, 2012; Doshi & Akabayashi, 2010; O'Shea, 2008). Despite the reduced emphasis on vaccination, Japan ranks as having the third lowest infant mortality rate (probability

per 1,000 that a newborn baby will die before reaching age five) of 2.79 per 1,000 children, compared to 6.22 per 1,000 children in the United States (Appendix B).

It is unclear what factors are responsible for the decreased infant mortality rates in Japan; however, the quality of healthcare provided during pregnancy may be a contributing factor. For example, it is estimated that approximately 80% of hospitals in Japan warn mothers of decreased fetal movement (DFM; Takemura, 2006). Furthermore, several hospitals in Japan have implemented new techniques where mothers are asked to keep track of their baby's movement using a kick chart. Culture can also play a role in lowering the infant mortality rate by emphasizing the importance of breastfeeding and other healthy behaviors during and post pregnancy.

Vaccine acceptability in the community is one of the most significant factors that influence the decision of whether and how to integrate a vaccine into a national health program as well as to adopt a vaccination schedule (Cover at al., 2012; Winkler, 2008). However, according to recent research, vaccine safety issues and acceptability of vaccines are not adequately discussed and investigated, especially in low-/middle-income country studies (Burchett et al. 2012). Also, the impact of various vaccinations schedules on individuals' health has not adequately investigated with the use of a qualitative approach (Burchett et al. 2012). With this study I attempted to fill this gap by qualitatively investigating the impact of different vaccination schedules on infants' and children's physio-psychological health. These schedules mostly concern U.S. and Japanese vaccination systems; however, schedules from other countries were included.

Purpose of the Study

It is crucial to comprehend the dilemma of being vaccinated or not and what are the short-term physio-psychological side effects and long-term consequences of vaccines. Also, it must be investigated if a mandatory vaccination system is effective, since the effectiveness of most vaccines lasts 2-10 years, which means that 30% to 40% of the public has effective vaccines and 70% to 60% are without vaccine protection (Blaylock, 2009). In this study, I aimed at in depth understanding of the beliefs, experiences, and perceptions of adolescents, parents, and health care providers regarding different vaccination schedules. For example, according to the CDC, healthcare providers do not want to get vaccinated for specific diseases such as the flu due to their underestimation of the effectiveness of the vaccines, fear of experiencing side effects, or assumption that there is not a real need to be vaccinated (Sepper, 2013). Even though vaccinations are now required for healthcare workers in many hospitals and they are vaccinated in a coverage rate of 83%, 15% of healthcare providers get vaccinated only because their employer requires it (Sepper, 2013). Additionally, how some beliefs may prevent parents from getting their kids vaccinated (e.g., anthroposophic, cultural, and religious beliefs) was addressed. Anthroposophic beliefs are based on the idea that being naturally exposed to common illnesses makes the immune system stronger (The Children's Hospital of Philadelphia, 2012). On the other hand, religious beliefs can be based on the idea that disease is an "act of God." In other cases, there are some concerns about "putting certain things into one's body" (The Children's Hospital of Philadelphia, 2012). Last but not

least, the study addressed potential parents' discomfort about vaccines and their knowledge of vaccination effectiveness, while each year approximately 24 million infants less than one year of age remain unvaccinated throughout the world. (The Children's Hospital of Philadelphia, 2012).

Research Questions

The research questions of the study are the following:

RQ1: For parents and children from different vaccination backgrounds (not necessarily parents and children from the same family), what themes emerge in their reports regarding their physio-psychological consequences for the received vaccination schedules and about the factors which may affect their decision to be vaccinated or not?

RQ2: For health team members, what themes emerge in their reports about the physio-psychological vaccination consequences for their patients, the character of vaccination schedule (mandatory or nonmandatory but recommended) and the role of public health agencies or other authorities to better educate parents regarding the benefits of vaccination?

Theoretical Framework for the Study

The theoretical framework of this study was the health belief model (HBM) by Hochbaum, Rosenstock, and Kegels, which is a psychological model to explain and predict health behaviors (Rosenstock et al., 1988). The model was developed in response to the failure of a free tuberculosis (TB) health screening program. In brief, this theory was applied in this study by focusing on the attitudes and beliefs of the parents, and

specifically the concern of susceptibility or the parents' assessment of the need in terms of benefit/risk to having their infants/children vaccinated. It also helped to understand the barriers that influence the adoption of promoted behavior and what the benefits and the positive consequences of infant vaccination are. The variables that may influence the theory are the demographic variables, which are age, ethnicity, and occupation, in addition to the socio-psychological variables, such as socioeconomic status and personality. Additionally, health motivation can play a role in influencing the theory as it is the key driver which impacts the parents to ensure their children are vaccinated (Rosenstock et al., 1988). More detail on the HBM and how it was applied in this study is provided in Chapter 2.

Conceptual Framework

As previously mentioned, the main purpose of this study was to investigate the impact of different vaccinations schedules on children's physio-psychological health and parents' attitudes towards the mandatory or voluntary vaccination systems. For this purpose, ethnography grounded this qualitative investigation, because this approach focuses on social interactions, behaviors, and perceptions within a particular group (Reeves et al., 2008). For this study, individual qualitative interviews were conducted to investigate vaccination physio-psychological health consequences, knowledge, attitudes, financial burden, cultural beliefs, and behaviors in order to better elucidate the topic. Several researchers have explored all the aforementioned parameters in other ethnicities and populations living in their native country and upon immigration to the U.S. and they

are discussed in more detail in Chapter 2. The ethnographic approach is additional to theoretical framework of this dissertation, HBM. After obtaining the data, I analyzed and explained potential differences between the participants.

Nature of the Study

The nature of this study was qualitative. Qualitative research is consistent with understanding the complexities and impact of different vaccination schedules. This qualitative study included adolescents and parents, as well as healthcare providers who were involved with vaccination schedules. Adolescents and parents were from different vaccination backgrounds and beliefs regarding vaccination; however, most of them lived in U.S. That means that individuals who recently immigrated (within the past 1 to 5 years) to the US were included in the study sample, because they received/experienced or believe in different vaccination schedules in their home countries (e.g., Japan) as children or parents. Individual qualitative interviews were conducted to investigate vaccination physio-psychological health consequences, knowledge, attitudes, and financial burden (for those who are uninsured or with limited insurance coverage), cultural beliefs, and behaviors in order to contribute to the public dialogue regarding the best possible vaccination schedule. Each sample category (adolescents, parents and health care workers) included at least 12 participants (Gowda et al., 2012) and the principle of saturation was applied to determine the final sample size, which allows stopping new participant recruitment when the last interviews bring no new insight or information Sample size would ideally equally include adolescents and parents who have followed a

mandatory vaccination schedule (such as the US or similar vaccination schedule) as well as adolescents and parents who have followed a more flexible vaccination schedule (such as Japanese or similar vaccination schedule); regarding health care providers, the two sampling categories included health professionals who supported or believed in a mandatory vaccination or flexible vaccination schedule, respectively.

Definitions

Autism: A physical condition linked to abnormal biology and chemistry in the brain. There is extreme controversy on the causes of these abnormalities. Many studies have shown that there are several factors linked to autism, mainly those related to genetic factors (PubMed Health, 2012). Similarly, language abnormalities are more common in relatives of autistic children. Chromosomal abnormalities and other nervous system (neurological) problems are also considered common in families with autism (PubMed Health, 2012). Other factors can be diet, digestive tract changes, mercury poisoning, the body's inability to properly use vitamins and minerals, and vaccine sensitivity (PubMed Health, 2012).

Diphtheria, tetanus, and pertussis (DPT): Diphtheria, tetanus, and pertussis are serious diseases caused by bacteria, spread from person to person (U.S. Department of Health and Human Services, 2007). Diphtheria causes a thick covering in the back of the throat, which can lead to breathing problems, paralysis, heart failure, and even death (U.S. Department of Health and Human Services, 2007).

Health care provider: An individual or an institution that dispense prophylactic, curative, promotional, or rehabilitative health care services in a structured method to individuals, families or communities (WHO, 2003). An individual health care provider may be a health care professional within medicine, nursing or a department of unified health. Health care providers may also be a public/community health professionals.

Mandatory vaccination schedule: State laws that necessitate certain individuals or populations to be vaccinated against various communicable diseases; and State laws mandating vaccinations for children are very common in the US (Hodge & Gostin, 2002; Welborn, 2005). Also, each State has a law demanding children be vaccinated before they are admitted to a public or private school. Early statutes required vaccination against smallpox and were modified as new vaccines were initiated (Hodge & Gostin, 2002; Welborn, 2005). Furthermore, many modern school vaccination requirements are the repercussion of measles outbreaks during the 1960's and 1970's (Hodge & Gostin, 2002; Welborn, 2005). Generally, states use the CDC schedule of immunizations as an example/guide and require children to be vaccinated against a number of diseases, including diphtheria, measles, rubella, and polio (Hodge & Gostin, 2002; Welborn, 2005).

Measles: A virus that causes rash, cough, runny nose, eye irritation, and fever, and it can lead to ear infection, pneumonia, seizures (jerking and staring), brain damage, and death (CDC, 2012).

Mumps: It is a virus that causes fever, headache, muscle pain, loss of appetite, and swollen glands, and it can lead to deafness, meningitis (infection of the brain and spinal cord covering), painful swelling of the testicles or ovaries, and rarely sterility (CDC, 2012).

Pertussis (whooping cough): It is a disease that causes coughing spells so bad that it is hard for infants to eat, drink, or breathe, and these spells can last for weeks (US Department of Health and Human Services, 2007). It can lead to pneumonia, seizures (jerking and staring spells), brain damage, and death (US Department of Health and Human Services, 2007).

Physio-psychology: It is a subdivision of behavioral neuroscience or biological psychology that addresses the neural process of perception and behavior through direct manipulation of the brain (Pinel, 2004). Furthermore, the key focus of physiological psychological research is the development of theories that illustrate brain-behavior relationships rather than the growth of research that has translational importance (Pinel, 2004).

Rubella (German Measles): it is a virus that causes a rash, arthritis (mostly in women), and mild fever. If a woman gets rubella while she is pregnant, she could have a miscarriage or her baby could be born with serious birth defects (CDC, 2012).
Sudden infant death syndrome (SIDS): is the unexpected, sudden death of a child under the age of one year due to unexplainable/unclear cause of death. It usually occurs during

sleep of a supposedly healthy baby and it is also known as crib death (Mayo Clinic, 2011).

Tetanus (Lockjaw): It is a disease that causes painful tightening of the muscles, usually all over the body, and it can lead to "locking" of the jaw such that the patient cannot open his or her mouth or swallow (US Department of Health and Human Services, 2007). Tetanus leads to death in up to two out of 10 cases (US Department of Health and Human Services, 2007).

The herd immunity theory: A theory which was originally conceived in 1933 Hedrich, who had been studying measles patterns in the US between 1900-1931 (years before any vaccine was ever invented for measles; Vaccine Awareness Network, 2012). Hedrich observed that epidemics of the illness only occurred when less than 68% of children had developed a natural immunity to it (Vaccine Awareness Network, 2012). This was supported by the fact that children build their own immunity after suffering with or being exposed to the disease. The herd immunity theory addressed the natural disease process and how it outweighs the benefits of vaccination (Vaccine Awareness Network, 2012).

Vaccine: It is any preparation intended to develop immunity to a disease by revitalizing the production of antibodies. Vaccines include, for example, exclusion of killed or attenuated microorganisms or products or derivatives of microorganisms (WHO, 2009). The most common method of administering vaccines is by injection; however, there are some administered by mouth or nasal spray (WHO, 2009).

Voluntary Vaccination Schedule: Recommended vaccines that are free and personally covered by individuals for elective vaccines (Oshea, 2008). Usually, in societies that have voluntary vaccination, the public has high trust in authority and high surmise for vaccine safety. Voluntary vaccines in several countries can be classified but not limited to Hib, Streptcoccus Pneumoniae, Influenza, Chickenpox, Mumps, Hepatitis A, Hepatitis B, and HPV (Oshea, 2008).

Assumptions

One of the key assumptions of the study was that some individuals believed in the possibility of vaccine contamination with viruses, bacteria, or DNA fragments, which can lead to significant side effects such as brain diseases; however, there is no vital study which supports this possibility (Blaylock, 2009). This assumption is crucial for the study, as new research has shown that possibility of a vaccine being contaminated may be relatively high. For example, SV-40, which was a major contaminant of the polio vaccine until 1963, not only existed as a latent virus for the lifetime of those exposed to the vaccine but was being passed on to the next generation, primarily by way of sperm, something called vertical transmission (Blaylock, 2009). There is also compelling evidence that some polio vaccines manufactured after 1963 may contain SV-40 virus (Engels, 2005). This virus has a link to several cancers like mesothelioma, medulloblastoma, ependymoma, meningioma, astrocytoma, oligodendroglioma, pituitary adenoma, glioblastoma, osteosarcomas, non-Hodgkins lymphoma, papillary thyroid carcinomas, and anaplastic thyroid carcinomas (Engels, 2005).

Another assumption was that that the dosage and formulation are not considered to be related to the outcome among all countries. For example, in the US, by the age of 2 months, infants are administered eight vaccines like Hepatitis B (three doses from birth till age of 2), Rotavirus RV (RV-1 with 2 dose series and RV-5 with 3 dose series), DTaP, Haemophilus Influenzae type b (Hib), Pneumococcal Conjugate (PCV13), and inactivated Poliovirus IPV (CDC, 2013). While in the UK, only 5 vaccines are administered by the age of two months, like DTap, IPV, Hib, PCV, and Hep B (Surveillance Community Network for Vaccines Preventable Infectious Diseases, 2011). Additionally, there was an assumption that some persons believe that some issues may arise from vaccination, probably due to inappropriate vaccine manufacture. Typically, safeguards in place within the manufacturing process allow these issues to be detected before anyone ever receives the vaccine, but once in a while the vaccine gets distributed without knowledge of a problem (The Children's Hospital of Philadelphia, 2012). Vaccines that are too dilute, too concentrated, or otherwise not prepared appropriately is one example. In one of history's most horrible vaccine disasters, known as the Cutter Incident, 70,000 people in the U.S. got polio, 200 people were paralyzed, and 10 were killed because the vaccine virus was not properly killed (The Children's Hospital of Philadelphia, 2012). This event occurred in 1955, when the polio vaccine program was new and led to added regulation and oversight of the vaccine industry in the U.S. Contaminated preparations can also be of concern. Earlier in 2009, health officials in the U.K. had to withdraw doses of meningitis C vaccine typically given to all 4-month-olds

because of contamination with another type of bacteria. Fortunately, no one was reported to have suffered adverse events from this error (The Children's Hospital of Philadelphia, 2012).

Limitations

A key limitation to the study is related to the analysis of data by culture and language as I am comparing other countries' (e.g., Japan) vaccination systems with the American system. Also, overcoming foreign health regulations and lack of available data in Europe and the world, makes it difficult to obtain up to date vaccination schedules, and it can create a challenge in the long run. The main measure of this possible limitation is the limited studies conducted by American researchers in these countries (Blaylock, 2009).

Qualitative research is considered by some researchers with a positivist background as less precise and this may introduce errors in the data obtained. Because all people are subject to natural human error, misinterpretation of the data can occur to mean different information than what is represented by my study's results (Kung, 2013). Additionally, research bias could happen when either the participants or the researchers inaugurate personal opinions into the discussion, while qualitative research is known as more susceptible to human bias (Kung, 2013). For example, I might interfere with the data of an interview through asking probing questions or leading discussions to a certain direction. Some of the chosen parents may already have a preconception of the vaccines,

and having a couple of extremely biased parents/people may significantly influence the data set (Kung, 2013).

In general, qualitative research is by nature highly sensitive to the opinions of participants. Also, self-reported data may contain several potential sources of bias that should be considered as limitations for several reasons: high possibility of selective memory, like remembering or not remembering experiences or events that occurred at some point in the past; telescoping and recalling events that occurred at one time as if they occurred at another time; and exaggeration, like representing outcomes or embellishing events as more remarkable than is actually advocated from other data (USC, 2013).

The Scope of the Study

The main scope of the study was to address the variation of vaccination schedules worldwide and how the United States' schedule is different from the rest of the world. Also, this study addressed any correlation (directly or indirectly) of vaccines to several diseases. Hence, through identification of the differences in health care system in the US and the world, the study provided health care professionals the opportunity to focus on the reasons behind these changes and if the new applied systems lead to any differentiation. The disparity of the groups included in the study (groups who believe in the US vaccination schedule or similar and groups who do not support this kind of vaccination schedule) possibly contributed to validate the importance of modifying the health system and to assist parents taking the most appropriate decision on whether to

vaccinate or not. Also, the population of some major countries which have communication barriers/difficulties such as language barriers were excluded.

Significance of the Study

The present study may contribute in a unique way to fill the gap identified in the problem statement, by investigating qualitatively individual physical and psychological experiences, perceptions and needs regarding the impact of different vaccination schedules. The findings of this study provided information and insights which could significantly contribute to the public dialogue about the vaccination policy which each nation should develop. Parents', children's and health team's experiences from different vaccination backgrounds can be considered as a great force for social change by promoting the most appropriate vaccination solutions for both the public and the government.

Summary

Although the impact of various vaccinations schedules on individuals' health have already been adequately investigated, there is a lack of studies which attempt to qualitatively explore this impact. Much remains to be uncovered about vaccines, particularly whether vaccines should be voluntary or mandatory. This study filled the aforementioned gap, by qualitatively investigating the impact of different vaccination schedules on infants' and children's physio-psychological health. In this chapter, a brief examination of the current state of knowledge on different vaccination schedules was provided. The characteristics of how vaccines have reduced some preventable infectious

diseases and reduced the exposure to the devastating effects of measles, pertussis, and other illnesses were addressed. Additionally, the basic dynamic effects of vaccines and their side effects and duration were introduced. The programs that were established to reimburse individuals who have been injured by vaccines were briefly explained, and the Vaccine Injury Table that summarizes the adverse events caused by vaccines was presented. Definitions for uncommon terms have been provided in this introductory chapter, as well as the hypotheses, the purpose, the theoretical and conceptual framework (HBM and ethnography, respectively), the assumptions and the limitations of the study. Finally, a brief discussion of the positive social change that could result from a qualitative investigation regarding mandatory vs. voluntary vaccination schedule was offered. Further explanation and clarification will be found in subsequent chapters. To further understand the extent of my current understanding on different vaccination schedules and their consequences, a thorough review of the literature follows in Chapter 2.

Chapter 2: Literature Review

Introduction

As mentioned in Chapter 1, it is crucial to comprehend the dilemma of being vaccinated or not and which are the short-term physio-psychological side effects and long-term consequences of vaccines. Also, it must be investigated if a mandatory vaccination system is effective, because most of the vaccines effectiveness last only 2-10 years only, which means that 30 to 40% of the public has effective vaccines, and 70% to 60% are without vaccine protection (Blaylock, 2009).Vaccine acceptability in the community is one of the most significant factors which influence the decision of whether and how to integrate a vaccine into a national health program as well as to adopt a vaccination schedule (Cover at al., 2012; Winkler, 2008). However, according to recent research, vaccine safety issues and acceptability of vaccines are not adequately discussed and investigated, especially in low-/middle-income country studies (Burchett et al. 2012). The aim of the study was to in depth understand the beliefs, experiences and perceptions of adolescents, parents as well as health care providers, as far as different vaccination schedules are concerned.

In this chapter, the benefits of vaccination as well as its potential side-effects are discussed. Also, different vaccination schedules are described (e.g., United States' vs. Japan's) and their advantages and disadvantages. Further, individual, cultural, or other factors which affect parents' decision to vaccinate their children are presented through the lens of the HBM and ethnography.

Research Strategy

For reviewing the literature on vaccination schedules and their positive/negative impact, the following resources were used: Cochrane Library, MEDLINE (PubMed), Scopus, academic textbooks, Google Scholar, newspaper articles, and relative websites, such as WHO and CDC websites. The following keywords were used alone and in combination: *vaccination, vaccines, vaccination schedule, side-effects, mandatory vaccination, voluntary vaccination, qualitative study, infant mortality rate, vaccination statistics, decision making, health belief model, and ethnography*. Only relatively recently published in English articles were reviewed. The list of references in each document was useful for pursuing additional resources. The main obstacle faced during my search was identifying the exact differences of vaccines around the world in order to compare it to the United States' vaccination schedule. Surprisingly, this was solved through medical groups located in social media like Facebook and Twitter, which describe vaccination schedules of several countries around the globe.

Main Advantages and Disadvantages of Vaccination

Each year approximately 2.1 million people around the world die from vaccine-preventable diseases and most of these deaths are correlated to a dearth of immunization (WHO, 2009). People may not receive the needed vaccines due to availability, personal beliefs, vaccine safety apprehensiveness, or other personal/external factors (WHO, 2009). Some vaccines are not available in all countries despite WHO recommendations for the availability of specific vaccines for the world's population (e.g., tuberculosis, polio,

diphtheria, tetanus, pertussis, hepatitis B and measles; WHO, 2009). In the developing world, limited resources and accessibility play a significant role in how and when vaccines are offered (WHO, 2009). Consequently, these limitations as well as worldwide travel make the control of some diseases difficult.

