A Social Controversy: Autistic Spectrum Disorder's Correlation to the Measles-Mumps-Rubella Vaccination

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Abstract

A 1998 research study lead by Dr. Andrew Wakefield linked the measles-mumps-rubella (MMR) vaccination as a probable cause to autism spectrum disorder. This publication has started a significant debate among healthcare professionals and instigated an anti-vaccination movement within the general population. This vaccination controversy was started by parents who readily accepted Wakefield's findings as truth and frequently would choose to withdrawal the administration of vaccinations from their children's care plans. There has also been disapproval by healthcare professionals over Wakefield's study since numerous research teams have been unable to replicate his findings. This disagreement surrounding the MMR vaccination is likely putting millions of people, mostly children, at risk of contracting horrific diseases.

Brian Deer established the fraud in Wakefield's original study and rejected Wakefield's null hypothesis. Deer's seven years of investigation affirmed the countless research studies that rejected Wakefield's null hypothesis. Deer's analysis of Dr. Wakefield's study demonstrates how the public and the media can be blindly misled by scientific studies. When information has reached people's grasp, it is hard to retract false information once it has permeated millions of households, which is what needs to be accomplished regarding the truth behind the relationship between the MMR vaccination and autism. The medical world could benefit from knowing the cause of this detrimental disorder, in an effort to treat patients better and possibly someday cure them.

A Social Controversy: Autistic Spectrum Disorder's Correlation to the Measles-Mumps-Rubella Vaccination

The public often misunderstands the merciless world of medicinal research. Yet, when scientific studies reach into the hearts of the general population, the research can be better understood and received. This type of infusion to the public occurred when a medical research study, released in 1998 by Wakefield et al., described a cause for autism spectrum disorder. Those affected by this disorder, whether family, friends, or those diagnosed with autism, were rejoicing, for they finally received an answer of why their loved ones developed this condition. There was no known cause to autism prior to the release of this study, so it appeared to be the answer for the families affected and for everyone in health professions. Yet, this is not the case. Other researchers were never able to replicate the results of this study by Wakefield et al. Replicating studies were only able to contradict it by finding no causative link between the measles-mumps-rubella (MMR) vaccine and autism spectrum disorder as the study in 1998 did. This controversy over the link between the MMR vaccine and autism has remained a popular medical and societal topic through the 21st century. Parents of autistic children are holding on to the only evidence that found a cause of their child's disorder while the healthcare professionals can only contradict the parents' beliefs through their scientific research. How can research teams correctly inform society with the most relevant and new studies? How can health care professionals intervene and provide support to families with autistic members? How important to families and healthcare professionals is finding a cause to autism? Digging deeper into autism spectrum disorder, the MMR

vaccination, and studies between the two may entice new ways to teach health care professionals and reach the public with true and correct information.

Autism

Autistic spectrum disorder, often referred to as autism, is a ruthless persistent developmental disorder distinguished by mutilation of common social relations. The Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) has outlined five different disorders that fit under the umbrella of autism spectrum disorder including autistic disorder, Asperger syndrome, pervasive developmental disorder not otherwise specified, Rett syndrome, and childhood disintegrative disorder (Klauck, 2006; Mendelsohn & Schaefer, 2008). The term autism typically refers to the first defined category, but can encompass all five disorders. It was first described in 1943, by Leo Kanner, yet it is still one of countless medical disorders with an unknown etiology (Klauck, 2006; Mendelsohn & Schaefer, 2008).

Characteristics of Autism

This disorder includes irregularities in the development of communication skills, destruction of verbal and nonverbal language, and constrained social interactions leading to clearly limited behavior, play, and imagination (Makela, Nuorti, & Peltola, 2002; Smeeth et al., 2001). Autistic symptoms can vary immensely depending upon the age and developmental level of the child ("Autism," 2010). Seventy percent of people with autistic spectrum disorder also suffer from mental retardation (Kelleher & Bear, 2008). However, 10% of those diagnosed have demonstrated paradoxical skills named savant abilities (Kelleher & Bear, 2008). These individuals excel in several different areas like memory or artistic capabilities (Kelleher & Bear, 2008).

Diagnosing Criteria and Prevalence

In order for a child to be diagnosed with autism, the abnormalities displayed with this disorder must be apparent in the child by three years of age (Smeeth et al., 2001). However, most are not diagnosed until the ages of four or five. With the expanded knowledge and awareness of the disorder, there are more children diagnosed with an autistic spectrum disorder (Doja & Roberts, 2006). The latest evidence has identified that autistic spectrum disorders can affect as many as six in every 1000 (Doja & Roberts, 2006). This disorder is appearing more and more in today's world, which has sparked quite a bit of attention to the disorder. Since several areas of social relations are mutilated by this disorder, it is thought that multiple factors could play a role in the etiology of this developmental disorder (Doja & Roberts, 2006). Is it possible that this persvasive developmental disorder could occur at the expensive of vaccinating against several devestating diseases including the measles, mumps, and rubella.