Each year approximately 24 million infants less than 1 year of age remain unvaccinated throughout the world (WHO, 2009). Economic limitations, the methodology of dose administration, as well as the kind of a particular vaccine provided determine which vaccines are provided. For example, despite the fact that lesser side effects arise from the acellular pertussis vaccine, many countries still use the whole cell version due to its efficiency (WHO, 2009).

Newer, technologically advanced (and hence more expensive) vaccines may not be offered at all or for several years. One example is the HPV vaccine, which counteracts cervical cancer, and costs about $125US per dose (three doses needed) (WHO, UNICEF, World Bank, 2009). Cervical cancer is considered a public health issue, because it is the second most common cancer among women worldwide and 80% of the deaths caused by cervical cancer occur in the developing world (Polio Global Eradication Initiative, 2012). Several programs have been established to promote and provide vaccines to all at-risk populations. The Global Alliance for Vaccines and Immunization (GAVI) has been conducive to these efforts, contributing more than $1 billion to sustain and support immunizations in the poorest countries (Polio Global Eradication Initiative, 2012). Furthermore, partners including the WHO, Rotary International, CDC, and UNICEF have

bestowed programming, expertise and subsidizing in an effort to eliminate polio (Polio Global Eradication Initiative, 2012). Measles initiatives have accomplished significant progress in diminishing disease and death initiated by measles since their commencement in 2001. The main partners in this initiative include the American Red Cross, CDC, UNICEF, United Nations Foundation, and the WHO (Measles and Rubella Initiative, 2012).

On the other hand, during the last years, distrust of authorities has led to a decreased use of some vaccines, because many people believe that vaccines are prone to cause negative consequences rather than to help (Miller & Goldman, 2011). The recommended childhood vaccination schedule has been modified significantly over the years, with children now receiving 26 vaccines, including multiple combination vaccines, before the age of 6 (Miller & Goldman, 2011). In many cases, doctors and nurses administer half a dozen or more vaccines all at once during a single visit to make sure children get all these shots and to save time. But according to data obtained from the government's Vaccine Adverse Events Reporting System (VAERS), approximately 145,000 children or more have died throughout the past 20 years as a result of this multiple vaccine dose approach (Miller & Goldman, 2011).

In a study published in the journal *Human & Experimental Toxicology*, Miller and Goldman (2011) evaluated the overall number of hospitalizations and deaths correlated to vaccines administered between 1990 and 2010 and compared these data to the number of vaccines administered at one time to individual children. Hospitalizations and deaths

resulting from one vaccine dose were compared to those of two vaccine doses, and the same all the way up to eight vaccine doses (Miller & Goldman, 2011). Miller and Goldman also evaluated overall hospitalization and death rates derived from getting one to four combined vaccine doses, five to eight combined vaccine doses, and one to eight combined vaccine doses. According to the results of their analysis, the researchers found that the more vaccines a child receives during a single doctor visit, the more likely he or she is to undergo a severe reaction or even die (Miller & Goldman, 2011). Further, according to Heidi Stevenson from Gaia Health, for each additional vaccine a child receives his or her chance of death seems to be increased, and with each additional vaccine dose, chances of having to be hospitalized for severe complications increase two-fold (Benson, 2013). In summary, the overall size of the vaccine load was found to be directly associated with hospitalization and death risk, demonstrating potential dangers of administering multiple vaccines at the same time (Benson, 2013).

In this study from *Human and Experimental Toxicology*, analysis was made on more than 38,000 reports of infant hospitalizations and deaths following vaccinations (Miller & Goldman, 2011). Based on the study, infants who received two vaccines simultaneously were significantly less likely to be hospitalized than infants who received three or more vaccines at the same time (Miller & Goldman, 2011). Further, infants who received three vaccines simultaneously were significantly less likely to be hospitalized than infants who received four or more vaccines at the same time (Miller & Goldman, 2011). Babies who received 6, 7, or 8 vaccines during a single pediatric well-baby visit

were the most likely to be hospitalized as a result of their injections. In fact, the hospitalization rate increased dramatically from 11.0% for infants receiving 2 vaccine doses to 23.5% for infants receiving 8 vaccine doses (Miller & Goldman, 2011). Goldman and Miller (2011) also discovered that younger infants were significantly more likely to be hospitalized after receiving vaccinations than older infants. In addition, infants who received 5-8 vaccines simultaneously were significantly more likely to die following their shots than infants who received 1-4 vaccines simultaneously (Miller & Goldman, 2011).

Several factors could contribute to whether an infant will have an adverse reaction to vaccines, including genetic predisposition, illness (which may be a contraindication to vaccine administration), quality of vaccines (which can vary by manufacturing methods), and sensitivity to one or more vaccine components (Miller & Goldman, 2011). Some infants might be more likely to experience an adverse reaction due to biochemical or synergistic toxicity associated with concurrent administration of multiple vaccines (Miller & Goldman, 2011)

Review of Vaccination Schedules

In 1990, American infants received a total of 24 vaccine doses prior to their first year of life. By 2007, the CDC recommended the following vaccine doses for children under one: three DTaP, three polio, four Hib, three hepatitis B, three pneumococcal, three rotavirus, MMR, Varicella, Hepatitis A, and two influenza vaccines (CDC, 2012). While each childhood vaccine has individually undergone clinical trials to measure safety,

studies have not been conducted to examine the safety (or efficacy) of combining vaccines during a single physician visit as recommended by the CDC's guidelines (Miller & Goldman, 2011). For example, 2-, 4-, and 6-month-old infants are expected to receive vaccines for polio, hepatitis B, diphtheria, tetanus, pertussis, rotavirus, Haemophilus influenzae type B, and pneumococcal, all during a single well-baby visit, even though this combination of eight vaccines was never tested in clinical trials (Miller & Goldman, 2011). On the other hand, some countries have a nonmandatory but recommended vaccination schedule, as in Japan (Appendix C), where the infants at age 2, 4, and 6 months are expected to receive DPT-IPV, BCG, and PCV only (Hep B is expected to be administered at any age) (Fukuyama, 2012). Additionally, in the UK, although vaccines are mandatory, only 5 vaccines are recommended to be given between the age 2-12 months (Dtap, IPV, and Hib are given as combined vaccine), and Hib and Meningitis C are given in combination as well (Surveillance Community Network for Vaccine Preventable Infectious Disease, 2010a). However, Hep B vaccination is recommended for selected high risk groups only. Furthermore, varicella vaccine is not currently recommended for routine use in children. However, it is recommended for healthy susceptible contacts of immunocompromised patients where continuing close contact is unavoidable (e.g., siblings of a leukaemic child, or a child whose parent is undergoing chemotherapy), while in the United States varicella is mandated for infants (aged 12-15 months) and children (4-6 years); Surveillance Community Network for Vaccine Preventable Infectious Disease, 2011b. Additionally, based on the French vaccination

schedule, four vaccines are administered for infants aged 2-6 months, including DT, ap, IPV, and Hib (Surveillance Community Network for Vaccine Preventable Infectious Disease, 2010b). A three-dose primary course of Hep B is recommended at 11-13 years only if not previously vaccinated. Additionally, BCG vaccination is highly recommended at birth or within the first month of life for children at-risk of tuberculosis. Vaccination can be performed until 15 years of age. BCG vaccination was previously mandatory until July 2007 (Surveillance Community Network for Vaccine Preventable Infectious Disease, 2010b). Finally, based on the German vaccination schedule, only 5 vaccines are administered in children aged 2-6 months old: DTap, Hib, IPV, Hep B, and PCV (Surveillance Community Network for Vaccine Preventable Infectious Disease, 2010c). Also, Hep B is given at least 4 weeks apart with a required minimum of 6 months between the final, 11-14 months dose, and it is also recommended for newborns of HbsAg positive mothers or to mothers with unknown HbsAg status (Surveillance Community Network for Vaccine Preventable Infectious Disease, 2010c).

Some countries have less Infants Mortality Rate (IMR) than half of the US rate: Singapore, Sweden, and Japan are below 2.80 (Anderson et al. 2005). According to the CDC, US' relative position compared to other countries with lower infant mortality rates seems to be worsening (MacDorman & Mathews, 2008). There are many factors that affect the IMR of a country (Kent, 2009). For example, premature births in the United States have surged by more than 20% between 1990 and 2006. Preterm babies have a higher risk of complications that could lead to death within the first year of life

(Kent, 2009). However, this does not fully explain why the United States has seen little improvement in its IMR since 2000 (Xu et al., 2007).

The United States appear to have one of the most aggressive mandated vaccine schedules in the world (Philips, 2001). The vaccine schedule has been expanded since 1990 (25 additional vaccines); however, the adoption rate of other countries are far lower for current vaccines (Varicella, Rotavirus, Hep A & B, Flu) than they have been for the main vaccines used to fight fatal disease, as shown in Table 3 (DTP, MMR, Polio) (Philips, 2001). Recommended Immunization Schedule published annually by the CDC suggests many of the vaccines are administered multiple times (Philips, 2001). Every year, between 12,000 and 14,000 reports of adverse vaccine reactions are reported at the FDA, and these include hospitalizations, permanent brain damage, and death, not to mention the FDA reported that this figure may represent just 10% of the true AEs (Philips, 2001). In just 7 years (thru August 31, 1997), the U.S. government devoted more than $802 million counteracting and compensating parents for any brain injuries and deaths inflicted on their children by mandated vaccines (Philips, 2001).

Despite the fact that United States spend more per capita on health care than any other country, in the under 5 mortality evaluation of country-specific child mortality rates before the age of 5, the United States is ranked 34th in the world in 2009, joined with Greece, and behind such diverse countries as France, Germany, Japan, Singapore, Cuba, and Slovenia (Generation Rescue, 2009). Additionally, based on a study addressed by the

United Nations, there were 29 other countries which have lower/better under 5 mortality rates than the U.S. as shown in Table 2 (Generation Rescue, 2009).

Vaccines have shown to minimize the exposure to several life threatening diseases and the demand for these vaccines is accelerating since it is widely accepted that the benefits outweigh the side effects (Thompson et al., 2007). On the other hand, vaccine manufacturers have paid out nearly $2 billion in damages to parents in America whose children were harmed by one of the childhood vaccination such as the MMR or DPT (Thompson et al., 2007).

Furthermore, there is a reclassification of sudden infant death syndrome (SIDS) deaths to suffocation in bed and unknown causes (Miller & Goldman, 2011). The post neonatal SIDS rate seems to have declined from 61.6 deaths (per 100,000 live births) in 1999 to 50.9 in 2001 (Miller & Goldman, 2011). However, during this period there was a remarkable escalating in post-neonatal deaths assigned to suffocation in bed due to unknown causes (Miller & Goldman, 2001). When these sudden unexpected infant deaths (SUIDs) are unified with SIDS deaths, the total SIDS rate remains relatively stable, resulting in a nonsignificant decline as shown in Figure 1 (Miller & Goldman, 2001). Based on the CDC's Vaccine Datalink, it was concluded that children who are given three thimerosal-containing vaccines are estimated 27 times more likely to develop autism than children who receive thimerosol-free vaccines (Sifferlin, 2012). Thimerosal has been gradually removed from vaccines since 1999; however, it is still considered as a main component of some vaccinations, including virtually all flu shots (Sifferlin, 2012).

Medical experts discussed the results from a study that showed urinary mercury concentrations were six times higher in children with autism, as opposed to normal-age/vaccine matched controls (Sifferlin, 2012). However, in three papers published in the *Journal of Pediatrics*, a group of experts, including a former member of the American Academy of Pediatrics (AAP) board of directors, said there is so far a lack of evidence that thimerosal causes these problems, and that the benefits of keeping thimerosal in vaccines to maintain their quality outweigh any potential health problems associated with exposure to small amount of mercury (Sifferlin, 2012).

In the new statement, the AAP experts argued thimerosal should not be banned, noting that preserving vaccines is dangerous for developing countries, due to potential chemical and inexpensive methods to preserve vaccines (Sifferlin, 2012). More specifically, many vaccines are shipped in vials that contain more than one dose, to save on packaging costs for pediatricians and medical centers. While these can be used to vaccinate more than one child at a time, multidose containers are also more vulnerable to contamination, which is why they are often treated with thimerosal as a preservative (Sifferlin, 2012). In the U.S. and Europe, thimerosal has not been used for over 10 years because of single-dose vials, which are more exorbitant to manufacture and disposed after they are opened and they can be stored in refrigerators until they are needed (Sifferlin, 2012). Dr. Walter Orenstein of the Emory Vaccine Center at Emory University explained that without thimerosal, diseases like whooping cough could reappear in developing countries (Sifferlin, 2012). Additionally, vaccines have been implicated as a

possible cause of illness in Gulf War veterans. Recent study by Hotopf et al., (2005) hypothesized symptoms addressed by veterans may be due to a shift in their T cell cytokine profiles from Th1 to Th2 (Hotopf et al., 2000). They suggested that such a shift could be related to the regimen of vaccinations given to veterans and that this could contribute to symptoms similar to those of chronic fatigue syndrome (Hotopf et al., 2000).

GlaxoSmithKline (GSK) vaccine Pandemrix, which was widely administered throughout Europe during the 2009-2010 H1N1 influenza "pandemic," was accountable for causing serious and permanent side effects in some of the children who received it. At least 800 children, it turns out, many of whom live in Sweden, now have narcolepsy because of the vaccine, and some government officials are demanding answers. A study published in the journal Public Library of Science ONE discovered (Partinen et al., 2012) that cases of narcolepsy, an incurable sleeping disorder that can cause hallucinations, nightmares, and even paralysis, skyrocketed by about 1,700 percent in children and teenagers under the age of 17 following the widespread administration of Pandemrix (CBS, 2011). Following the initial release of reports connecting Pandemrix to narcolepsy, the European Medicines Agency (EMA)prevented the vaccine from being further administered to individuals under the age of 20 (CBS, 2011).

Additionally, Miller and Goldmann (2011) investigated the higher IMR observed in the US compared to some other countries as shown in figure 2. They indicated that IMR is one of the crucial measures of the socio-economic well-being and public health

conditions of a country. The US childhood immunization schedule particularize 26 vaccine doses for infants aged less than 1 year, yet 33 nations have lower IMRs as shown in table 2 (Miller & Goldman, 2011). Some countries have IMRs that are less than half the US rate like Singapore, Sweden, and Japan, which are below 2.80 (MacDorman & Mathews, 2009). The study applied linear regression, where the immunization schedules of 34 nations were examined and a correlation coefficient of $r = 0.70$ ($p < 0.0001$) was found between IMR and the number of vaccine doses routinely given to infants as shown in figure 2 (Miller & Goldman, 2011). The nations in this study were also grouped into five different vaccine dose ranges: 12–14, 15–17, 18–20, 21–23, and 24–26. The mean IMR of all nations within each group were then deliberated. Linear regression analysis of unweighted mean IMRs spotted a high statistically remarkable interconnection between expanding number of vaccine doses and escalating infant mortality rates, with $r = 0.992$ ($p = 0.0009$) as shown in figure 3 (Kent, 2009; MacDorman & Mathews, 2009; Miller & Goldman, 2011). Using the Tukey-Kramer test, statistically significant differences in mean IMRs were found between nations giving 12–14 vaccine doses and those giving 21–23, and 24–26 doses (Kent, 2009; MacDorman & Mathews, 2009; Miller & Goldman, 2011). It was also revealed that Preterm birth rates in the United States have steadily increased since the early 1980s and this has been attributed to a greater reliance on caesarian deliveries, induced labor, and more births to older mothers (Kent, 2009; MacDorman & Mathews, 2009; Miller & Goldman, 2011). Preterm babies are more likely than full-term babies to die within the first year of life and about 12.4% of US

births are preterm (Kent, 2009; MacDorman & Mathews, 2009; Miller & Goldman, 2011). In Europe, the prevalence rate of premature birth ranges from 5.5% in Ireland to 11.4% in Austria. Preventing preterm births is essential to have lower infant mortality rates (Kent, 2009; MacDorman & Mathews, 2009; Miller & Goldman, 2011). However, it is important to note that some nations such as Ireland and Greece, which have very low preterm birth rates (5.5% and 6%, respectively) compared to the United States, demand their infants to receive a relatively high number of vaccine doses (23) and have correspondingly high IMRs. Therefore, minimizing preterm birth rates is only part of the solution to reduce IMRs (Kent, 2009; MacDorman & Mathews, 2009; Miller & Goldman, 2011).

Theoretical Foundation

The Health Belief Model (HBM) is a psychological model that endeavors to explain and predict health behaviors, and this can be achieved by emphasizing on the attitudes and beliefs of individuals (Alyaemeni, 2012). The HBM was first developed and initiated in the 1950s by social psychologists Hochbaum, Rosenstock and Kegels working in the U.S. Public Health Services (Alyaemeni, 2012). The model was developed in response to the failure of a free tuberculosis (Tb) health screening program. Since then, the HBM has been adapted to explore a variety of long- and short-term health behaviors (Alyaemeni, 2012). Usually, HBM has four dimensions perceived, which are Susceptibility, Severity, Benefits and Costs (Alyaemeni, 2012; Harrison, 1990). These concepts could demonstrate people's willingness to act, and an additional concept, cues to

action, would activate the willingness and stimulate clear behavior. Also, self-efficacy, was recently added to the model, which is one's confidence in the ability to successfully perform an action (Alyaemeni, 2012). The major hypothesis of this model is that if the outcome expectation is desirable, a person will more likely be motivated to change their behavior (Alyaemeni, 2012). The HBM has been applied to an extensive scope of health behaviors and subject populations. Three broad areas can be identified: 1) Preventive health behaviors, which include health- promoting (e.g., diet, exercise) and health-risk (e.g., smoking) behaviors as well as vaccination and contraceptive practices. 2) Sick part behaviors, which designate to compliance with endorsement of medical regimens, usually following professional diagnosis of illness. 3) Clinic attendance, which includes physician visits for different reasons (Alyaemeni, 2012). This theory is applied to the present study by the fact that parents will take a health-related action by getting their children vaccinated or not, depending on how parents feel regarding the physo-psychological consequences or side effects of vaccination. Also, the theory is related to parents who have positive expectations that by taking a recommended action, they will avoid a negative health condition of post-vaccination side effect or life threatening outcome, and believe that they can successfully take a recommended health action by getting their children vaccinated voluntarily with confidence (Alyaemeni, 2012).

Conceptual Framework

The main purpose of this study is to qualitatively analyze the impact of different vaccination schedules on children's physio-psychological health and parents' attitudes

towards the mandatory or voluntary vaccination systems. Ethnographic approach will be applied through focusing on social interaction and behavior within the focus group in order to better explore the cultural phenomena (Reeves et al., 2008). Public insights about vaccination include varied and deep-seated beliefs, being an outcome of divergent cultural viewpoints and value systems (The College of Physician of Philadelphia, 2012a). Several vital cultural perspectives on vaccination derive from perceived individual rights and public health attitudes, various religious beliefs, and suspicion and doubts about vaccines among different U.S. and global cultures and communities (The College of Physician of Philadelphia, 2012a). In addition, individualism is a strong principle of U.S. citizens' ideals and ethics; therefore, individuals tend to exercise and express their rights to protect themselves and/or their children if they do not accept or believe in the existing medical evidence about the relative safety of vaccines, or if their ideological beliefs do not encourage vaccination (Blum, 2006; Salmon & Omar, 2006). Furthermore, certain religions and belief systems advocate alternative perspectives toward vaccination. Religious objections to vaccines are generally based on the ethical dilemmas correlated with using human tissue cells to produce vaccines, and beliefs that the body is blessed, thus, it should not receive certain chemicals or blood or tissues from animals, and should be treated and healed by God or natural means (The College of Physician of Philadelphia, 2012a). For example, the Catholic Church identifies the value of vaccines and the importance of protecting individual and community health. It asserts, however, that its members should search for alternatives to vaccines that are made using cell lines derived

from aborted fetuses (National Catholic Bioethics Quarterly, 2006). Christian Scientists rely generally on prayer for healing other than unnecessary medical interventions, like vaccines (Christian Science, 2010)

Most U.S. states, with the exception of West Virginia and Mississippi, permit individuals to request for religious exemptions to mandatory vaccines based on their religious beliefs and objections (CDC, 2010), and religious vaccine exemptions have accelerated in recent years (LeBlanc, 2007). Although adults and children who request vaccination exemptions are a small part of the overall population, they are often the center of controversy and media attention (Aspinwall, 1997). Last but not least, religious objections by Muslim fundamentalists have driven suspicions about the polio vaccine in several counties, where Polio is still epidemic like Pakistan, Afghanistan, and Nigeria due to the belief that Polio vaccination aim to sterilize Muslim population and attempt to avert God's will (Warraich, 2009).

Physio-Psychological impact of vaccination.

According to the recent systematic review of Burchett et al. (2012), few studies have systematically investigated the relative importance of different types of evidence in decision-making regarding vaccination, thus further research may be very useful in vaccination field. In addition, vaccine acceptability in the community is still an issue which requires further investigation, especially as far as middle/low income individuals are concerned (Burchett et al, 2012; Cover at al., 2012; Winkler et al., 2008).

Further, a minority of studies discussed issues about the predicted impact of vaccination, "either in general or specifically affecting health or non-health outcomes" (Burchett, at al., 2012, p.68). The lack of reporting of predicted impact may be partly attributed to the non-explicit assessment of such issues, since it could be determined through consideration of several factors, such as disease burden and costs as well as the vaccine's effectiveness. Studies have already explored the influence of these separate factors, rather than the actual potential impact of vaccination (Burchett at al. 2012).

Many researchers have reported different linkage between vaccines and diseases, like the study conducted in the U.K. in 1998, when a report by Andrew Wakefield suggested that the MMR vaccine caused diseases like autism (The Children's Hospital of Philadelphia, 2012a). One of the main disadvantages of this study is the lack of sufficient data to support this claim, especially since several subsequent studies have shown this not to be the case (The Children's Hospital of Philadelphia, 2012a). For example, the determination of whether MMR causes autism is should be made by studying the incidence of autism in both vaccinated and unvaccinated children, but this was not done in this report (American Academy of Pediatrics, 2013). Further, the authors supported that autism was a consequence of gastrointestinal inflammation, but gastrointestinal symptoms were observed after, not before, symptoms of autism in all cases. (American Academy of Pediatrics, 2013). However, this study had led some people to still believe that the first report was correct and has led to a decreased acceptance and use of the MMR vaccine (The Children's Hospital of Philadelphia, 2012a).

More recently, internal political issues and suspicion of westerners in specific, and medicine in general, led people in northern Nigeria to reject the polio vaccine because they believed that anti-fertility drugs and HIV viruses were present in the vaccine (The Children's Hospital of Philadelphia, 2012b). The vaccines were tested in several laboratories and harmful substances were not discovered (The Children's Hospital of Philadelphia, 2012b). Some Nigerians have also rejected the pertussis vaccine due to their belief that vaccines may contribute to the disease.

Further, a study conducted in Slovakia and published in the Journal Food and Chemical Toxicology (1993) showed that the flu vaccines may cause infertility because they contain polysorbate 80 as a stabilizer (Mercola, 2010). Furthermore, it was found that when newborn females rats were injected with the substance within a week of birth, they developed damage to the vagina and uterine lining, hormonal changes, ovarian deformities and infertility (Mercola, 2010). One of the disadvantages of this study is the absence of accurate data to support this conclusion, especially since the concentrate of polysorbate 80 (known as Tween 80) in the vaccine is very small. Each dose contains 50 micrograms (a microgram is one-millionth of a gram and a gram is the weight of one-fifth of a teaspoon of water) (The Children's Hospital of Philadelphia, 2012a).To put this in perspective, polysorbate 80 has been used for many years as an emulsifier to make ice cream smooth and to slow melting. A typical serving of ice cream (1/2 cup) may contain about 170,000 micrograms of polysorbate 80. Therefore, there is no reason to believe that

the polysorbate 80 will cause infertility, particularly in the quantities used in vaccines (The Children's Hospital of Philadelphia, 2012a).

In addition, a study from Denmark (Huynh, 2008; Piyasirisilp & Hemachudha, 2002) concluded that for 1 of every 50,000 - 75,000 pertussis vaccine doses, encephalomyelitis may occur (which is a swelling of the brain and spinal cord); however, these findings were not reproduced in the U.S. and Japan where rates were found to be about 1 for every 500,000 doses (Huynh, 2008; The Children's Hospital of Philadelphia, 2012a). Because of the high rate of adverse events and the low level of disease, many countries do not commonly recommend this vaccine. When the pertussis vaccine was first made, it contained all of the pertussis bacterial proteins (Children's Hospital of Philadelphia, 2012a). This first version of the vaccine is referred to as the whole-cell pertussis vaccine, resulting in fever and redness, swelling and pain at the injection site in about 1 of every 2 patients who receive it. High fever (105°F) and uncontrollable crying are also common, occurring in about 1 to 4 of every 100 persons (The Children's Hospital of Philadelphia, 2012a). A newer version of the vaccine, called the acellular pertussis vaccine, contains fewer pertussis proteins and causes fewer reactions. While some countries, including the U.S., use the acellular version, many countries still use the more economical whole-cell version (The Children's Hospital of Philadelphia, 2012a). The whole-cell pertussis vaccine was suggested as a cause of brain injury (Marshall, 2010) including epilepsy and mental retardation; however, multiple studies have found that while there are more cases of fever-induced seizures, there are not permanent brain

injuries (Marshall, 2010). The vaccine has also been questioned with regard to infantile spasms and SIDS. Neither was found to be causally related to the whole-cell pertussis vaccine (The Children's Hospital of Philadelphia, 2012a).

Additionally, for most people who are infected with Japanese Encephalitis, (JE) it is not known how they have it (Tsai, 1990); however, symptomatic disease is characterized by high fever, change in mental state, abdominal pain, diarrhea, headache and eventual disturbances in speech, gait, or other motor dysfunction (Tsai, 1990 ;The Children's Hospital of Philadelphia, 2012). The disease is spread by mosquitoes and is more common in some regions of Asia, such as Japan, Korea and China. The most commonly used JE vaccine is made in mouse brain cells and then chemically treated, so that it cannot cause infection (Tsai, 1990). The vaccine is reactive in that 1 of every 5 people who get the vaccine experience tenderness, redness or swelling at the injection site and about 1 of 10 have headache, low-grade fever, pain, weakness, abdominal pain or diarrhea (Tsai, 1990). Sometimes, the vaccine also causes more severe allergic reactions, such as rash and swelling of the extremities, face or throat and can lead to respiratory distress. This can occur in about 2 to 6 people per 1,000 who receive the vaccine (Tsai, 1990). Furthermore, there was a theory gained significant attention in 1999 with the publication of a book by Edward Hooper, titled "The River: A Journey Back to the Source of HIV and AIDS" which suggested that polio vaccine trials in Africa specifically during the 1950s introduced the HIV virus to this population. However, subsequent testing found that this was not the case (The Children's Hospital of Philadelphia, 2012a).

In one of history's most significant vaccine disasters, known as the Cutter Incident, 70,000 people in the U.S. got polio, 200 people were paralyzed, and 10 were killed because the vaccine virus was not properly killed (The Children's Hospital of Phildelphia, 2012a). This event occurred in 1955, when the polio vaccine program was new and led to added regulation and oversight of the vaccine industry in the U.S. Contaminated preparations of vaccines may be of concern in some occasions (The Children's Hospital of Philadelphia, 2012a). In 2009, health officials in the U.K. had to withdraw doses of meningitis C vaccine typically given to all 4-month-olds because of contamination with another type of bacteria. Fortunately, no one was reported to have suffered adverse events from this error (The Children's Hospital of Philadelphia, 2012a). Several studies have accused several vaccines to specific diseases like SIDS, multiple sclerosis, diabetes, neurological delays and arthritis (Mercola, 2013). However, none of the studies designed to determine causality have found vaccines to be a cause of these diseases (The Children's Hospital of Philadelphia, 2012a).

According to one recent study on parental attitudes toward vaccinations, 13 percent of parents with children between the ages of 6 months and 6 years reported that they did not vaccinate their children according to the recommended schedule (Rosen, 2012). Nine percent refused some or all of the regular childhood immunizations for their children despite the proven and unqualified success of childhood immunizations in reducing death and burden from infectious disease (Rosen, 2012).

An internet survey conducted by University Children's Hospital in Switzerland in 2006 (Heininger, 2006) revealed that parental misperceptions have been recognized as major barriers towards immunizations in children, providing information on prevalent parental attitudes towards immunizations (Heininger, 2006). Of 6,025 participants, 5,722 (95.0%) considered their pediatrician as the most important source of information regarding vaccination, followed by leaflets (48.0%), health magazines (44.7%), and the internet (38.7%) (Heininger, 2006). Among generally recommended childhood vaccines, those against pertussis, Hib and especially measles–mumps–rubella were considered least important by parents (Heininger, 2006). Furthermore, 22.6% of survey participants felt that vaccination is administered "too early" in life and 21.0 and 12.2% thought that overload of the child's immune system and induction of allergies, respectively, would be side effects of some vaccines (Heininger, 2006).

A systematic review conducted by Mills et al. (2005) in UK, concluded that barriers identified regard concerns about the risk of adverse effects, concerns that vaccinations are painful for their children, distrust of those advocating vaccines (including belief in conspiracy), belief that vaccination should not be administered when the child has a minor illness, unpleasant staff and doctor's aggressive behavior or poor communication among the medical staff, and lack of awareness of the vaccination information and schedule (Mills et al., 2005).

Furthermore, a recent study by Gust et al., (2005), reported that although most parents agreed that they can easily be informed about vaccination, approximately a third

did not seek for relevant information. Perceived lack of information was correlated with negative attitudes about immunization and toward healthcare providers as shown in figure 4 (Gust et al., 2005). Basic information about the benefits and risks of vaccines presented by a trusted provider could go a long way toward maintaining and/or improving confidence in the immunization process (Gust et al., 2005).

Last but not least, a study which was conducted by the Department of Family and Community Medicine, including 32 family practice clinics in Minnesota (Kay & Harper, 1994) supported that most parents, nurses, and physicians (71%, 76%, and 59%, respectively) believe that three injections of vaccines are too many for a child to receive at one visit (Kay & Harper, 1994). Sixty-seven percent of the physicians who do not offer universal newborn hepatitis B vaccinations cited the number of required simultaneous injections as a factor in that decision (Kay & Harper, 1994). Only 15% of physicians ordered all three recommended injections for most of their 15-month-old patients (Kay & Harper, 1994).

Summary

From the preceding review, the depth and breadth of our understanding regarding parents' attitude towards getting their children vaccinated can be discerned. Detailed understanding of the consequences and side effects of vaccines, the variety of vaccination schedules among the world, and the high administration of some vaccines is apparent. Furthermore, knowledge of these factors is essential to acquire an understanding of their impact on children. This review of the literature also reveals established concepts and

tools for analysis of data related to vaccines, such as the use of time-series analysis to illuminate patterns of epidemics.

A large and detailed body of knowledge exists about the investigation on vaccines, parents' attitude and epidemic modeling. However, a gap existed in this body of knowledge about the qualitative investigation of parents' and children's perception and experiences regarding different vaccination schedules, and this is the gap that this study will attempt to fill. In Chapter 3, the study design, sampling strategy and sample, and analytic techniques used to answer the main research question of the study will be described.

Chapter 3: Methodology

Purpose of the Study

It is crucial to comprehend the dilemma of being vaccinated or not, and which are the potential short term physio-psychological side effects and long term consequences of vaccination. Additionally, it should be investigated if a mandatory vaccination system is effective, since most of the vaccines effectiveness only lasts 2-10 years, which means that 30 to 40% of the public have ineffective vaccines, and 70% to 60% are without vaccine protection (Blaylock, 2009). The purpose of the study was to in depth understand the beliefs, experiences and perceptions of adolescents, parents, as well as health care providers, regarding different vaccination schedules. For example, according to the CDC, some healthcare providers don't want to get vaccinated for specific vaccines like flu vaccines due to their underestimation of the effectiveness of the vaccines, fear experiencing side effects, or due to the assumption that there is not a real need to be vaccinated (Sepper, 2013). The major sections of this chapter are the qualitative methodology utilized to collect data from participants, sample strategy and recruitment process, and data analysis plan. Validity and reliability issues regarding the qualitative nature of the study are also addressed. Finally, the data analysis plan regarding the obtained qualitative data is provided in detail.

Research Design and Rationale

Research Questions

In this study the following research questions were answered:

RQ1: For parents and children from different vaccination backgrounds (not necessarily parents and children from the same family), what themes emerge in their reports regarding their physio-psychological consequences for the received vaccination schedules and about the factors which may affect their decision to be vaccinated or not?

RQ2: For health team members, what themes emerge in their reports about the physio-psychological vaccination consequences for their patients, the character of vaccination schedule (mandatory or nonmandatory but recommended) and the role of public health agencies or other authorities to better educate parents regarding the benefits of vaccination?

Definition of Central Concepts and Phenomena

There are many beliefs and experiences of individuals in general and parents in particular that determine their attitude towards vaccination schedules. For example, one in four U.S. parents believes some vaccines are linked directly or indirectly to autism in children (NBC News, 2010). However, many of those who worried about vaccine risks also think that their children should be vaccinated (NBC News, 2010).

Additionally, the CDC and the American Academy of Pediatrics (AAP) recommend vaccination against 16 diseases (including influenza), and some of these vaccines need to be given more than once. As a result, children may receive up to 29 vaccinations by the time they are 2 years old, and a child may receive up to six shots during one visit to the doctor, which can make the vaccination experience frightening for many of the children and parents (AAP, 2005).

Autism is a relatively common developmental disability, affecting approximately one in 150 children (AAP, 2005). Because the MMR vaccine is first given at age 12-15 months, and the first signs of autism (e.g., poor social interaction and speech, repetitive behaviors) often appear at 15-18 months of age, concerns have been raised among parents about a possible link between the vaccine and the development of autism (American Academic of Pediatrics, 2005).

Also, some parents believe that the hepatitis B vaccine should not be given to infants and children because it is associated with high-risk behavior including intravenous drug use and sexual activity; therefore, the percentage of parents getting their children vaccinated seems to decrease year after year (American Academic of Pediatrics, 2005).

Additionally, some parents question the need for a yearly dose of the flu vaccine, since they believe that influenza is a relatively mild disease and the risk of vaccination outweighs the risk of the disease. Parents also may have concerns about thimerosal in the flu vaccine (American Academic of Pediatrics, 2005). Some parents also question the need for the varicella vaccine. Like influenza, they believe that chickenpox is a harmless illness and that the risk of vaccination outweighs the risk of the disease (American Academic of Pediatrics, 2005).

Additionally, religious beliefs can play a significant role in parent's attitude towards vaccination and their objections to vaccines are generally based on the ethical dilemmas correlated with using human tissue cells to produce vaccines, and beliefs that

the body is blessed, thus, it should not receive certain chemicals or blood or tissues from animals, and should be treated and healed by God or natural means (The College of Physician of Philadelphia, 2012). Most U.S. states, with the exception of West Virginia and Mississippi, permit individuals to request for religious exemptions to mandatory vaccines based on their religious beliefs and objections (CDC, 2010), and religious vaccine exemptions have been increased in recent years (LeBlanc, 2007). Although adults and children who request vaccination exemptions are a small part of the overall population, they are often the center of controversy and media attention (Aspinwall, 1997).

Research Tradition

As it was already mentioned, the main purpose of this study was to investigate the impact of different vaccination schedules on children's physio-psychological health and parents' attitudes towards the mandatory or voluntary vaccination systems. For this purpose, ethnography grounded this qualitative investigation, since this approach focused on social interactions, behaviors and perceptions within a particular group (Reeves et al., 2008). For this study, individual qualitative interviews were conducted to investigate vaccination physio-psychological health consequences, knowledge, attitudes, financial burden, cultural beliefs and behaviors in order to better elucidate the topic.

Role of the Researcher

Participant observation approaches have been important components of ethnographic qualitative research. Generally, observation has been emphasized over

participation (Johnson, et al., 2006). But there are many ethnographic circumstances in which active participation by the ethnographer is advantageous, if not essential, to the collection of quality data. Johnson et al. (2006) provided a framework for analyzing the potential benefits of an ethnographer participating in a lively role in a given ethnographic setting (Johnson et al., 2006). However, there was not any kind of personal or/and professional relationship with the participants. Hence, individual interviews were conducted formally, and they did not require any direct/indirect relationship with any of the participants in order to reduce any potential bias issues which can influence the accuracy of the data obtained.

Many research methodology experts suggest that researchers may benefit from inaugurating reflexivity as part of their practice. Reflexivity is a critical feature of feminist research methodology that identifies the power relations and the exercise of power in the research process (Ramazanoglu & Holland, 2003). Reflexivity has four levels in the research process: (a) the identification of power, power relationships and its consequences; (b) theory of power relations (hidden and explicit); (c) ethical decisions in the research procedure, and the politics and interests of those that make those decisions; and (d) accountability for knowledge production (Ramazangolu & Holland, 2003).

Furthermore, according to Blodgett et al., (2005), there are several techniques that help minimize participant's anxiety, reluctance, and time commitment. The authors stated that researchers can be aware of issues to ensure that the participants feel comfortable and they are valued and appreciated (Blogett et al., 2005). Also, according to Meara and

Schmidt (1991), there are four principles for guiding the treatment of qualitative research participants. First the respect for autonomy, which is recognition and making structural allowances that take the independence and desires of the participant into consideration. Second, non-maleficence, which is avoiding any stress or harm to the participants (Meara & Schmidt, 1991). The third principle is beneficence, which is benefiting those who had involved in the study. Finally, there must be justice, which is commitment to equitably distributing responsibilities and rewards between researcher and participant (Meara & Schmidt, 1991). A commitment to justice means that the researchers should avoid using the study to aid themselves to the detriment of others, in order not to result in an imbalance of responsibility for the participant and reward for the researcher (Meara & Schmidt, 1991).

Study Population

The populations under study were adolescents and parents, as well as healthcare providers who are involved with vaccination schedules. Adolescents and parents were from different vaccination backgrounds and beliefs regarding vaccination, however they were currently living in the US and speak/read English fluently. That means that individuals who recently immigrated (most probably from 1 to 5 years) to the US were included in the study sample, since they received/experienced or believe in different vaccination schedules in their home countries (e.g., Japan) as children or parents. The age of adolescents included in the study was 14 to 18 years old; although US, for complex social and political reasons, permit independent decision-making, including health care,

at age 18 years, the cut point of 14 years was selected since 14-year-olds appear to have cognitive or reasoning capacity equivalent to 20- to 22-year-olds in according to some empirical evidence (Frader & Flanagan, 2011). Also, health care providers (like nurses, pediatrician, researchers) were included in this study since their observation was crucial to our study due to the fact that they are in direct contact with children and their parents, not to mention they've experienced parents attitudes, beliefs, and reaction towards vaccination outcomes in the daily basis.

After obtaining written informed consent from all the participants (please see Ethical Concerns section for more details), individual qualitative interviews were conducted to investigate vaccination physio-psychological health consequences, knowledge, attitudes, and financial burden (for those who are uninsured or with limited insurance coverage), cultural beliefs, and behaviors in order to contribute to the public dialogue regarding the best possible vaccination schedule.

Sampling Strategy

Purposeful sampling strategy was applied for this qualitative study. More specifically, this type of sampling was appropriate as it is used to strategically select information-rich cases, according to the purposes of the study (Patton, 2002). Theoretical sampling was the subtype of purposeful sampling was used in the present research, while the researcher sampled incidents, slices of life and time periods of individuals, according to their potential manifestation of specific theoretical constructs (attitude towards vaccination based on experiences, beliefs and perceptions; Patton, 2002). This kind of

sampling also required establishing interpretative theories from the emerging data (Marshall, 1996). A judgment sample framework was applied, including various variables such as age, gender, residency, place of birth and ethnicity. Each sample category (adolescents, parents and health care workers) included 12 participants (Gowda et al., 2012) and the principle of saturation was applied to determine the final sample size, which allows stopping new participant recruitment when the last interviews bring no new insight or information. Sample size ideally equally included adolescents and parents who have followed a mandatory vaccination schedule (such as the US or similar vaccination schedule) as well as adolescents and parents who have followed a more flexible vaccination schedule (such as Japanese or similar vaccination schedule); regarding health care providers, the two sampling categories included health professionals who supported or believed in a mandatory vaccination or flexible vaccination schedule, respectively.

The best procedure to know how potential participants were identified is through observation alone or by both observing and cooperating, to different degrees, in community's daily activities (Mack et al., 2005). Participant observation always takes place in community settings and in locations believed to have some direct or indirect relevance to the research questions (Mack et al., 2005). According to the aforementioned criteria, potential participants (adolescents and parents) were from local communities of Americans (who have followed the US mandatory vaccination schedule), from local communities of immigrants who are more likely to have received a flexible vaccination

schedule (e.g., Japanese or French communities), through schools, churches and community centers based in the US South West, as well as from countries outside U.S. via skype or phone. Additionally, health care providers who supported or believed in a mandatory vaccination or flexible vaccination schedule, respectively, were recruited from the same communities (American or immigrant). Purposeful sampling was exercised where family members, friends and colleagues acted as gatekeepers for gaining access to study subjects. Generally speaking, we tended to be engaged in participant observation to learn about individual's real attitude towards vaccines and what are the issues discussed among the community regarding this subject (Mack et al., 2005). This was achieved by contacting for example parents through informal conversations and socialization.