Measles, Mumps, Rubella

The three diseases this controversial vaccine immunizes against are measles, mumps, and rubella. These diseases were highly widespread among the world population before the introduction of this vaccination, but in turn, the case numbers tremendously decreased after this vaccination became available and administered all over the world. These viruses are considered neurotropic, meaning they have a mysterious unexplainable attraction to various nerve tissues within the human body (Makela et al., 2002; Myers, 2009).

Measles

Prior to administration of the MMR vaccine, a great number of people in the United States were infected with measles. An average of 450 measles related deaths occurred each year between 1953 and 1963 ("What would happen," 2010). The incubation period for measles ranges from 8 to 12 days so people are contagious for a few days before symptoms appear (Myers, 2009). Measles often has effects on the central nervous system in the body (Makela et al., 2002). This disease is prominent in the respiratory tract and is characterized by a spreading maculopapular rash on the skin (Myers, 2009). It is transmitted by direct contact with fluid droplets from the nose, throat, and mouth of people with the infection. Diagnosis is confirmed through a serological exam and through the appearance and identification of white spots inside the mouth called Koplik's spots. Seventeen percent of those infected with measles would have at least one secondary complication ("What would happen," 2010). Due to the high prevalence and current use of the MMR vaccine in the United States, measles-associated death is limited to three in every 1000 persons infected with the virus ("What would happen," 2010). While on the contrary, developing countries experience one death for every 100 people infected with measles ("What would happen," 2010). This disease is one of the most prevalent communicable diseases in the world and is often introduced into the United States through traveling foreigners or nationals, because many countries do not have a prevalent use of the vaccination against measles. Those who are not protected by the MMR vaccine or who are not immune have a 90% chance of becoming infected with measles once exposed ("What would happen," 2010). If immunizations were stopped, the Center for Disease Control and Prevention (CDC) predicted the

incidence of the disease would increase to pre-vaccine levels, and the occurrence could lead to an expected 2.7 million measles-related deaths worldwide ("What would happen," 2010).

Mumps

Mumps, among children, was the most common cause of viral encephalitis before the MMR vaccine was introduced (Makela et al., 2002). Normally, mumps is a mild disease, yet the complication of encephalitis, which is an inflammation of the brain, makes this infection devastating because it can cause brain damage ("What would happen," 2010). This virus was also a large contributor to child deafness. The incubation period is from 16 to 18 days (Makela et al., 2002). This disease is highly contagious. This virus actually hurts adults more than children, as serious side effects are seen more among the adult population ("What would happen," 2010). There is an increased chance of miscarriages for pregnant women infected with the mumps, and swelling of the testes, known as mumps orchitis, occurs in post-pubescent males infected by the virus("What would happen," 2010). This disease is identified by swelling of the parotid glands of the lymph system (Myers, 2009). Mumps occurs most often in the late winter and early spring. It is transmitted by droplets and direct contact with someone who is infected with the virus. Common symptoms experienced by those infected include headache, malaise, low-grade fever, and anorexia (Myers, 2009). Before the MMR vaccine, the mumps virus was reported to cause about 300,000 childhood cases in the United States each year ("What would happen," 2010). After the vaccine was licensed in 1967, the number of cases quickly declined. The year 2001 produced only 266 reported cases of mumps, which occurred after a reappearance of the disease in 1987 with 12,848 cases. The

current decline is most likely a result of administering a second dose of the MMR vaccination ("What would happen," 2010). Worldwide experiences have shown that more than one dose of the vaccination and continuous high levels of vaccinations are necessary to prevent the diseases (World Health Organization, 2007). This second dose improves the range of effectiveness against mumps from 73% to 91% of people with immunity after the first dose and 79% to 95% immunity after receiving the second dose of the vaccination ("What would happen," 2010). This is the main reason for the administration of a second dose. Preservation of the two-dose administration of the MMR vaccine will effectively limit and prevent this communicable disease from outbreak.

Rubella

Rubella, also known as German measles, is normally a mild disease characterized by fever, mild upper respiratory tract infection symptoms, lymph node enlargement, arthralgia, and a verbose fine red maculopapular rash (Myers, 2009). First trimester neonates in the womb experience the harshest effects of rubella (Myers, 2009). They can develop congenital rubella syndrome, which can cause mental retardation, heart issues, cataracts, and deafness ("What would happen," 2010). Rubella's incubation period is the same length as the mumps, at 16 to 18 days (Makela et al., 2002). Before the immunization against rubella was widely available, a rubella epidemic occurred in the United States between 1964 and 1965 where 20,000 infants were infected with congenital rubella syndrome ("What would happen," 2010). There were also 2,100 deaths of neonates and 11,250 miscarriages ("What would happen," 2010). Thanks to the MMR vaccination, only six cases of congenital rubella syndrome occurred in the year 2000 in

the United States ("What would happen," 2010). The cases today are not only affecting neonates but more than half of the cases have been infected adults ("What would happen," 2010). Halting rubella vaccinations could lead to a decrease in immunity against the virus. The future would result in many adults infected with rubella, leading to babies being born with congenital rubella syndrome because of their rubella-infected mothers.