Each interview lasted for 60 to 120 minutes and for adolescents, these lasted maximum 60 minutes. All interviews were audiotaped and transcribed verbatim by myself.

Instrumentation

Primary data collection is an important piece of this research project. The use of proper techniques guarantees that qualitative data were collected in a scientific and consistent manner. Appropriate data collection techniques strengthened the accuracy, validity, and reliability of research outcomes. Ultimately, using these methods helped to achieve the goal of conducting high-quality research with meritorious findings (Harrell et al., 2009). No historical or legal documents, as well as secondary data were used as source of data for the present study. On the contrary, individual qualitative interviews

were used to collect the needed qualitative data. These discussions were conducted with the use of a an interview guide with open-ended questions with a wide coverage of interest regarding vaccination schedules; more specifically, questions relevant to vaccination physio-psychological health consequences, knowledge, attitudes, and financial burden (for those who are uninsured or with limited insurance coverage), cultural beliefs and behaviors of the participants, were included. The interview guide was modified according to the needs of the participants of each group (adolescents, parents and health care providers), thus all the themes that emerged from the discussions and analysis will be provided in detail in Chapter 4, in results section. Some examples of the open-ended questions are the following based on previous research like the one conducted by Miller and Goldmann (2011), who investigated the outcomes of vaccination and how it's compared in the US and the rest of the world. Also, additional to the questions below there are some frequent check-ins which were used with questions such as "How are you doing? Are you feeling well? Do you need a break or to schedule another meeting later to finish the interview?" The corresponding research question appears in parentheses following each question of the interview guide.

For Adolescents

1. Based on your experiences regarding the vaccines you have received so far, do you know/feel that vaccines are necessary to be healthy or not? (RQ1)

2. Could you share some positive or negative experiences of yours regarding vaccination? (RQ1)

3. What do you hear about vaccination benefits or side effects from your parents, teachers or close friends? (RQ1)

4. Did any of your friends, family member, or community experience any kind of minor or severe side effect or disease after vaccination? (RQ1)

5. Do you think that taking Influenza vaccine regularly will have positive or negative consequences on your health? (RQ1)

6. Do your friends prefer being vaccinated and does this influence your decision to be vaccinated or not? (RQ1)

7. Based on your experiences regarding the vaccines you have received so far, do you believe that vaccines should be mandatory or voluntary, and why? (RQ1)

For Parents

1. Based on your experiences regarding the vaccines you or your child have received so far, do you recommend getting your children vaccinated? If no/yes, why? (RQ1)

2. Did you personally have any bad experience regarding vaccination? (RQ1)

3. What are the procedures that should be applied to minimize your concerns about vaccinations and their potential negative consequences? (RQ1)

4. What are your concerns about vaccines? (RQ1)

5. Do you have any religious beliefs that prevent you from getting your child vaccinated? (RQ1)

6. Based on your experiences regarding the vaccines you or your child have received so far, do you believe that vaccines should be voluntary or mandatory and why? (RQ1)

7. What are the changes you would like to see in the US health care system regarding vaccination schedule? (RQ1)

8. Are you aware of the vaccines that your children receive(d) and why they should receive them? (RQ1)

For Health Care Providers

1. Are you aware of any side effects (emotionally or physical) regarding vaccination in general? (RQ2)

2. If you are aware of these side effects, are there any strategies that have been successfully implemented by health care systems of US or other countries to address this problem? If there are no strategies, what do you suggest according to your experiences on vaccination schedules? (RQ2)

3. What type of health care programs are needed to help parents get a better education about what vaccine should be administered to infants, and which can be given till the children are older? (RQ2)

4. What should be the role of CDC and public health agencies in providing solutions to better educate parents regarding the benefits of vaccination? (RQ2)

5. Are you aware of some cultural factors that may contribute to choice of vaccination schedule by parents? (RQ2)

6. What are the advantages and disadvantages as well as benefits and negative consequences of the vaccination schedule you apply/suggest? (RQ2)

Procedure for Recruitment, Participation, and Data Collection

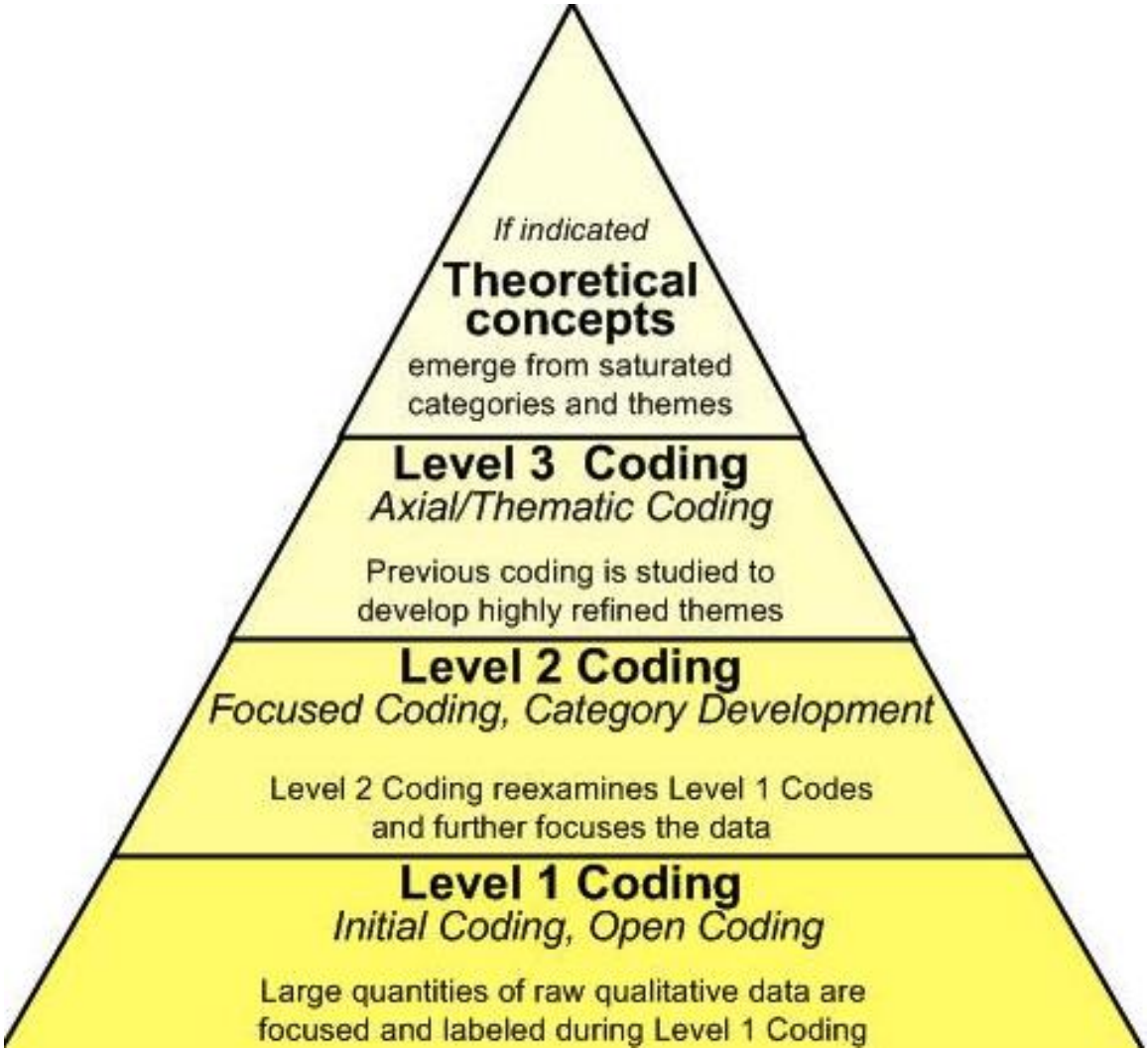
The participants of the study were adolescents, parents and health care providers, who were contacted by myself, since I was the one who collected the data. As mentioned in previous sections, after obtaining written informed consent, individual qualitative interview were conducted, and each discussion lasted about to 60 to 120 minutes, although discussions with adolescents were no more than 60 minutes in order to eliminate potential discomfort as much as possible. Efforts were made to complete all interviews within 4 weeks..As already mentioned, potential participants (adolescents and parents) were from local communities of Americans (who have followed the US mandatory vaccination schedule), as well as from local communities of immigrants [who are more likely to have received a flexible vaccination schedule (e.g. Japanese or French communities)], through schools, churches and community centers based in the US Southwest. Additionally, health care providers who supported or believed in a mandatory vaccination or flexible vaccination schedule, respectively, were recruited from the same communities (American or immigrant). Purposeful sampling was exercised where family members, friends and colleagues acted as gatekeepers for gaining access to study subjects. All interviews were audiotaped and transcribed verbatim by myself. Also, some demographic data were recorded (age, gender, profession, place of birth, residency, and years in US for immigrants) but no names were recorded in order to ensure the

anonymity of the participants. At the end of each discussion, the participants were asked to provide their last input or comments they might have forgotten during the discussion, but, no follow up was established at this point, since it will not further contribute to the research questions of the study.

Data Analysis Plan

The qualitative methodology approach adapted by this study attempted to contribute to the existing knowledge regarding the impact of different vaccination schedules on the physio-psychological health of the individuals (Hahn, 2008). Additionally, the software used in the data analysis is Computer Assisted Qualitative Data Analysis Software (CAQDAS). All qualitative methods employ coding techniques to help organize and analyze the overwhelming amount of data that are collected during qualitative research (Hahn, 2008). Coding moves in a stepwise fashion progressively from unsorted data to the development of more refined categories, themes, and concepts (Hahn, 2008).

According to Hahn (2008), the number of steps required to complete the coding process varies between research methods and the amount of raw data, but qualitative coding commonly utilizes three or four steps as following:



Hahn, C. (2008). Techniques and Tips for Qualitative Researchers. Sage Publication. ISBN:9781412946926. Retrieved on May 23, 2013. From: http://qrtips.com/coding.htm

Qualitative analysis is a process of breaking data into smaller elements, determining the import of these elements, and allocating them back together in an elucidated form. Breaking down the data is a process of classifying or coding (CEDU,

n.d.). A category is a classification of ideas or concepts, and concepts in the data are investigated, compared, and connected to form categories. Lower-level categories can be organized into higher and more abstract conceptual categories (CEDU, n.d.). The categories one researcher uses to classify qualitative data may not be the same categories another researcher would utilize to arrange the same data.

Different authors recommend different approaches of defining categories. Some suggestions include: participants' acts, activities and meanings, relationships among participants, settings, perspectives of participants, participants' ways of thinking, regularly occurring activities etc (CEDU, n.d.). Each of these categories may be further classified into sub-categories, not to mention depending on pre-defined categories may accelerate the probability that the researcher will not omit other important categories of the data. Categories should always be provisional and the researcher should not become too attached to initial categories (CEDU, n.d.).

Issues of Trustworthiness

In general, researcher should acknowledge and show sensitivity about the ethical way of thinking towards participants' narratives and relationships among concepts should be aligned with the identified theory (CEDU, n.d.). Therefore, data were collected from more than one source (individuals with different opinions), and thus there was adequate evidence to affirm the factuality of the respondents' statements (CEDU, n.d.).

On the other hand, internal validity is the degree to which a researcher determines that an observed relationship is causal. Qualitative research may be particularly useful in

deciding how phenomena operate and in developing preliminary causal hypotheses and theories (CEDU, n.d.). For the present study, the researcher acted as detective: more specifically, the qualitative researcher investigates for evidence of cause and effect and establishes a list of rival explanations (e.g., confounding extraneous variables) that are possible or plausible explanations for the relationship (CEDU, n.d.).

As far as external validity is concerned (that is the extent to which the findings of a study may be generalized to another setting or another population) it is generally considered as not consistent with the qualitative paradigm or perspective, while if generalization is the aim of a study, then quantitative methods should be used (Newman & Benz, 1998). The present study aims to in depth understand participants' perceptions on vaccinations schedules and not to apply the study to another sample.

Finally, all coding reports were read independently by myself (D.A.) and my dissertation supervisor (V.M.) for discussing similarities and differences in interpretation of the obtained data and therefore the maximum validity and reliability of the analyzed patterns were achieved.

Ethical Procedures

There are several ethical concerns regarding each research and therefore specific measures should be taken. First, I informed all participants about which were the objectives of the study, the anonymity of the participants, the confidentiality of responses, the voluntary nature of the study, the fact that the obtained results would be

used only for research and that the study did not pose risk to the safety or wellbeing of the participants.

Regarding the qualitative approach of the study, invasion of privacy constitutes a significant risk due to the sensitive data often collected and analyzed (Baez, 2002). This risk was managed with the use of fictitious names in order to ensure the anonymity of the participants.

Written informed consent (assent for adolescents) to participate to the study was obtained from all the participants. Since the study included a vulnerable population (adolescents aged 14 to 18 years-old) a parental informed consent was also obtained. Also, in order to minimize the risks for this group, the discussions with adolescents lasted as less as possible and certainly no more than 60 minutes. Also, the cut point of 14 years was selected since 14-year-olds appear to have cognitive or reasoning capacity equivalent to 20- to 22-year-olds in according to some empirical evidence (Frader & Flanagan, 2011).

Each participant had the right to withdraw from the study at any point. By adequately addressing all the aforementioned ethical concerns, the I obtained Walden University's IRB approval (01-31-14-0133364), prior to the start of the study.

Summary

The present study was intended to provide a detailed description of experiences and perceptions of adolescents, parents and health care providers regarding different vaccination schedules, with the use of individual qualitative interviews. The present

research was based on the principle of purposeful sampling strategy, after obtaining ethical committee approval and written consent of each potential participant, as well as parental consent for adolescents. Ethical concerns were adequately managed by specific measures (e.g., the researcher fully informed the participants about the objectives of the study and she ensured the confidentiality of responses as well as the anonymity of the respondents). Qualitative data were coded systematically and were analyzed thematically. The detailed presentation of the analyses of the qualitative data of the study follows in Chapter 4.

Chapter 4: Results of the Study

This study aimed to in depth understand the beliefs, experiences and perceptions of adolescents, parents as well as health care providers, as far as different vaccination schedules are concerned. In Chapter 4, data analysis and results of the study will be presented in detail. The researcher conducted a thematic analysis of 72 qualitative interviews with 24 adolescents, 24 parents, and 24 health care members in order to investigate and explore their perceptions about the impact of vaccination schedules overall. After the researcher gathered the information needed from the participants, the findings were stored, transcribed verbatim, and coded through the computer software, NVivo 9 by QSR and the thematic analysis followed for meanings and answers to be fully extracted. I will discuss in this chapter the setting, demographics, method of data collection, data analysis, and summary of the data. All records collected were aimed to address the following research questions:

Research Question 1: For parents and children from different vaccination backgrounds (not necessarily parents and children for the same family), what themes emerged in their reports regarding their physio-psychological consequences for the received vaccination schedules and about the factors which may affect their decision to be vaccinated or not?

Research Question 2: For health team members, what themes emerged in their reports about the physio-psychological vaccination consequences for their patients, the character of vaccination schedule (mandatory or non mandatory but recommended) and

the role of public health agencies or other authorities to better educate parents regarding the benefits of vaccination?

Setting

The data were collected by the researcher through in person interviews, telephone interviews, and skype given that the participants were in different locations, both inside and outside of the United States. The interviews were held at different locations like Chandler Public Library in Chandler- Arizona, Maricopa Community College library in Mesa, Arizona, coffee shop in LaJolla, San Diego, coffee shop in Orange County, California, Temecula Public Library in Temecula-Califronia. The participants were notified that they did not have to feel pressured to stay longer than they would like to, and that they could skip any question that they felt unwilling to answer. Additionally, the participants were offered to have breaks at any time, while a timer was set to indicate the time spent during the interview. When one of the participants had an urgent need to go home or end the interview, the rest of the interview was conducted via phone at later time. Additionally, each participant received $10 cash for his or her participation at the end of the interview. Some of the interviews were conducted through skype with/without visual contact, especially for the participants who were located outside the US. Difference in time zone was taken under consideration, and the participants were asked to confirm the best time for them to conduct the interview. Finally, the participants were reminded if they wanted to have a stopping point or to reschedule the interview. Furthermore, the voluntary nature of the study was fully explained, along with the risks

of discomfort and benefits of the study. During the time of the interviews, there were no issues observed that might have affected the children and parents' responses, but some health care members who lived outside U.S, were not aware of the U.S. public agencies' responsibilities, as they were not familiar with these agencies. In addition, the frequency and signal of the telephone interviews might have affected some participants, as the responses were not as clear and descriptive as they could be in face-to-face communication.

Demographics of the Sample and Data Collection Information

After obtaining Walden's IRB approval (01-31-14-0133364), participants were invited through flyers, which were distributed in several locations such as San Tan Elementary school in Chandler- Arizona, Gakun Japanese school in Mesa- Arizona, Chandler and Temecula Public Libraries. Additionally, several invitation announcements were sent to parents, and health care providers who are located outside the US. Also, health care groups on social media like Facebook were utilized to distribute the invitation announcements. I obtained the written consent of each potential participant either directly or via email, and if the participant was interviewed through skype, then his/her written consent form was obtained through emails. The interviews lasted for approximately 30-60 minutes for adolescents and 60-120 minutes for adults with several breaks offered. Participants of the study were adolescents and parents, as well as healthcare providers who were involved with various vaccination backgrounds. The age of adolescents included in the study was from 14 to 18 years old. In addition, health care providers such

as nurses, pediatricians, and researchers were included in this study as well since their reports were considered as a crucial addition to the data of the study, according to RQ2. Tables 1 to 3 present the demographics of all 72 participants.

Table 1

Demographics of the Adolescents

	Country of Residence	Origin Country	Age	Sex	Marital Status
Participant # 1	Japan	Yokohama, Japan	14 years old	Female	None
Participant # 2	Kingdom of Saudi Arabia	Kingdom of Saudi Arabia	14 years old	Female	None
Participant # 3	Kingdom of Saudi Arabia	Kingdom of Saudi Arabia	15 years old	Male	None
Participant # 4	Kingdom of Saudi Arabia	Kingdom of Saudi Arabia	18 years old	Female	None
Participant # 5	Doha, Qatar	Qatar	16 years old	Male	None
Participant # 6	United Kingdom	Mumbai, India	15 years old	Female	None
Participant # 7	Vancouver, Canada	Canada	15 years old	Female	None
Participant # 8	Musafa- Abu Dhabi, United Arab Emirates	Abu Dhabi, United Arab Emirates	18 years old	Male	None
Participant #	Germany	Offenback Frankfurt, Germany	16 years old	Male	None

Table continues

Participant # 10	United Kingdom	Marrakech, Morocco	17 years old	Female	None
Participant # 11	Quebec, Canada	Iraq	14 years old	Male	None
Participant # 12	Ontario, Canada	Iraq	18 years old	Female	None
Participant # 13	Washington, USA	USA	17 years old	Female	None
Participant # 14	USA	USA	14 years old	Female	None
Participant # 15	Texas, USA	USA	15 years old	Female	None
Participant # 16	Arizona, USA	USA	16 years old	Male	None
Participant # 17	Temecula California, USA	Egypt	14 years old	Female	None
Participant # 18	California, USA	USA	17 years old	Female	None
Participant # 19	USA	USA	14 years old	Female	None
Participant # 20	USA	Washington, USA	15 years old	Male	None
Participant # 21	USA	USA	16 years old	Female	None
Participant # 22	Temecula California, USA	Egypt	14 years old	Female	None
Participant # 23	Temecula California, USA	Egypt	18 years old	Male	None
Participant # 24	North Carolina, USA	USA	16 years old	Female	None

Table 2

Demographics of the Parents

	Country of Residence	Origin Country	Age	Sex	Marital Status	Occupation
Participant # 25	Spain	Erbil, Iraq	39 years old	Male	Married with two daughters	Dentist
Participant # 26	Japan	Nihombashi Gofukubashi, Japan	40 years old	Female	Married	Housewife
Participant # 27	United Arab Emirates	Dubai, United Arab Emirates	29 years old	Female	Married with one child	Associate at Mubadala
Participant # 28	Canada	Syria	39 years old	Female	Married with one child	Author and motivational speaker
Participant # 29	Canada	Mousel, Iraq	28 years old	Female	Married and have a child	Elementary School Teacher
Participant # 30	Ashford, United Kingdom	Ambaji, India	37 years old	Male	Married	IT Engineer
Participant # 31	Scotland	Stirling, Scotland	50 years old	Female	Married	Translator

Table continues

Participant # 32	Marbella, Spain	Lebanon	49 years old	Female	Married	Housewife
Participant # 33	Marbella, Spain	Lebanon	56 years old	Male	Married	Marketing Manager
Participant # 34	Berlin, Germany	Germany	55 years old	Male	Married	Aerospace Engineer
Participant # 35	Berlin, Germany	India	52 years old	Female	Married	Housewife
Participant # 36	USA	USA	42 years old	Male	Married	Teacher
Participant # 37	USA	USA	34 years old	Male	Married	Product Manager
Participant # 38	USA	China	38 years old	Female	Married	Housewife
Participant # 39	USA	Germany	46 years old	Female	Married	Pharmacy Technician
Participant # 40	USA	USA	50 years old	Male	Married	Pilot
Participant # 41	Chicago, USA	USA	53 years old	Female	Married	Housewife
Participant # 42	Texas, USA	USA	42 years old	female	Divorced	Entrepreneur
Participant # 43	California, USA	Egypt	52 years old	female	Married	Housewife
Participant # 44	California, USA	USA	55 years old	male	Married	Pilot
Participant # 45	California, USA	USA	30 years old	female	Married	Hair Dresser
Participant # 46	Arizona, USA	Greece	42 years old	Female	Married	Leasing Consultant
Participant # 47	Texas, USA	Jalawlaa, Iraq	35 years old	Male	Married	Accountant
Participant # 48	Spain	Lebanon	55 years old	Female	Married	High School Teacher

Table 3

Demographics of the Healthcare Providers

	Country of Residence	**Origin Country**	**Age**	**Sex**	**Marital Status**	**Occupation**
Participant # 49	Abu Dhabi, UAE	Saida, Lebanon	57 years old	Female	Married	Pediatrician
Participant # 50	UAE	Sharqa, Lebanon	30 years old	Female	Married	Pediatrician
Participant # 51	Doha, Qatar	Qatar	37 years old	Male	Divorced	Pediatrician
Participant # 52	Shikoku, Japan	Japan	39 years old	Female	Single	General Practitioner
Participant # 53	Bahrain	Bahrain	47 years old	Female	Married	Pediatrician
Participant # 54	Abu Dhabi, UAE	Bordeaux, France	41 years old	Female	Married	Pediatrician
Participant # 55	United Kingdom	Iraq	42 years old	Female	Married	Pediatrician
Participant # 56	Germany	Stuttgart, Germany	29 years old	Male	Single	Pediatrician
Participant # 57	Japan	Kuroishi, Japan	35 years old	Male	Married	Pediatrician
Participant # 58	Japan	Isesaki, Japan	39 years old	Male	Married	Pediatrician
Participant # 59	Japan	Japan	45 years old	Male	Married	Pediatrician
Participant # 60	Oga, Japan	Japan	52 years old	Female	Married	Pediatrician
Participant # 61	Texas, USA	Basra, Iraq	53 years old	Male	Married	Pediatrician

Table continues

Participant # 62	California, USA	France	40 years old	Female	Married	Pediatrician
Participant # 63	USA	USA	38 years old	Female	Married	Medical Researcher
Participant # 64	Texas, USA	USA	44 years old	Female	Divorced	Nurse
Participant # 65	Arizona, USA	USA	33 years old	Female	Married	General Practitioner
Participant # 66	California, USA	USA	40 years old	Female	Married	Pediatrician
Participant # 67	Texas, USA	Lebanon	41 years old	Female	Married	General Practitioner
Participant # 68	Arizona, USA	USA	39 years old	Male	Married	Nurse
Participant # 69	Arizona, USA	USA	50 years old	Female	Divorced	Medical Researcher
Participant # 70	Arizona, USA	USA	28 years old	Female	Married	Nurse
Participant # 71	Utah, USA	Syria	45 years old	Female	Married	Medical Researcher
Participant # 72	Arizona, USA	USA	46 years old	Male	Married	Pediatrician

Data Analysis

The researcher employed a qualitative thematic analysis to determine the most common themes from the extensive interviews with the 72 participants. Pope, Mays, and Popay (2007) explained thematic analysis as the "identification of the main, recurrent, or most important issues or themes arising in a body of evidence" (p. 96). Hubner (2007) added that thematic analysis is mainly targeted to bring "order into the data, categorizing it, and defining core themes that emerged from the discursive data" (p. 79). The

researcher then employed the thematic analysis approach to form themes that can directly address and explain the issues detected about the two research questions of the study. In specific, the researcher followed Attride-Stirling's (2001) three major steps in completing the thematic analysis method: “(1) the reduction or breakdown of the body text from the interviews; (2) the examination or exploration of the text; and (3) the integration or grouping of the exploration" (p. 390). The results of the three steps are presented in the next section.

Emerged Themes for RQ1

Adolescents

The first major theme that was discovered from the interviews with the adolescents, answering the research question on the physio-psychological consequences for the received vaccination schedules was the overall positive and beneficial effects for the received vaccination schedules. This theme received the highest number of responses with 23 occurrences out of the 24 interviewed adolescents or 96% (Table 4). There were two other perceptions that emerged but are considered as minor themes given that they received just one response respectively or 4%. It was also believed that vaccinations were painful and ineffective as individuals can still get sick and that there were possible side effects that may emerge after the vaccination.

Table 4

Emerged themes regarding the physio-psychological consequences for the received vaccination schedules (RQ1, adolescents).

Emerging Themes	# of occurrences	% of occurrences
Major Theme 1: Overall positive and beneficial effects for the received vaccination schedules	23	96%
Minor Theme 1: Painful and ineffective as individuals can still get sick	1	4%
Minor Theme 2 Possible side effects that may emerge after the vaccination	1	4%

For the first major theme, examples of adolescents' opinion are the following:

Participant #1 stated that for him, vaccines are beneficial and he has not had any problem with it given that in Japan, the schedule is voluntary:

> "I know they're very beneficial and reduce diseases around the world, and as I said before, I never had problem with them. Vaccines are not a big deal in Japan, mainly because the schedule is not intensive and voluntary".

Participant #2 added that there are positive effects upon receiving vaccination schedules:

"Positive effect as it minimizes the effect of the virus."

Participants # 3, 6, 15, 17, 20, 21, 22, 23, and 24 simply stated that the effects of vaccines schedule for them were positive.

Participant # 4 also added that vaccines result in positive consequences and even shared an example:

> "I think flu vaccine will have positive consequences. Like here in KSA, we have our annual religious ceremonies (called Haj and it's once a year) that require visitors to have vaccines. Without these vaccines, many diseases will be disseminated."

Participant # 5 emphasized that scheduled vaccines promotes safety and good health:

"Positive experience like feeling safe and healthy."

Participant # 7 stated that he couldn't recall any bad effects of vaccines:

"I can't recall any bad experience with vaccines, and the benefits have been well spread over years."

Participant # 9 stated that vaccines could help in many ways:

"Yes, because I feel vaccines have helped us to stay healthy and safe epidemically."

Participant # 10 stated that there were positive effects for vaccines overall:

> "I hear that vaccines have many benefits, and at my school I had a project presenting the objectives of vaccines. It was long presentation and I learned a lot about vaccines."

Participant # 11 admitted that he did not give vaccines much attention but believed that these are very important:

> "I consider vaccines as necessary thing to have within our lives. I don't give it that much attention but I know they're important."

Participant # 12 shared that vaccines were very important and beneficial:

> "I can't remember when was the last time I had vaccines. But, I know they're beneficial to our health. My dream is to get into pharmacy school; I think it'll be odd if I don't believe in vaccines! I feel they're important".

Participant # 13 stated that vaccines were necessary and have positive effects:

> I think vaccines are necessary and health as they prevent many diseases. My teacher keeps telling us to get vaccines like HPV as it prevents AIDS and cancer. Feeling that vaccines will keep me healthy give a positive experience, I didn't have any negative one.

Participant # 16 shared some other positive effects such as:

> "They keep us safe and without suffering from any diseases."

Participant # 18 stated that vaccines were necessary as they bring positive outcomes:

> "I think vaccines are necessary and health as they prevent many diseases. My teacher keeps telling us to get vaccines like HPV as it prevents AIDS and cancer. Positive for sure. I don't take it every year, but when I hear in the news that we're have a sever flu season, my family tend to take it".

The first minor theme that followed the first major theme was that one participant had the perception that vaccinations were painful and ineffective as individuals can still get sick. Participant # 8 stated that vaccines may be healthy but the effect was painful, also there was a pre-conceived notion that they do not work:

> "I feel vaccines are healthy but personally I don't like to take them because they hurt, and I feel they don't work (like flu vaccines) as I still get some flu sometimes. I never had bad experience with vaccines back home (Abu Dhabi-United Arab Emirates)".

The second minor theme was that again, one participant had the perception possible side effects may emerge after the vaccination. Participant # 9 also admitted that side effects couldn't be put aside:

> "No, because I'm concerned about my health when I hear the rare side effects (even though it's not common) but it still has that effect on me)."

The second major theme that was discovered, answering the research question on the factors which may affect adolescents' decision to be vaccinated or not, was (1) mandatory vaccination for individuals to be safely protected against diseases. This theme received the highest number of responses with 19 occurrences out of the 24 interviewed adolescents or 79% (Table 5). There were two other perceptions that emerged but are considered as minor themes; given that they received relatively lower responses and occurrences than the second major theme. The other factors were: (2) friends' decision whether to be vaccinated or not with two occurrences or 8%; and the (3) awareness of the significance of vaccines with just one occurrence or 4%.

Table 5

Emerged themes regarding the factors which may affect adolescents' decision to be vaccinated or not (RQ1, adolescents)

Emerging Themes	# of occurrences	% of occurrences
Major Theme 2: Mandatory vaccination for individuals to be safely protected against diseases	19	79%
Minor Theme 1: Friends' decision whether to be vaccinated or not	2	8%
Minor Theme 2: Awareness of the significance of vaccines	1	4%

For the second major theme some examples are the following::

Participant # 2:"Mandatory because they're important for our health."

Participant # 3 simply answered that she preferred vaccination to be:

"Mandatory."

Participant # 4 also added that vaccinations should be mandatory, as they were essential:

"Mandatory because they're necessary."

Participants # 5, 6, 14, 15, 16, 17, 19, 20, 21, 22, 23, and 24 straightforwardly stated that vaccinations should be:

"Mandatory."

Participant # 7 added that vaccines should be necessary as they aid individuals in having a more healthy body:

"I think it should be mandatory as vaccines can help all of us be healthy".

Participant # 8 also wanted vaccines to be mandatory:

> "Vaccines are very important and it should be mandatory. Without vaccines, we probably had many diseases and health effects."

Participant # 10 stated that vaccines are highly recommended to be mandatory to individuals:

> "I highly recommend that vaccines should be mandatory so everyone will be healthy and diseases are limited."

Participant # 12 emphasized that vaccines should be mandatory and explained why:

"Probably mandatory so we won't an odd epidemic disease threatening our lives."

The first minor theme that followed the second major theme was that two participants were influenced by their friends' decision whether to be vaccinated or not. Participant # 2 admitted that he is influenced by his friends' decision on whether to be vaccinated or not:

> [Do your friends prefer being vaccinated and does this influence your decision to be vaccinated or not] "Yes".

Participant # 8 added that his friends also believe that his friends' decision to receive vaccines can also affect him:

> "Yes, all my friends had vaccines and the same with my brothers. My parents get vaccines if they travel during summer because my mom had swine flu 2 years ago when we came back from Maldives."

The second minor theme that followed the second major theme was that one participant considers his awareness of the significance of vaccines. Participant # 1 believed that vaccines should be voluntary and at the same time, the people should know and understand the significance of vaccines before deciding to get one or not:

> "I think vaccines should be voluntary but people should understand the importance of vaccines before they decide whether to get vaccines or not."

Parents

The third major theme that was emerged from parents' interviews, answering the research question on the physio-psychological consequences for the received vaccination schedules of parents (RQ1), was (1) recommendation[s] for vaccination because of the positive effects to children's health. The third major theme received the highest number of responses with 20 occurrences out of the 24 interviewed parents or 83% (Table 6). There was one other perception that emerged but is considered as a minor theme given that it received just four occurrences or just 17% of the total sample population. It was also believed that vaccinations could result in:(2) possible side effects to the children that may emerge after the vaccination.

Table 6

Emerged themes regarding the physio-psychological consequences for the received vaccination schedules (RQ1, parents)

Emerging Themes	# of occurrences	% of occurrences
Major Theme 3: Recommendation for vaccination because of the positive effects to children's health	20	83%
Minor Theme 1: Possible side effects to the children that may emerge after the vaccination	4	17%

Some examples of parents' statements regarding this third major theme are Q:

Participant # 25 stated that he recommends getting his children vaccinated as it provides positive and beneficial effects:

> "I absolutely recommend getting my children vaccinated. I remember when my mom used to tell me several stories about her brothers back in Iraq when they didn't get vaccines, and then after late seventies and early eighties, vaccines became mandatory and everyone was able to get it. My mother's little sister had passed away when she was 18 months back in Iraq because she had chicken pox".

Participant # 27 personally recommended that vaccines should be given to children:

> "Yes, I recommend having giving my 18 months old son vaccine."

Participant # 28 recommended getting vaccinations because they provide a better quality of life for the whole family:

> "Yes, without a doubt. I support and fully believe in medical research, I will in turn follow any medical recommendations that can help provide a better quality of life for my family. When it comes to my children specifically, I find that it is my full responsibility to make certain that they are immunized and protected from life threatening / disabiltiating diseases".

Participant # 30 was also confident in recommending to others that children should be vaccinated:

> "I absolutely recommend getting my children vaccinated."

Participant # 31 stated that she recommends having vaccinations for her children to avoid getting diseases:

> "Yes I do. Since my husband's passing 20 years ago, I always made sure to get my children vaccinated to avoid having any diseases as I was a single mother and I worked two jobs to support my two kids".

Participant # 32 stated that vaccines keep away all individuals from diseases, but also had some concerns:

> "Yes, I like how vaccines keep us healthy and concealed from any diseases. However, when you hear the discussion everywhere about the effect of vaccines it just makes me scared to death and makes me wonder if I'm doing the right thing. I remember when I was a child seeing flyers anywhere reminding parents to vaccinate their children on time. But the media makes it look like a scary thing right now so I'm confused".

Participant # 35 shared that he supports getting vaccination:

> "Yes, my stepson is 18 years old now, so it's been a long time since he got his last vaccines (He's not vaccine fanatic so he tends to skip the flu vaccines). He took his childhood vaccines back in Abu Dhabi-UAE".

Participant # 36 stated that vaccinations were recommended, although some concerns:

> "Yes, definitely. I had doubts now and then every time I heard the news, but I was sure that this is the right thing to do."

Participant # 37 shared that he recommends for children to be vaccinated:

> "Yes, I do recommend getting children vaccinated. We have not observed any side effects or issues with vaccines. Although my son has become ill several times, they are common issues that children acquire from school during cold season and not directly related to vaccinations".

Participants # 38, 42, 46 shared that vaccinations were recommended, as kids need them:

> "Yes absolutely, I think this is very very important for kids."

Participant # 39 shared that vaccinations were recommended to help in preventing diseases:

> "Absolutely, I think this is very important for all children to control and prevent the spread of disease."

Participant # 40 stated how important it is for him to have his children's vaccinations on time:

> "All my children were vaccinated on time. This is very important for their well-being and I would not even consider any other option."

Participant # 41 stated that vaccines are truly important and are recommended:

> "Yes of course, why would one even consider not getting children vaccinated?"

Participant # 43 explained that vaccinations are recommended because these fight the diseases that may be transmitted to the children. However, he had some concerns on flu vaccines:

> "Yes for serious illnesses as we've seen many people who had lost their lives due to lack of vaccines...My son had his regular vaccines, as it prevent serious illness like HPV, Meningitis, polio vaccines. But I'm against the unnecessary ones like flu vaccines because after I got it, I had an awful flu. It was probably one of the worst flu I've ever had, it was really really bad".

Participant # 44 expressed how important vaccinations are because of the positive effects they bring:

> "Yes, I do believe that vaccinations are important, in the long run it prolongs life and take care of disease and if you get the disease, the vaccines will reduce the severity of the diseases."

Participant # 47 shared that he definitely believes that vaccines have positive effects thus he greatly recommended them:

> "I would definitely recommend it for kids and adults. I remember where I grew up in overseas, I encountered a disease because I didn't take the chicken pox vaccines, I had it when I was 13, and so did my siblings as well. So, we all ended up in bed for few weeks".

Participant # 48 also echoed that vaccinations should be recommended and followed:

> "Yes, I don't see any issue with getting my daughter vaccinated."

The only minor theme that followed the third major theme was that four parent participants were concerned with the possible side effects to the children that may emerge after the vaccination. Participant # 29 admitted that she does not support vaccinations for children, as she is afraid of the side effects:

> "I don't like to give my children vaccines but I have to in order for him to be enrolled in school. No, but I'm concerned about the sudden side effects that might appear in the future."

Participant # 33 admitted that although he supports getting vaccinations, he is still scared of the possible side effects that these might bring:

> Yes, but every time we had to take our kids to the pediatrician, I remember my wife gave me hard time as she was so concerned about the side effects. To be honest, I was concerned as well since I had a sister with down syndrome (this might have nothing to do with vaccination) but I was afraid from the combination of those factors (I'm not a doctor, you know!)

Participant # 45 admitted that the side effects of vaccinations caused her to not believe in the procedure:

> "Honestly no. I didn't have (or any of kids) any side effects; however, I feel that I got lucky. Seeing the side effects of vaccines makes me feel uncomfortable and at risk."

The fourth major theme that was discovered, answering the research question on the factors which may affect parents' decision to vaccinate or not their children, was that they perceived that the chief factor of their decision would be the (1) mandatory vaccination for individuals especially the children to be protected. The fourth major theme received the highest number of responses with 16 occurrences out of the 24 interviewed adolescents or 67% (Table 7). There were three other perceptions that emerged but are considered as minor themes; given that they received relatively lower responses and occurrences than the fourth major theme. The other factors that the parents usually consider in deciding whether they should have their children vaccinated were the: (2) ensured effectiveness of the vaccines through awareness with ten occurrences or 42%, (3) vaccinations should have the same mandates and rules all over the world with one

occurrence or 4%., And the (4) recommendation from the doctors to have the children vaccinated, again with one occurrence or 4%.

Table 7

Emerged themes regarding the factors which may affect parents' decision to have their children vaccinated or not (RQ1, parents)

Emerging Themes	# of occurrences	% of occurrences
Major Theme 4: Mandatory vaccination for individuals especially the children to be protected	16	67%
Minor Theme 1: Ensured effectiveness of the vaccines through awareness	10	42%
Minor Theme 2: Vaccinations should have the same mandates and rules all over the world	1	4%
Minor Theme 3: Recommendation from the doctors to have the children vaccinated	1	4%

For the fourth major theme, parents reported among other thoughts: Participant # 25 stated that vaccinations should be mandatory so that their children would be protected:

> "Mandatory. Yes, since I'm a dentist, I have an idea what are the vaccines should be given. Also, my husband is pediatrician graduated from Damascus (Syria back in 2001) so he's aware as well".

Participants # 27, 28, 30, 35, 37 simply shared that to encourage others to stay healthy vaccinations should be:

> "Mandatory."

Participant # 31 explained that:

> "I absolutely believe that vaccines should be mandatory. If you think about the odd disease we have over the years, I think it'll be much worse without vaccines."

Participant # 34 confidently shared that indeed, vaccinations should be mandatory:

> "I absolutely think it should be mandatory. Without vaccines, half of us would be dead probably."

Participant # 36 shared a suggestion on whether or not vaccines should be mandatory:

> "I think critical vaccines should be mandatory where they might infect or impact the health of other children such as polio. However, with other vaccines like flu shot, this might be better left to the discretion of the parents."

Participant # 39 shared why making vaccinations mandatory is crucial:

> "It needs to be made mandatory for all children. I don't think all the children get vaccines and I wonder what risks this will bring to my daughter. Mandatory, all children and all ages. I don't understand this option where children can avoid getting vaccinated for personal reasons; I think this puts all the other kids at risk".

Participant # 40 also mentioned that for people to be truly and effectively safe, vaccinations should be mandatory:

"It should be mandatory. What good is it if only half the population takes vaccine?"

Participant # 41 added that vaccines should be mandatory for all children:

> "It needs to be mandatory for all children. No exceptions because of religion or beliefs or because parents don't like it."

Participant # 42 believed that vaccinations should be mandatory but suggested that:

> "It should be mandatory; however the number and amount of vaccines should be determined by real doctors with real interest and concern for the health of children, and not by pharmaceutical companies."

Participant # 46 expressed that vaccinations should be obligatory because:

> "Mandatory, because they prevent diseases and death."

Participant # 47 also made known that another factor would be to make the vaccinations mandatory:

> "Mandatory... Everyone I know make sure to get their children vaccinated, except for one family, (the father is chiropractor and his wife is housekeeper, and I kept asking them why can't they vaccinate their four children? They never had a clear answer, yet concerned about issues surrounding vaccination".

Participant # 48 explained that vaccinations should be mandatory for children around the world:

> "Definitely it should be mandatory and it should applied to all children around the world."

The first minor theme that followed the fourth major theme was that ten parent participants also considered the: ensured effectiveness of the vaccines through awareness.

Participant # 25 stated that different agencies and clinics should ensure the public of the importance of vaccines:

> "However, I think public health agencies or clinics should provide posters explaining the importance of vaccines."

Participant # 29 also shared another factor of having more studies to confirm the effectiveness of vaccines:

> "I wish there are solid research studies that confirm lack of any relationship between vaccines and ADD, ADHD, and other diseases. I remember that there was a case in Australia maybe where the child had severe side effect after having one of the vaccines so I'm afraid that my son will have one of these side effects one day".

Participant # 32 stated that her concern is simple with:

> "I just want to know if it's right that the vaccines will lead to bad things, that's all what I need to know."

Participant # 33 echoed Participant # 32's concern that:

> "Intensive research that covers vaccination side effects [is needed]."

Participant # 37 suggested that lessons for awareness are needed to be implemented:

> My main concern is with regards to getting vaccines that could potentially be recalled due to manufacturing defects. I have heard of several recalls in the past years and it concerns me with my child being exposed to such a bad batch of vaccine. Hopefully there were some lessons learned from these incidents and that we would have a reduced chance of seeing this happen again.

Participant # 39 also shared that awareness is needed especially with regard to the side effects that the vaccines may bring:

> "Doctors should make clear to parents what are the benefits or potential side effects of vaccines. We need to be aware if there is even small chance that vaccine will cause problem."

Participant # 43 added that another factor would be the ensured effectiveness of the vaccines:

> "Not on the vaccination schedule itself, but rather on the formula of these vaccines given. Also, I hope that pharmaceutical companies are absolutely sure about the effectiveness of ingredients given."

Participant # 44 echoed that research and development should be considered to ensure the effectiveness of the vaccines:

> "Research and development by using large groups and numbers. As I said before, everybody reacts differently to vaccines, so pharmaceutical companies should give it some time to see any severe side effects."

Participant # 45 also stated that the companies need to provide clear support for the effectiveness of vaccinations:

> "We need clear answers, without any fabrication or misleading information, just honest and precise answers."

Participant # 47 also suggested that more educational research and information are needed:

> "The states should offer more educational information through libraries, schools, seminars to address the pros and cons of vaccines."

The second minor theme that followed the fourth major theme was that one parent participant suggested that: Vaccinations should have the same mandates and rules all over the world. Participant # 38 suggested that for parents to be encouraged to have their children vaccinated, the requirements or mandate should be the same all over the world:

> "It should be the same from state to state. When I moved from California to Arizona, there were different requirements. In China there also different requirements from US. I would like to one day see the same requirements around the world. Which one is right and which one is wrong, I don't know".

The third minor theme that followed the fourth major theme was that again, one parent highly considered the recommendation from the doctors to have the children vaccinated. Participant # 41 stated that another factor would be the recommendation from the doctor:

> "Yes of course, their mother or I would take them to the doctor for their vaccine. I don't know exactly what each one is for, but we did what was recommended by the doctor."

Emerged Themes for RQ2

Health care providers

The fifth major theme that was discovered, answering the second research question (health care providers) on the physio-psychological vaccination consequences for their patients, was that the health members perceived that (1) side effects are mainly emotional. The first major theme received the highest number of responses with ten occurrences out of the 24 interviewed health care members or 42% (Table 8). There were four other perceptions that emerged but are considered as minor themes; given that they received the lower number of responses when compared to the fifth major theme. It was also believed that: (2) both physical and emotional side-effects are present with six occurrences or 25%; (3) no real side-effects considered and known with four occurrences or 17%; (4) benefits of vaccination outweigh the side-effects with three occurrences or 13%; and (5) side-effects are mainly on the physical aspect with one occurrence or 4%.

Table 8

Emerged themes regarding the physio-psychological consequences for their patients (RQ2, health care providers)

Emerging Themes	# of occurrences	% of occurrences
Major Theme 5: Side effects are mainly emotional	10	42%
Minor Theme 1: Both physical and emotional side-effects are present	6	25%
Minor Theme 2: No real side-effects considered and known	4	17%
Minor Theme 3: Benefits of vaccination outweigh the side-effects	3	13%
Minor Theme 4: Side-effects are mainly on the physical aspect	1	4%

For the major theme on the vaccination consequences as observed by health care providers, participants shared that:

Participant # 50 shared that the side effects were mainly on the emotional level:

"Yes, they're mainly emotionally and rarely physically."

Participant # 51 added that the side effects were more on the emotional side of the children:

> "Yes, I witnessed usual emotional side effect like crying. In fact, it's unusual to see a child that doesn't cry when he gets vaccine. It's tough sell for many children."

Participant # 54 shared why children usually do not like being vaccinated:

> "Yes, I've noticed that children just don't like the shape of the syringe. It usually depends on how good are you in administrating the vaccines. If it's harmful, then they'll have bad experience and they won't like it".

Participant # 55 also stated that the effects were mostly minor:

"Yes, they're minor side effects like swelling, and redness (fever occasionally)."

Participant # 56 echoed that the effects of vaccination were mostly on the emotional side:

"I know that infants and toddlers get frustrated every time they have vaccines."

Participant # 59 confidently shared that the consequences were more at the emotional and rarely at physical level:

> "Yes, emotional and rarely physical. I remember there was an issue with Tamiflu, which is not a flu vaccine. It's given to minimize the severity of flu, especially when you have a sever flu season. I don't see any of these side effects anymore".

Participant # 63 reported:

> "Yes there are both emotional and in some cases physical side effects from vaccines. The emotional side effects are more common in my experience and come from fear of the vaccine injection and from concern on what side effects it may cause. This is clearly seen in patients where they continue to ask questions, appear uneasy, and look for ways in delaying the injection".

Participant # 68 shared the "emotional side effects of crying and whining".

Participant # 69 stated that the consequences are more on the emotional side, which is normal:

> "Just emotional I would say which is pretty normal."

The first minor theme that followed the fifth major theme was that six health care providers observed that both physical and emotional side effects were present. Participant # 60 admitted that there were both physical and emotional side effects present:

> "Yes, some emotional and physical side effects."

Participant # 61 in particular shared her experiences in UAE:

> "Yes, there are also side effects, and especially here in the UAE you will sometimes find situation where vaccines have expired, and or have been recalled by the manufacturer and we are not informed of this."

Participant # 62 addressed the misconception that vaccines only bring positive benefits:

> "Yes, sure vaccines are just like any medication, it has side effects and concerns that parents need to be aware of. There is a misconception that vaccines are beneficial to all with no side effects or issues, this is not the case".

Participant # 67 shared that the usual consequences would be more on the physical and emotional aspects:

"I know only the usual side effects which are swelling or discomfort."

Participant # 70 added that there were only minor emotional and physical consequences:

"Minor emotional and physical side effects."

Participant # 72 stated that the three consequences were usually present:

"Discomfort, redness, and swelling."

The second minor theme that followed the fifth major theme was that four health care providers observed that no real side effects considered and known. Participant # 49 stated that there are no side effects present, as the common ones mentioned (redness and swelling) cannot be considered as real side effects:

> "I won't call redness and swelling as side effects. Even emotional ones like crying, it can't be categorized as side effects. When you talk about side effects, it means obvious signs that can threat the patient's life if it left untreated. Since these are not considered as side effects, I can't provide any suggestions regarding the health care systems strategies".

Participant # 57 simply replied when asked about the side effects:

"No."

Participant # 64 stated that a misconception on the side effects was present:

> "There is significant misconception due to inaccurate media reports or sometimes a recall will cause great concern with patients."

Participant # 71 added that the decision on what the consequences of vaccination are goes beyond the regular side effects:

> "The thing is not about the emotional or the basic physical side effects, it's beyond that. Many parents are using alternative vaccination schedules for their

> little ones, and many actually skip many visits to avoid vaccines altogether. Many parents think it's just too much for their kids".

The third minor theme that followed the fifth major theme was that three health care providers observed that the benefits of vaccination outweigh the side effects [it may bring]. Participant # 53 stated that benefits truly outweigh the possible side effects present:

> "There are no disadvantages in my experience. I've been doing this for over 20 years and I can tell you that vaccination is very important to the well-being of the children. The side effects are so rare and small in nature compared to the benefits".

Participant # 56 explained that the positive effects of vaccination outweigh the possible side effects it may bring:

> "I always tell my patients that vaccines these days cause fewer problems than in the past. On the day of vaccination, most people can work, drive a car, play sport or go to the gym, but it is best to take it easy and not to do heavy activity on that day, but usually modern vaccines do not leave a scar. Sometimes some vaccines can cause rare and less common reactions, but the benefit sometimes outweighs the cost".

Participant # 65 added that side effects may be present but the benefits prevail over them:

> "Yes, there are side effects; there are always side effects with any vaccine or medications. Even a medication as simple as a low dose aspirin has side effects. The problem is that people need to understand and weigh the difference between the advantages and disadvantages".

The fourth minor theme that followed the fifth major theme was that one health care provider observed that the side effects were mainly on the physical aspect.

Participant # 66 was not aware of any emotional side effects but focused more on the physical aspect:

> "No, I am not aware of any emotional side effects regarding vaccines in general. However, I am aware of physical side effects regarding vaccinations in general."

The sixth major theme that was discovered, answering the second research question on the character of vaccination schedule (mandatory or voluntary was that the health members had (1) no significant disadvantages were reported for the received vaccination schedule, so mandatory vaccination schedule was suggested. The sixth major theme received the highest number of responses with nine occurrences out of the 24 interviewed health care provider or 38% (Table 9). There were three other perceptions that emerged but are considered as minor themes; given that they received the lower number of responses when compared to the sixth major theme. It was also believed that: (2) vaccination schedule in US is effective with six occurrences or 25%; (3) voluntary vaccination schedule in Japan allowed enough time for the patients to prepare and make decisions, with five occurrences or 21%; and the (4) global vaccination schedule is effective with four occurrences or 17%.

Table 9

Emerged themes regarding the character of vaccination schedule, mandatory or voluntary

(RQ2, health care providers)

Emerging Themes	# of occurrences	% of occurrences
Major Theme 6: No significant disadvantages were reported for the received vaccination schedule	9	38%
Minor Theme 1: Vaccination schedule in US is effective	6	25%
Minor Theme 2: Voluntary vaccination schedule in Japan allows enough time for the patients to prepare and make decisions	5	21%
Minor Theme 3: Global vaccination schedule is effective	4	17%

For the sixth major theme health care providers reported among others that:

Participant # 49 stated that vaccinations had unlimited benefits, although unpredictable risks were also possible:

> "The benefits are unlimited, and risks are possible but unpredictable."

Participant # 54 did not see any disadvantages in the vaccination schedule:

> "I don't see any disadvantages, however; parents keep asking me why do I have combined vaccines and if it safer. Sometimes, I give the vaccines in separate visits (based on parents' request)."

Participant # 55 stated that the only vaccination consequence she was aware of was the fever after the vaccination:

> "The only disadvantage I found is the side effect after vaccination. We usually inform parents to give their children Tylenol if the child has fever, and if the fever continues for more than three days then they have to contact us. I've never witnessed a severe side effect. Also, I go to my clinic 3 days a week only as I work as an adjunct professor as well".

Participant # 56 had no specific vaccination schedule provided but advised the following:

> "The advantages that vaccines are given frequently so the child or patient have a good immune system. The disadvantage is that parents tend to forget keeping track with the schedule all the time."

Participant # 67 believed that the side effects of the received schedule were minor:

> "Side effects are minor so there is no need for any strategies."

Participant # 68 shared that multiple visits can bother some for parents and children but had no specific schedule suggested:

> "The only thing that bothers most parents is the fact that we have to apply multiple doses at one visit, especially for young children."

Participant # 71 echoed Participant # 68 concerns:

> "As I said, it might be overwhelming for many parents, and the number of vaccines given to children should be explained to parents."

The first minor theme that followed the sixth major theme was that six health care providers reported that the vaccination schedule in US is effective. Participant # 61 admitted that the US schedule has been the basic schedule followed for years and no changes were recommended:

> "Our schedule is basically based on the US mandatory schedule. This has worked well for us here and I don't see us making or recommending changes anytime soon."

Participant # 62 echoed that the vaccination schedule of the US is effective for most patients:

> "The US based schedule is very conservative and in my opinion seems almost excessive, especially when compared to Europe. I'm not saying that one is better than the other; however I do find that in the US medication is the first choice, while in Europe we always first try alternate solutions before attempting medications and antibiotics".

Participant # 63 elaborated on why the US schedule was the most effective of all:

> "The vaccination schedule use in the US today has evolved over many years and through continued research. It provides the highest level of protection to our children and sets the standard for the rest of the world to follow. The only problem we have is more related to cost and the availability of vaccination to the whole population, which remains a challenge".

Participant # 66 stated that the US schedule had no disadvantages:

> "I don't see any disadvantages of the vaccination schedule, and I can only see the benefits of the current vaccination schedule which is keeping track of the updated vaccines and maintain human body immunity."

Participant # 69 also declared that the US schedule was an excellent one:

> "I think the vaccination schedule in the US is excellent and there's nothing wrong with it."

Participant # 72 explained why the US schedule should be followed and provided the main advantages:

> "The American vaccination schedule is very clear and organized; I don't see a problem with that. The only thing for health care providers is to share the vaccination side effects openly with parents and patients."

The second minor theme that followed the sixth major theme was that five health care providers implied that the voluntary vaccination schedule in Japan allows enough time for the patients to prepare and make decisions. Participant # 52 stated that the vaccination system in Japan was most effective:

> "The vaccination system in Japan is by choice and you have time frame to get vaccinated so there is no rush."

Participant # 57 echoed that the benefits of the Japanese vaccination schedule were easy and flexible to follow:

> "The benefit of Japanese vaccination schedule is very easy and flexible, and there is no pressure to get all the vaccines. I'm not quite sure about the rest of the world but I know it is different."

Participant # 58 added that the vaccination in Japan was already good:

> "I think the vaccination schedule in my country is good and parents never complain about it."

Participant # 59 stated that Japan Health Care was doing an excellent job on the vaccination schedule:

> "Japan Health care Info (which is social organization), is doing an excellent job covering all the vaccination schedules, explaining the updates and changes in that schedule. For an example, Once the HPV vaccine was suspended because parents were complaining about the side effects, the organization published that so it updates the parents with the new routines, and costs. (Usually voluntary vaccines are not free)".

Participant # 60 also implied that the Japanese vaccination schedule was one that should be followed by other countries:

"The Japanese vaccination schedule is very good and it doesn't have any negative facts."

The third minor theme that followed the sixth major theme was that four health care providers implied that the global vaccination schedule was effective. Participant # 50 explained that the vaccination schedule used in his country is the one used globally:

> "The vaccination schedule in UAE follows or similar to the British vaccination schedule. So it's used globally and nothing different about it."

Participant # 51 stated that the global vaccination should be retained:

> "The vaccination schedule is global all around the world, and it's been the same for years and I don't see any advantages and disadvantages."

Participant # 64 added that the schedule was already set by the CDC:

> "The advantages are clear and many. The schedule is set by the CDC and significant research has gone into developing this schedule. The disadvantage is with regards to keep cost under control and making this available to all people."

Participant # 70 from her country at present believes that the schedule was effective if decided by the parents:

> "I can answer this question by addressing the advantages and disadvantages of vaccines, but not the schedule itself. I believe parents will answer this question better than me."

The seventh major theme that was revealed form health care providers interviews answering the second research question on the role of public health agencies or other authorities to better educate parents regarding the benefits of vaccination, was that the health members believed that agencies should (1) properly convey the benefits of vaccination through different mediums of communication. The seventh major theme received the highest number of responses with 11 occurrences out of the 24 interviewed health care members or 46% (Table 10). There were four other perceptions that emerged but were considered as minor themes, given that they received the lower number of responses when compared to the seventh and last major theme. It was also believed that other roles of the agencies and authorities were: (2) to impose stricter rules and policies from the authorities in discussing information about vaccinations between parents and doctors, with six occurrences or 25%, (3) unknown roles, shared with three occurrences or 13%.,(4) to improve communication with parents using technology, with three occurrences or 13%., and to (5) develop programs that are well established and well founded with one occurrence or 4%.

Table 10

Emerged themes regarding the role of public health agencies or other authorities to better educate parents regarding the benefits of vaccination (RQ2, health care providers).

Emerging Themes	# of occurrences	% of occurrences
Major Theme 7: Properly convey the benefits of vaccination through different mediums of communication	11	46%
Minor Theme 1: Impose stricter rules and policies from the authorities in discussing information about vaccinations between parents and doctors	6	25%
Minor Theme 2: Unknown roles shared	3	13%
Minor Theme 3: Improve communication with parents using technology	3	13%
Minor Theme 4: Develop programs that are well established and well founded	1	4%

For the seventh major theme, health care providers partly reported that:

Participant # 49 stated that health agencies should be more proactive in communicating the benefits of vaccination:

> "Simple flyers with simple images explaining the consequences of not vaccinating their children or the side effects of vaccines (which are rare)."

Participant # 50 added that hospital staff should be accommodating to the parents who want to learn more about vaccination and that agencies should:

> "I understand that new mothers might feel uncomfortable when their children get vaccinated but that's normal. The medical staff should be friendly and explain in details the importance of vaccines, and I don't think having such a situation will need strategies. Like anywhere in the world, CDC or public health agencies should offer classes, videos, or assign women in special programs".

Participant # 51 stated that public health agencies should educate the public especially the parents and even the doctors themselves:

> "Public health agencies can educate parents through schools, or doctors themselves. Basic information can be very helpful for many mothers like when the flu shot should be given, and nasal vaccines should not be given to children who have asthma or diabetic".

Participant # 53 reported that in Bahrain, the media was the most effective medium and they can properly convey the importance of vaccination to the public through it:

> "In Bahrain the media is the most effective means. Everyone watches TV and the government should focus on this to help inform and promote vaccinations."

Participant # 54 suggested that the public agencies should provide workshops for an increased awareness:

> "If health care programs can give workshops at hospitals before or after birth so women will have an idea about what are they going to experience. Educational lectures, brochures, booklets provided at the hospitals or schools."

Participant # 55 added that flyers and other educational programs could help increase the awareness on the benefits of vaccination:

> "Flyers, or educational programs at the clinics. I think their website should be simple and rich with all the information needed for parents. Social media like Facebook and twitter are good sources to disseminate information as well."

Participant # 59 suggested that public agencies should be responsible for bringing facts and awareness to the public:

> "It should explain and list all the facts related to vaccines or medications."

Participant # 63 highlighted that public agencies should also be accountable in delivering the right information and messages about vaccination:

> "Again, I believe that information should be available through other means aside from the doctor's office. The more methods in which there are to deliver the message the more likely that the message will reach its intended target. It is also crucial that the information in made clear and easy to understand, with use of common English so that all parents of various backgrounds and education can understand and follow".

Participant # 66 explained that public awareness needed to be increased and that the public health agencies should be the main actors and movers:

> "As I mentioned before, the community based health care programs are the best solution. Also, I believe that to minimize the concerns about vaccinations; public awareness needs to be increased about the fraudulent research by Andrew Wakefield. Andrew Wakefield smeared the positive reputation and benefits of vaccinations".

Participant # 67 echoed that providing educational knowledge and awareness should be the main job of public health agencies:

"Providing educational programs and seminars."

Participant # 70 emphasized that public health agencies should provide the public with clear information on the benefits and advantages of vaccination:

"Clear and updated information addressing the benefits of vaccination."

The first minor theme that followed the seventh major theme was that six health care providers implied that health agencies should impose stricter rules and policies from the authorities in discussing information about vaccinations between parents and doctors. For example, participant # 56 suggested that public health agencies should impose stricter rules on vaccination:

> "CDC should have restricted rules encouraging doctors to have clear discussions with their patients."

Participant # 57 suggested that public health agencies can encourage better communication between doctors and patients:

> "There are no programs needed. The best way to make parent comfortable is that the doctor or the nurse should be gentle when they administer the vaccine."

Participant # 61 personally observed that an improved confidence on the doctors helps in encouraging vaccination support"

> "I feel that parents in the UAE know of the need and benefit of vaccines and I find in most cases they have total confidence doctors and don't ask an additional question."

Participant # 64 added that parents should be informed by public health agencies on the possible effects of not being vaccinated and other relevant information:

> "Parents need to understand the potential negative side effects of not being vaccinated. Once they see this they will certainly give vaccination a higher priority."

Participant # 65 highlighted that public health agencies should mandate better education for parents:

> "They should mandate the need for educating parents and providing the standard that should be used."

Participant # 69 echoed that the CDC should mandate better knowledge support for the parents:

> "CDC should fulfill the parents' need of facts that support vaccination."

The second minor theme that followed the seventh major theme was that three health care providers reported that they were unaware of the roles of public health agencies. Participant # 52 admitted that she was not aware of the roles of public health agencies:

> "I have no idea."

Participant # 58 also stated that she does not know the roles of public health agencies:

> "I can't answer because I don't know."

Participant # 60 explained that being based in Japan, she is not very much aware of the basic responsibilities of public health agencies in U.S.:

> "I live in Japan, so sorry I can't answer."

The third minor theme that followed the seventh major theme was that another three health care providers wanted the health care agencies to improve communication

with parents using technology. Participant # 62 suggested that technology could play a big role in helping public agencies reach the parents for vaccination support:

> "Net based media should be used more, as clearly more and more parents are using this for their research, email, and have a higher dependence than ever on this."

Participant # 68 echoed that the use of websites can improve the knowledge of parents as well:

> "Updating their website regularly with new studies so parents will use it as a solid source to rely on"

Participant # 72 also shared the effectiveness of the CDC website:

> "CDC website has provided tremendous amount of information to parents and health care providers."

The fourth minor theme that followed the seventh major theme was that one health care provider participants wanted the health agencies to develop programs that are well established and well founded. Participant # 71 solely suggested that well founded programs are the main solutions to the vaccination issues currently present:

> "I think having well established programs is the solution."

Evidence of Trustworthiness

In this qualitative research study, the researcher established validity and reliability through the following: credibility, transferability, dependability, and inter-coder reliability. The researcher established credibility in the study by warranting that the issues being discussed were evident throughout the study, thus it was ensured that the interviews were not interrupted at any cost or not ended prematurely. In addition, the

researcher repeatedly performed member checks with all 72 participants to certify the precision of the interview transcripts. The researcher also regulated transferability by taking note of each procedure and step of the research process employed. These notes and logs will be secured for a period of at least five years as suggested and required by the University. This was followed by conformability, which was achieved by having the 72 participants corroborate and authenticate what they have shared to the researcher. Lastly, I also attempted to establish inter-coder reliability, as my dissertation supervisor (V.M.) and I reported all the codes independently to achieve the maximum validity and reliability of the analyzed themes. Additionally, the similarities and differences in interpretation of the qualitative data were discussed prior to the presentation of the qualitative data

Summary

The developed themes emerged from the qualitative interviews of the study were presented in detail in this chapter. The sample consisted from 24 adolescents, 24 parents, and 24 health care providers who have experienced various vaccination schedules. The researcher, through the responses of the 72 participants, rationally analyzed the experiences, knowledge, and perceptions shared during the interviews wherein new meanings and answers were extracted in order to address the research questions of the study. Overall, seven major themes revealed during the data collection:

(1) Adolescents generally believed that the consequences of vaccinations were *positive and they felt that the received vaccination schedules had beneficial effects (RQ1).*

(2) Adolescents also believed that *mandatory vaccination for individuals is needed to be safely protected against diseases* (RQ1).

(3) Parents reported that vaccination schedules allowed them to recommend *vaccination due to the positive effects to children's health* (RQ1).

(4) The great majority of the parents suggested that vaccination should be mandatory (RQ1).

(5) Health care providers reported that vaccination *side effects were mainly emotional* (RQ2).

(6) No significant disadvantages were reported for the received vaccination schedule, so mandatory vaccination schedule was suggested (RQ2).

(7) Finally, health care professionals generally believed that public health agencies should *properly convey the benefits of vaccination through different mediums of communication (RQ2).*

In chapter 5, interpretation of these findings, recommendations for future research and practice and conclusions will be provided.

Chapter 5: Discussion and Conclusions

A review of the existing literature indicated that there is a paucity of studies investigating the impact of different vaccination schedules on individuals' physical and psychological health (Burchett et al, 2012). In response, the purpose of this study was to understand the beliefs, experiences and perceptions of adolescents, parents and health care providers regarding different vaccination schedules, mostly between mandatory and voluntary vaccination schedules. This includes an exploration of how anthroposophic, cultural, religious and others beliefs may obstruct parents from getting their children vaccinated, and of parents' and adolescents' potential discomfort about vaccines and their knowledge on vaccination effectiveness, while each year, approximately 24 million infants less than one year of age remain unvaccinated throughout the world in developed countries (The Children's Hospital of Philadelphia, 2012).

In this final chapter, the results of the qualitative data analysis will be discussed in relation to the existing literature on the topic under study, and conclusions for further research and practice will be also provided. I will also discuss the social change implications and recommendations of this study's results.

Interpretation of the results

In the United States and around the world, vaccines are responsible for the reduction of the prevalence and incidence of many common infectious diseases, such as polio, measles, diphtheria, pertussis, rubella, smallpox, mumps, tetanus and Haemophilus

influenza type B (HiB) (Garret & March, 2009; CDC, 2012). However, some vaccines may also carry side effects that range from the minor to the serious. While rare occurrences, these serious side effects can include thrombocytopenia from measles vaccines or chronic encephalopathy from the DPT (diphtheria, tetanus and pertussis) vaccine (CDC, 1996). Similarly, the National Vaccine Information Center (2012) released that 1 in 875 DPT shots contribute to collapse/shock reaction, which could affect 18,000 American children annually. In response to the adverse effects caused by vaccines, governments worldwide have made amendments in terms of their recommendations for vaccines (O'Shea, 2008; Kulenkampff, et al., 1974). These side effects have also encouraged some countries, such as Japan, to implement a non mandatory but recommended vaccination system (Omara, 2010). Despite its reduced emphasis on vaccination, Japan has the third lowest infant mortality rate in the world (Appendix B), while at the present, most western countries still debate policies on "mandatory" vs. "nonmandatory but recommended" vaccination policies.

The increased concern over the risk associated with vaccines, including illnesses following immunization (Chen & Hibbs, 1998; Ellenberg & Chen, 1997; Centers for Disease Control and Prevention, 1997) over the recent years have resulted in studies conducted on the impact of potential side effects of vaccinations schedules on individuals' health. However, there is a paucity of qualitative studies exploring this impact. In line with this gap in the literature, the purpose of this study was to qualitatively investigate the impact of different vaccination schedules on infants' and children's

physio-psychological health. To accomplish this purpose, a qualitative study was conducted, using an ethnographic design, focusing on social interactions, behaviors and perceptions within a particular group (Reeves et al., 2008).

For this qualitative study, the researcher concentrated on addressing two main research questions and hypotheses. The first research question was formulated to determine the themes derived from the reports from parents and adolescents from different vaccination backgrounds on the physio-psychological consequences for the received vaccination schedules and the factors that may have affected their decision to be vaccinated or not. The second research question was addressed based on data collected from health care members. This research question focused on the themes that were derived on the physio-psychological vaccination consequences for their patients, the type of vaccination schedules (mandatory vs. non voluntary but recommended) and the role of public health agencies or other authorities to better educate parents regarding the benefits of vaccination.The thematic data analysis resulted in seven major themes, which can be further classified into three groups: adolescents, parents, and health members. Based on these themes it was found that for adolescents, the consequences of the vaccinations were overall positive and beneficial, regardless the given mandatory or voluntary schedule. The adolescents who received mandatory vaccination, reported that this scheme was appropriate to protect individuals against diseases. On the other hand, the themes derived based on the responses of parents indicated a recommendation for vaccination because of the perceived positive effects on children's health. The parents' responses also signified

that the decision to vaccinate would be affected by recommendations for mandatory vaccination for individuals, especially to protect the children. The last set of themes was based on the responses of the health care providers. According to the health care members, vaccination side effects were mainly emotional. The health care members suggested that vaccination schedule should be mandatory, and they believed that public health agencies should properly convey the benefits of vaccination through different mediums of communication.

Discussion of Results in Relation to Literature

According to the results of the study, a general comment may be that it was observed a generally positive view on the issue of vaccination from all the participant groups (adolescents, parents and health care providers). Most of the participants indicated a belief in the benefits of vaccination, citing its ability to protect children from life-threatening or debilitating illnesses. The majority of the participants also suggested a mandatory vaccination schedule for children.

One interesting point to note is that the respondents, who reported knowing people who did not vaccinate their children, stated that these individuals did not have a reasonable explanation for declining to vaccinate, apart from a general fear of side effects. Some participants cited the media as a source of confusing data on vaccination. This is in accordance with previous research (Moynihan et al., 2000), which indicated that news-media stories about common medications may include inadequate or incomplete information about the benefits and risks of drugs. Therefore, focusing on the

potential side effects of the vaccine can overshadow the benefits of vaccination. However, this is not to say that the potential side effects of vaccine should be overlooked. There is still a need to make the public aware of the potential side effects of vaccines, but information on side effects should be credible, and supported by scientific studies conclusively proving that the identified side effects are attributable to vaccination.

This indicates that a key issue in the debate between pro-vaccination and anti-vaccination advocates is the lack of reliable and credible information for parents to use as a basis in making an informed decision on whether to vaccinate or not and this finding is also supported by some studies (Kent, 2009; MacDorman & Matthews, 2009; Miller & Goldman, 2011). As some of the participants reported their concerns on the reception of multiple vaccines in one visit, this information should also include some suggestions on reducing multiples vaccines in a single visit, as studies have shown that increasing infant mortality rates displayed a high statistical interconnection with the expanding number of vaccine doses (Kent, 2009; MacDorman & Matthews, 2009; Miller & Goldman, 2011). Therefore, more information needs to be provided for parents on the risks of administering multiple dose vaccines.

According to the results of the study, no cultural, religious of similar factors appeared to affect parents' decision to get their children vaccinated, due to their confidence on the effectiveness of vaccination schedules. This is not in accordance with previous studies; one factor that appeared to affect the decision is the strong emphasis on individuality in the United States. In the exercise of their individual right to protect

themselves and/or their children if they do not believe in the existing medical evidence about the relative safety of vaccines, or if their individual ideological or religious beliefs do not encourage vaccination (Blum, 2006; Salmon & Omar, 2006), parents choose to decline to vaccinate their children. The decision to not vaccinate based on religious reasons is to be respected, yet, a crucial aspect of this exercise of individual rights is also affected by the lack of trust in the existing evidence on the value of vaccines and the likelihood that side effects will occur (Heininger, 2006). Outside the United States, the decision to refuse to vaccinate is also based on misinformation, such as case in Nigeria (The Children's Hospital of Philadelphia, 2012b) and some Muslim countries (Warraich, 2009). Similarly, various studies that were cited in the campaign against vaccination are not necessarily backed by empirical data (The Children's Hospital in Philadelphia, 2012; Godlee, Smith & Marcovitch, 2011; Mercola, 2010). Once again this goes back to a problem that can be addressed by continuing to conduct scientifically sound studies on the benefits and risks of vaccination, and providing the general public with credible and empirical evidence on the pros and cons of vaccinating children. It is emphasized that these studies should be backed by credible data, based on extensive testing and experimentation. Such credible studies, especially on the side effects of vaccines, are also necessary in order to improve current formulations and reduce associated side effects (The Children's Hospital of Philadelphia, 2012a). Fortunately, the results of this study indicated that most parents were well informed on vaccination benefits, and they supported the received vaccination scheme.

As far as adolescents' attitudes or believes towards vaccination are concerned, an overall positive and beneficial perceived effect of vaccines was observed, and this was also mostly perceived from their teachers and parents. Small percentage of the participants noted vaccines as painful, and in some cases as ineffective since got the flu even after getting the flu shot. Others were simply concerned with regards to the possibility of potential side effects after vaccination. This could be attributed to the fact that adolescents can be influenced by their parents or health care providers exaggerating psychologically the potential side effect of the flu vaccine, and overseeing its actual influence on their health. According to the American Academic of Pediatrics (2005), some parents and health care providers still question the need for a yearly dose of the flu vaccine, classifying it as unnecessary (American Academic of Pediatrics, 2005), and ineffective (Sepper, 2013).This might align with a systematic review conducted by Mills et al. (2005) in UK, identifying some concerns about vaccines being painful for some children (Mills et al., 2005). However, these short term side effects can be neglected since they would not interfere with the patients' health, and are common with any injection administered.

Through detailed discussions with health care providers, it became apparent that they had a clear image of the character of vaccination schedules, and would hence substantiate the absence of significant consequences of vaccines. Also, most of them encouraged the adoption of mandatory vaccination schedules, and recognized the benefits that lay behind it. Most health care providers believed that most patients were informed

about the common benefits and risks of vaccination, which was consistent with parents' opinions and similar studies (Gust et al., 2005). While according to one participant interviewed (Participant # 56), health agencies should impose stricter rules and policies from the authorities in discussing information about vaccinations between parents and doctors, because many parents cannot keep track of their children's vaccination schedule.

Some health care providers reported that the number of doses was the main concern which distressed some parents, and made them reluctant to follow the vaccination schedule entirely (Participants # 68, & 71), and this finding was in accordance with some parents' reports. This results is also in a agreement with a study conducted by the Department of Family and Community Medicine, which divulged that some parents, nurses, and physicians disagree with the number of doses given (Kay & Harper, 1994), while in some cases, half a dozen or more vaccines administered all at once during a single visit (Miller & Goldman, 2011). However, the health care providers of the present study declined any fatal or serious incident in regards to the number of doses administered to their patients.

Creditability and reliance on the American vaccination schedule was elaborated by most of the health care providers, which was an indication of the accuracy of the system practiced. Most participants were familiar with foreign regulations, and only few were unfamiliar with the US public health regulations.

Utilizing the media, health care programs were greatly emphasized by most of the health care providers. Suggesting that technology, along with well-established programs

(Participant # 71, & # 62), workshops, and mainly an updated CDC website with the latest studies which discuss the benefits and side effects of vaccines can boost parent's reliance/trust and help clarify any misconceptions (Participant # 68 & # 72). This aligns with the fact that there are many states which utilize the Centers for Disease Control and Prevention's schedule for immunizations, considering this as a trustworthy source and guide since many programs and expertise have been bestowed to eliminate diseases (Hodge & Gostin, 2002; Welborn, 2005). However, providing detailed information and solid facts which discuss the potential side effects of vaccines can increase the creditability of the programs among parents. Finally, lack of studies investigating the predicted impact of vaccination can partially be attributed to ambiguous assessment of the issues, since there are other factors which can have a remarkable contribution to the issues such as diseases, cost, vaccine's effectiveness, and external factors (Burchett at al. 2012). One participant recalled an incident in the UAE, where vaccines were expired and recalled by the manufacture without a previous notification to the physicians (Participant # 61). The participant didn't address any consequences of the issue but similar incidents should be discussed publicly.

Limitations

The results of this study may be limited by the fact that some of the health care members who were interviewed were not aware of the responsibilities of public agencies of their country. Also, although precautions were taken during data collection and documentation to ensure researcher objectivity, qualitative research is considered by

some as less precise due to susceptible to natural human errors (Kung, 2013). Qualitative studies are mostly dependent on the personal views of participants, and their memories, which according to University of Southern California (2013), can be selective since people might differentiate in their abilities to recall/remember events that occurred at some point in the past. This could either present a view of the situation under investigation that is skewed towards a particular perspective than is actually advocated from other data (USC, 2013).

Additionally, since the study included participants from several countries' (e.g., Japan, France, Spain, and Middle East), cultural differences may affect the information provided by the participants, and consequently the results of the study. For example, according to Chavez (2011) politeness is one of the solid infrastructures of the Japanese culture, and Japanese tend to put people first by not hurting other's feelings or cause speaker embarrassment. Therefore, there's a possibility that some of the participants were hesitant to discuss their opinions explicitly towards the Japanese or American vaccination schedule, and they might avoid any criticism regarding the difference in the vaccination schedules (mandatory vs. voluntary).

Recommendations for Practice

One of the key issues identified based on the responses of the participants is the need for more information on vaccination. Information dissemination is crucial, especially with regards to the issue of side effects. Apart from this, the information disseminated should be accurate and credible. Otherwise, decisions on such a vital public

health issue would be made on the basis of fraudulent information, such as the Wakefield publication on the MMR vaccine.

A suggested way to disseminate information is to implement a public health program through government funded health clinics. This could be in the form of seminars, targeted in particular to pregnant women or expectant parents. This particular demographic group is targeted because these individuals are the ones who are most likely to have an interest in the subject. By providing them objective and credible information on the pros and cons of vaccination, it can allow expectant parents to take their time on making an informed decision on the issue of vaccination for their children. While these seminars are specifically targeted towards pregnant women or expectant, they should also be open to the general public for the basic purpose of information dissemination.

Based on the responses of the participants, one of the issues with vaccination is that there is no definite list of mandatory vaccines that are standardized globally. Regulations on mandatory vaccines vary from country to country. In some cases, as stated by one participant, the regulations vary from state to state. This indicates a need for a globally recognized regulating body, such as the World Health Organization, to provide a list of vaccines that are mandatory regardless of geographical location. This list could include diseases that are debilitating or life threatening, or diseases that are easily spread. The rest of the vaccines could be classified as non mandatory but recommended, their administration left up to the discretion of the parents. An example of this is the flu vaccine, which could be classified as a non-mandatory but recommended vaccine.

The existence of a list of mandatory vaccines will allow for the protection of public health, because it will help prevent the millions of deaths that are attributed to vaccine-preventable diseases. The identification of mandatory vaccines applicable worldwide can also address one of the key issues for immunization and vaccination, which is the lack of available vaccines, especially in less developed countries. By developing a list of mandatory vaccines, resources could be directed to producing vaccines that are classified as the most necessary for public health. Similarly, the resources of public health agencies could be funneled towards the provision of these mandatory vaccines that are considered to be standard around the world. The same could be said of the resources of non-profit organizations dedicated towards promoting immunization, such as the Global Alliance for Vaccines and Immunization (GAVI), the American Red Cross and UNICEF (Polio Global Eradication Initiative, 2012; Measles and Rubella Initiative, 2012). At the same time, such an approach would also give parents the security of knowing that they have not randomly administered vaccines for their child, and that only the vaccines that are absolutely necessary were given.

In relation to the recommendation on releasing a mandatory list of vaccines for children, a key point was brought up by one of the participants. The list of mandatory vaccines should be constructed by independent physicians, such as faculty members, who have no ties to or stakes in the pharmaceutical industry. Given that pharmaceutical companies have a vested interest in the standardization of vaccines, recommendations by an independent group whose focus is on public health and safety would be more reliable

for parents than information released by pharmaceutical corporations. It is suggested that this list be evaluated and approved by the World Health Organization or a similarly recognized global regulating body on public health and safety.

Recommendations for Further Research

While this study aimed to generate views and perceptions from a variety of sources, namely parents, adolescents and public health workers, future researchers may want to consider adding another perspective, focusing only on parents who opted against vaccinations. One of the issues encountered in this study was the factors that affect the decision to vaccinate. However, the participants in this study mostly included parents who have vaccinated their children. Future studies can concentrate on the opposite perspective, that of the parent who chose not to vaccinate their child. The factors that led to this decision can also be explored, to create a more inclusive picture of the issue of vaccination. A study on the decision against vaccination could also include anti-vaccination advocates, to determine whether such a stand has its roots in sound scientific evidence, or just rooted in personal anthoposophic beliefs.

In relation to the recommendation in the previous paragraph to explore the issue of vaccination from an opposing view, future researchers could also conduct a study evaluating existing sources that are pro-vaccination and anti-vaccination. In an earlier section, the issue of faulty research, as published by Andrew Wakefield, was discussed in relation to false information for the general public. In the age of social media and the internet, it is easy to spread information that may seem credible, but is not. While the

studies that tout the benefits of vaccination, there is a need for a critical evaluation of the sources that discourage vaccination, in order to add to credible information that would help parents make a properly informed decision on whether to vaccinate their children or not.

Implications for Positive Social Change

The findings of this study, while relevant for the medical community are also relevant for parents. It has been found that decisions to vaccinate or not vaccinate children may be affected on misinformed beliefs, fears brought about by increased media attention on the side effects of vaccines, or studies such as those of Andrew Wakefield's, which are not based on scientific data. It should also be noted that some parents have also admitted that while the information is available, many did not seek this information (Gust et al., 2005). This places the burden of responsibility on parents, to use the resources at their disposal to make an informed decision regarding the immunization of their child. In addition, this study is relevant for medical and public health policy makers with regard to drafting a national, and hopefully worldwide, vaccination policy that is based on medically and scientifically sound data, in order to address the fears and concerns of many individuals regarding the benefits and dangers of vaccination for children. The experiences and views shared by parents, adolescents and health care workers, as discussed in this study, can be the basis for promoting a vaccination solution that is amenable for both the general public and the government.

Conclusion

This study addressed a need for qualitative studies on the impact of vaccination schedules on individuals' health. The purpose of this study was to understand the beliefs, experiences and perceptions of adolescents, parents and health care providers with regard to different vaccination schedules. This includes an exploration of how anthroposophic, cultural and religious beliefs may obstruct parents from getting their children vaccinated and address potential parents' discomfort about vaccines and their knowledge on vaccination effectiveness. Based on the data collected from the participants, it was found that perceptions on the issue of vaccination were generally positive, and a mandatory vaccination schedule was recommended by most of the participants.

Furthermore, it was found that for adolescents, the consequences of the vaccinations were overall positive and beneficial, regardless the given mandatory or voluntary schedule. Adolescents, who received mandatory vaccination, reported that this scheme is appropriate to protect individuals against diseases. Also, most of the parents and health care providers recommended mandatory vaccination because of the perceived positive effects on children's health. According to the opinions of the health care members, vaccination side effects were mainly emotional. The health care members suggested that public health agencies should gear the efforts towards the dissemination of credible and scientifically sound information on the benefits and risks of vaccination in order to help parents make an informed decision, through different mediums of communication, programs, and social media.

Such information campaigns are recommended to be focused on expectant parents, but also open to the general public. In addition, it was recommended that a list of mandatory vaccines that are accepted worldwide can be provided to parents, and all other vaccines are to be considered voluntary. However, it was also recommended that this list can be produced by independent physicians who are not tied to or have stakes in the pharmaceutical industry. Additionally, it was recommended that future researchers may produce similar studies focusing only on anti-vaccination advocates' views, in order to add to the existing literature on the issue. Further, it was suggested that the role of public health agencies should be expanded to include updated data and studies, and to address clearly the potential side effect of any vaccine. It is hoped that the findings of this study may be used as the basis for the formulation of an effective public health policy to adopt a widely nationally and internationally accepted vaccination schedule.

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Appendix A: Vaccines, Ingredients, and Known Potential Side Effects

Source: Generation Rescue, (2011). Vaccination symptoms and side effects. Retrieved on January 14, 2013. From: http://www.generationrescue.org/resources/vaccination/vaccine-ingredients-and-side-effects/

Vaccines by multiple manufacturers	Ingredients* partial list in one or more vaccines	Side Effects** including a partial list of reactions, events & reports*
DTaP (Diptheria, Tetanus, Toxiods, and Acellular Pertussis) Vaccine Absorbed	Aluminum Phosphate, Ammonium Sulfate, Aluminum Potassium Sulfate, Thimerosal [a vaccine preservative that is approximately 50% mercury by weight] Formaldehyde or Formalin, Glutaraldehye, 2-Phoenoxyethanol, Dimethyl-betacyclodextrin, Sodium Phosphate, Polysorbate 80.	Autism, fever, anorexia, vomiting, pneumonia, meningitis, sepsis, pertussis, convulsions, febrile, grand mal, afebrile and partial seizures, encephalopathy, brachial neuritis, Guillain-Barré syndrome, Sudden Infant Death syndrome.
DTaP/HepB/IPV Combination Vaccine, Diphtheria and Tetanus Toxoids and Acellular Pertusis Adsorbed, Hepatitis B (Recombinant) and Inactivated Poliovirus Vaccine Combined	Aluminum Hydroxide, Aluminum Phosphate, Formaldehyde or Formalin, Glutaraldhyde, Monkey Kidney Tissue, Neomycin, 2-Phenoxyethanol, Polymyxin B, Polysorbate 80, Antibiotics, Yeast Protein.	Seizures, diabetes mellitus, asthma, Sudden Infant Death Syndrome, upper respiratory tract infection, abnormal liver function tests, anorexia, jaundice, shock, encephalopathy, Stevens-Johnson syndrome, brachial neuritis.
Flu Vaccine Influenza Virus Vaccine	Thimerosal [a preservative that is approximately 50% mercury by weight], Chick Kidney Cells, Egg Protein, Gentamicin Sulfate, Antibiotics, Monosodium Glutamate [MSG], Sucrose Phosphate Glutamate Buffer.	Significant respiratory and gastrointestinal symptoms, seizure, allergic asthma , decreased appetite, increased mitochondrial encephalomyopathy, partial facial paralysis, Guillain-Barré syndrome, Bell's palsy, Stevens-Johnson syndrome, herpes zoster [shingles].
Hep B Vaccine Hepatitis B Vaccine	Aluminum Hydroxyphosphate Sulfate, Amino Acids, Dextrose, Phosphate Buffers, Potassium Aluminum Sulfate, Formaldehyde or Formalin, Mineral Salts, Soy Peptone, Yeast Protein	Influenza, febrile seizure, anorexia, upper respiratory tract illnesses, herpes zoster, encephalitis, palpitations, arthritis, systemic lupus erthematosus (SLE), conjunctivitis, abnormal liver function tests, Guillain-Barré syndrome, Bell's palsy, multiple sclerosis, anaphylaxis, seizures.
HIB Vaccine Haemophilus b Conjugate Vaccine (Tetanus Toxiod Conjugate)	Ammonium Sulfate, Formaldehyde or Formalin, Sucrose.	Anorexia, seizures, renal failure, Guillain-Barré Syndrome (GBS), diarrhea, vomiting.
HIB/HepB Vaccine, (Recombinant) Haemophilus b Conjugate (Meningococcal Protein Conjugate) and Hep B	Aluminum Hydroxyphosphate Sulfate, Formaldehyde or Formalin, Sodium Borate, Soy Peptone, Yeast Protein, AminoAcids, Dextrose, Mineral Salts.	Anorexia, seizure, otitis media [ear infections], upper respiratory infection, oral candidasis [yeast infection], anaphylaxis [shock].
HIB / Meningococcal [Haemophilus b Conjugate Vaccine (Meningococcal Protein Conjugate)]	Aluminum Hydroxyphosphate Sulfate, Formaldehyde or Formalin, Phosphate Buffers.	Febrile seizures, early onset HIB disease, otitis media [ear infection], upper respiratory infection, Guillain-Barré syndrome.
MMR Vaccine, Measles, Mumps and Rubella Virus Vaccine Live	Chick Embryo Fibroblasts, Amino Acid, Bovine Albumin or Serum, Human Serum Albumin, Antibiotics, Glutamate, Phosphate Buffers, Gelatin, Sorbitol, Sucrose, Vitamins.	Atypical measles, arthritis, encephalitis, death, aseptic meningitis, nerve deafness, otitis media [ear infection].

Pneumococcal, Pneumococcal 7-valent Conjugate Vaccine (Diphtheria CRM197 Protein)	Aluminum Phosphate, Yeast Extract, Amino Acid, Soy Peptone.	Febrile seizure, Sudden Infant Death, anaphylactiod reaction including shock, decreased appetite,
Poliovirus Vaccine (IPV) Poliovirus Vaccine Inactivated	2-Phenoxyethanol, Formaldehyde or Formalin, Monkey Kidney Tissue, Newborn Calf Serum Protein, Antibiotics, Neomycin, Polymyxin B, Streptomycin.	Death, anorexia, Guillain-Barré syndrome.
Chicken Pox (Varicella) Virus Vaccine	Ethylenediamine-Tetraacetic Acid Sodium (EDTA) [a metals chelation agent], Bovine Albumin or Serum, Antibiotics, Monosodium glutamate [MSG], MRC-5 DNA and Cellular Protein, Neomycin, Potassium Chloride, Potassium Phosphate Monobasic, Sodium Phosphate Monobasic, Sucrose.	Febrile seizures, encephalitis, Varicella-like rash, upper respiratory illness, lower respiratory illness, eczema, encephalitis, facial edema, cold/canker sore, aseptic meningitis, Guillain-Barré Syndrome, Bell's palsy, pneumonia, secondary bacterial infections.

Appendix B: 2009 Infant mortality rates, top 34 nations

Rank	Country	IMR
1	Singapore	2.31
2	Sweden	2.75
3	Japan	2.79
4	Iceland	3.23
5	France	3.33
6	Finland	3.47
7	Norway	3.58
8	Malta	3.75
9	Andorra	3.76
10	Czech Republic	3.79
11	Germany	3.99
12	Switzerland	4.18
13	Spain	4.21
14	Israel	4.22
15	Liechtenstein	4.25
16	Slovenia	4.25
17	South Korea	4.26
18	Denmark	4.34
19	Austria	4.42
20	Belgium	4.44
21	Luxembourg	4.56
22	Netherlands	4.73
23	Australia	4.75
24	Portugal	4.78
25	United Kingdom	4.85
26	New Zealand	4.92
27	Monaco	5.00
28	Canada	5.04
29	Ireland	5.05
30	Greece	5.16
31	Italy	5.51
32	San Marino	5.53
33	Cuba	5.82
34	United States	6.22

The US Central Intelligence Agency, 2009

Appendix C: Summary of International Immunization Schedules: vaccines recommended/required prior to one year of age in 34 nations

Nation	Vaccines Prior to One Year of Age	Total Doses	Group (Range of Doses)
Sweden	DTap(2), Polio (2). Hib (2), Pneumo (2)	12	1 (12-14)
Japan	DTap(3), Polio (2), BCG	12	
Iceland	DTap(2), Polio (2). Hib (2), MenC (2)	12	
Norway	DTap(2), Polio (2). Hib (2), Pneumo (2)	12	
Denmark	DTap(2), Polio (2). Hib (2), Pneumo (2)	12	
Finland	DTap(2), Polio (2). Hib (2), Rota(3)	13	
Malta	DTap(3), Polio (3). Hib (3)	15	2(15-17)
Slovenia	DTap(3), Polio (3). Hib (3)	15	
South Korea	DTap(3), Polio (3). HepB(3)	15	
Singapore	DTap(3), Polio (3). HepB(3), BCG, Flu	17	
New Zealand	DTap(3), Polio (3). Hib (2), HepB (3)	17	
Germany	DTap(3), Polio (3). Hib (3), Pneumo (3)	18	3(18-20)
Switzerland	DTap(3), Polio (3). Hib (3), Pneumo (3)	18	
Israel	DTap(3), Polio (3). Hib (3), HepB (3)	18	
Liechtenstein	DTap(3), Polio (3). Hib (3), Pneumo (3)	18	
Italy	DTap(3), Polio (3). Hib (3), HepB (3)	18	
San Marino	DTap(3), Polio (3). Hib (3), HepB (3)	18	
France	DTap(3), Polio (3). Hib (3), Pneumo (2), HepB (2)	19	
Czech Republic	DTap(3), Polio (3). Hib (3), HepB (3), BCG	19	
Belgium	DTap(3), Polio (3). Hib (3), HepB(3), Pneumo (2)	19	
United Kingdom	DTap(3), Polio (3). Hib (3), MenC (2)	19	
Spain	DTap(3), Polio (3). Hib (3), HepB, MenC (2)	20	

Philips, A., 2001

Appendix D: Consent forms

ASSENT FORM FOR RESEARCH

Hello, my name is Dina Alsalih and I am doing a research project to learn about the experiences of adolescents and adults regarding vaccines. I am inviting you to join my project. I am inviting all adolescents aged 14 to 18 years-old who are interest in participating in this study and speak and read English fluently. I am also going to read this form with you. I want you to learn about the project before you decide if you want to be in it.

WHO I AM:
I am a student at Walden University. I am working on my doctoral degree.

ABOUT THE PROJECT:
If you agree to be in this project, you will be asked to:

- Read and sign this assent form. Your parents already gave their consent in order for you to participate in this study.
- You will participate in an individual interview and I will coordinate the discussion.
- The discussion will last no more than 60 minutes. Everything you say will be kept confidential and will be audiotaped.

Here are some sample questions:
1. Based on your experiences regarding the vaccines you have received so far, do you know/feel that vaccines are necessary to be healthy or not?
2. Could you share some positive or negative experiences of yours regarding vaccination?
3. What do you hear about vaccination benefits or side effects from your parents, teachers or close friends?

IT'S YOUR CHOICE:
You don't have to be in this project if you don't want to. If you decide now that you want to join the project, you can still change your mind later. If you want to stop, you can.

Being in this project might make you tired or stressed, just like when attending a class in your school. Being in this study would not pose risk to your safety or wellbeing. However, if you are dealing any kind of problem regarding this research please call the toll-free, 24-hour hotline of the Centers for Diseases Control and Prevention Lifeline at 1-800-273-TALK (1-800-273-8255); TTY: 1-800-799-4TTY (4889) to talk to a trained counselor.

This study will help to better understand feelings and experiences of persons regarding vaccines.

Payment:
You will receive $10.00 gift coupon from a local bookstore for your participation immediately at the end of the interview.

PRIVACY:
Everything you tell me during this project will be kept private. That means that no one else will know your name or what answers you gave. The only time I have to tell someone is if I learn about something that could hurt you or someone else.

ASKING QUESTIONS:
You can ask me any questions you want now. If you think of a question later, you or your parents can reach me via Dina. [redacted]. If you or your parents would like to ask my university a question, you can call Dr. Leilani Endicott. Her phone number is [redacted]

I will give you a copy of this form.

Please sign your name below if you want to join this project.

Name of Adolescent
Adolescent Signature
Date

Researcher Signature

PARENT CONSENT FORM FOR RESEARCH

Your child is invited to take part in a research study to learn about the experiences of adolescents and adults regarding vaccines. The researcher is inviting adolescents 14 to 18 years-old who speak and read English fluently. This form is part of a process called "informed consent" to allow you to understand this study before deciding whether to allow your child to take part.

This study is being conducted by a researcher named Dina Alsalih, who is a doctoral student at Walden University.

Background Information:
The purpose of this study is to comprehend the dilemma of being vaccinated or not and to in depth understand the experiences and perceptions of adolescents, parents as well as health care providers about this dilemma.

Procedures:
If you agree to allow your child to be in this study, your child will be asked to:
1. Read carefully and sign an informed assent form (you can see it if you want).
2. Participate in an individual interview, coordinated by the researcher.
3. Each discussion will last maximum 60 minutes.

Here are some sample questions which will be asked to your child:
1. Based on your experiences regarding the vaccines you have received so far, do you know/feel that vaccines are necessary to be healthy or not?
2. Could you share some positive or negative experiences of yours regarding vaccination?
3. What do you hear about vaccination benefits or side effects from your parents, teachers or close friends?

Voluntary Nature of the Study:
This study is voluntary. Everyone will respect your decision of whether or not you want your child to be in the study. Of course, your child's decision is also an important factor. After obtaining parent consent, the researcher will explain the study and let each child decide if they wish to volunteer. No one will treat you or your child differently if you or your child decides to not be in the study. If you decide to consent now, you or your child can still change your mind later. Any children who feel stressed during the study may stop at any time.

Risks and Benefits of Being in the Study:
Being in this type of study involves some risk of the minor discomforts that your child might encounter in daily life, such as such as stress, fatigue, or becoming upset. Being in this study would not pose risk to the safety or wellbeing of your child.
This study will help to better understand feelings, perceptions and experiences of individuals regarding vaccination schedules in order to have a better evaluation of these schedules.

Payment:
Your child will receive $10.00 gift coupon from a local bookstore for his/her participation immediately at the end of the interview.

Privacy:

Any information your child provides will be kept confidential. The researcher will not use your child's information for any purposes outside of this research project. Also, the researcher will not include your child's name or anything else that could identify your child in any reports of the study. The only time the researcher would need to share your child's name or information would be if the researcher learns about possible harm to your child or someone else. Data will be kept secure by keeping them locked in a specific file cabinet and in computer protected by password. Interviews will be audiotaped and transcribed verbatim in reports describing in detail each population's information about vaccination, separated in files and documents to assure the accuracy of the collected data. Data will be kept for a period of 5 years, as required by the university.

Contacts and Questions:
You may ask any questions you have now. Or if you have questions later, you may contact the researcher via [redacted]. If you want to talk privately about your rights as a participant, you can call Dr. Leilani Endicott. She is the Walden University representative who can discuss this with you. Her phone number [redacted] Walden University's approval number for this study is IRB will enter approval number here and it expires on IRB will enter expiration date.

The researcher will provide an extra copy of this form for you to keep.

Statement of Consent:

I have read the above information and I feel I understand the study well enough to make a decision about my child's involvement this optional research project. By signing below "I consent," I understand that I am agreeing to the terms described above.

Printed Name of Parent
Printed Name of Child
Date of consent
Parent's Signature
Researcher's Signature

CONSENT FORM FOR ADULTS (PARENTS)

You are invited to take part in a research study of the impact of vaccination schedules on infants' and children's physio-psychological health. The researcher is inviting parents, adolescents and health care providers who had followed the American and other

vaccination schedules to be in the study and speak/read English fluently. This form is part of a process called “informed consent” to allow you to understand this study before deciding whether to take part.

This study is being conducted by a researcher named Dina Alsalih, who is a doctoral student at Walden University.

Background Information:
The purpose of this study is to comprehend the dilemma of being vaccinated or not and to in depth understand the beliefs, experiences and perceptions of adolescents, parents as well as health care providers, as far as different vaccination schedules are concerned.

Procedures:
If you agree to be in this study, you will be asked to:
- Read carefully and sign this consent form.
- Participate in an individual interview.
- Each discussion will last about 60 to 120 minutes.

Here are some sample questions:

For parents:
1. Based on your experiences regarding the vaccines you or your child have received so far, do you recommend getting your children vaccinated? If no/yes, why?
2. Did you personally have any bad experience regarding vaccination?
3. What are the procedures that should be applied to minimize your concerns about vaccinations and their potential negative consequences?

For health care workers:
1. Are you aware of any side effects (emotionally or physical) regarding vaccination in general?
2. If you are aware of these side effects, are there any strategies that have been successfully implemented by health care systems of US or other countries to address this problem? If there are no strategies, what do you suggest according to your experiences on vaccination schedules?
3. What type of health care programs are needed to help parents get a better education about what vaccine should be administered to infants, and which can be given till the children are older?

Voluntary Nature of the Study:
This study is voluntary. Everyone will respect your decision of whether or not you choose to be in the study. No one will treat you differently if you decide not to be in the

study. If you decide to join the study now, you can still change your mind later. You may stop at any time.

Risks and Benefits of Being in the Study:
Being in this type of study involves some risk of the minor discomforts that can be encountered in daily life, such as stress, fatigue, or becoming upset. Being in this study would not pose risk to your safety or wellbeing. However, if you are dealing any kind of problem regarding this research please call the toll-free, 24-hour hotline of the Centers for Diseases Control and Prevention Lifeline at 1-800-273-TALK (1-800-273-8255); TTY: 1-800-799-4TTY (4889) to talk to a trained counselor.

This study will help to better understand feelings, perceptions and experiences of individuals regarding vaccination schedules in order to have a better evaluation of these schedules.

Payment:
You will receive $10.00 cash for your participation immediately at the end of the interview.

Privacy:
Any information you provide will be kept confidential. The researcher will not use your personal information for any purposes outside of this research project. Also, the researcher will not include your name or anything else that could identify you in the study reports. Data will be kept secure by keeping them locked in a specific file cabinet and in computer protected by password. Interviews will be audiotaped and transcribed verbatim in reports describing in detail each population's information about vaccination, separated in files and documents to assure the accuracy of the collected data. Also, some demographic data will be recorded (age, gender, profession, place of birth, residency, and years in US for immigrants) but no names will be recorded in order to ensure the anonymity of the participants. At the end of each discussion, the participants will be asked to provide their last input or comments they might have forgotten during the discussion, but, no follow up will be established. Data will be kept for a period of at least 5 years, as required by the university.

Contacts and Questions:
You may ask any questions you have now. Or if you have questions later, you may contact the researcher via [redacted] If you want to talk privately about your rights as a participant, you can call Dr. Leilani Endicott. She is the Walden University representative who can discuss this with you. Her phone number is [redacted] Walden University's approval number for this study is IRB will enter approval number here and it expires on IRB will enter expiration date.

The researcher will give you a copy of this form to keep.

Statement of Consent:

I have read the above information and I feel I understand the study well enough to make a decision about my involvement. By signing below "I consent", I understand that I am agreeing to the terms described above.

.
Printed Name of Participant……
Date of consent……
Participant's Signature……
Researcher's Signature……

Curriculum Vitae

DINA ALSALIH

EDUCATION

Pursuing PhD in Public Health/ Epidemiology - Walden University, Minneapolis, MN
Anticipated completion in September 2014

MBA in Health Care Management, Focus: Continuous Improvement - University of Dallas, Irving, TX (2008)

BS in Pharmacy - Zaytoonah University, Amman, Jordan (2003)

PROFESSIONAL EXPERIENCE

CURE MEDICAL CENTER, Abu Dhabi, UAE • 2008-2010
Operations Manager

Oversaw day to day center operations, making critical decisions and supporting professional, clinical, clerical, and administrative staff. Coordinated, directed, and supervised delivery of healthcare program. Implemented new policies/directives and maintained strict financial budgets. Wrote reports, participated in meetings, and conducted presentations. Recruited, selected, and developed employees.

1)Initiated continuous improvement and lean operations processes within all units of facility. Able to cut costs, boost productivity, and improved efficiency through operational changes, setting clear goals, and developing operational plans.
2)Generated innovative strategies to improve service delivery through implementation of new IT system, revised shift schedules, and the addition of a customer focused team.
3)Contributed to regional customer market growth through supporting and managing regional marketing efforts

CVS/ECKERD'S, Irving, TX • 2004-2005
Pharmaceutical Associate

Dispensed medication to patients and provided counseling on proper use and adverse effects. Supervised and mentored intern pharmacists and pharmacy technicians to ensure optimum performance and seamless integration into the workplace.

JORDAN HOSPITAL, Amman, Jordan • 1999-2002

Intern Clinical Pharmacist

Interacted with physicians in clinics, hospitals, and community pharmacies, gaining exposure to various medical areas. Supplied and advised patients on non-prescription medicine use. Kept patient medication profiles (PMP). Formulated pharmaceutical agents by compounding ingredients to form powders, tablets, capsules, ointments, and solutions.