The MMR Vaccine

"Immunizations have been described as the most effective health intervention after clean water and sewage disposal" (Makela et al., 2002, p. 957). Vaccinations have significantly reduced or abolished numerous communicable diseases that used to harm or kill many people. Yet, those infectious diseases can still occur in people who are not protected by the immunizations, so the reason for widespread use of vaccinations is clearly evident ("What would happen," 2010). This particular immunization was made to protect against the viruses of mumps, measles, and rubella. The MMR vaccine is an active immunizing agent, meaning it contains a portion of the live viruses within the vaccination (Myers, 2009). It was first introduced in the United Kingdom in October of 1988 for children aged 12 to 15 months (Smeeth et al., 2001). In the early 1990s, the number of children receiving the MMR immunization was greater than 90% nationally in the United Kingdom (Hilton, Hunt, & Petticrew, 2007). The MMR vaccination is recommended for infants aged 12 to 18 months. A second dose is suggested for children age four to six years. Many parents will opt out their children of receiving the second dose if a child was diagnosed with autism. Some parents today will now choose to have

their children not receive the vaccination at all allowing their children to be exposed to the presenting dangers of becoming infected with measles, mumps, or rubella.

The common side effects associated with the vaccination include a fever or a mild rash (Centers for Disease Control and Prevention, 2009). Moderate issues include a febrile induced seizure, which occurs in about one out of every 3,000 doses, and a temporary low platelet count (Centers for Disease Control and Prevention, 2009). While some of the rare side effects include swelling of the glands in the cheek or neck region. Severe problems are extremely rare; severe allergic reactions occur in less than one in a million doses (Centers for Disease Control and Prevention, 2009; Gross, 2009). In a different light, this vaccination is contraindicated in persons who are immunosuppressed, hypersensitive to neomycin, or have neoplasms of the lymphatic system or bone marrow (Myers, 2009). It should not be given in the presence of tuberculosis. It should be given no less than three months after the use of whole blood, plasma, or immune serum globulin. It should not be administered one month prior to, or after, immunizations with other live virus vaccinations. Yet, these people who are unable to be vaccinated may remain protected against the diseases covered by the MMR vaccine through the idea of herd immunization (Myers, 2009). Herd immunity is known as "the level of disease resistance of a community," (Myers, 2009, p.868) which could be unsuccessful if parents keep intentionally choosing not to vaccinate their children.

Controversy

How the MMR Vaccine and Autism Controversy Began

A global increase for autism diagnoses has augmented concerns that vaccinations might be the cause of this disorder (Gerber & Offit, 2009). This rise in the diagnoses of

autism has brought on questions over the cause of this disorder, which inevitably probed researchers to conduct studies. Dr. Wakefield, along with 12 other researchers, published an article titled "Ileal-Lymphoid-Nodular Hyperplasia, Non-Specific Colitis, and Pervasive Development Disorder in Children" (Wakefield et al., 1998) in which they investigated 12 children with chronic enterocolitis and regressive developmental disorder, otherwise known as autism. These children, between the ages of three and ten years, were found to have a history of normal growth and development, followed by a decline of acquired skills and language (Wakefield et al., 1998). This type of developmental history demonstrates what typically occurs in autism. Their research found that the developmental decline was associated with the timing of the administration of the MMR vaccine. All the children in the study had gastrointestinal symptoms like abdominal pain, diarrhea, and bloating. Of the 12 children studied, three of them had developed autism without exposure to the MMR vaccine. Although his research article stated, "we did not prove an association between measles, mumps, and rubella vaccine and the syndrome described" (Wakefield, 1998, p. 641), this release of information through the uncontrolled case study started a crisis throughout the world. This study suggested a causative link between the MMR vaccine and autism spectrum disorder. Although the authors stated they "did not prove" (Wakefield, 1998, p. 641) the association between the MMR vaccination and autism, they believed that the presence of gastrointestinal symptoms within children receiving the vaccination might have triggered the MMR vaccine to cause autism in their bodies. These symptoms would have caused the body to be more vulnerable to infection, in turn allowing the vaccine to contribute to the development of an autistic disorder (Smeeth et al., 2001). Dr. Wakefield was noted to

be highly vocal about the believed correlation (Doja & Roberts, 2006). He even approached the American Academy of Pediatrics committee with his findings and declared, "… the widespread use of MMR immunization is a major determinant of the apparent increase in rates of autism" (Doja & Roberts, 2006, p. 342).

Associations between the vaccine and the disorder were unavoidable, due to the fact the vaccination is typically administered at the same time that autism presents. Many research teams, since the release of this study, have tried to replicate it to obtain the same results, yet have failed to achieve the same results, with inevitably lead to the start of the controversy. According to Gerber and Offit (2009), at least 13 scientific studies have failed to support any association between the MMR vaccination and autism; these studies came from many researchers from five different countries using at least three diverse study designs. The media took notice of the study by Wakefield et al. and highly publicized the results. This media coverage jolted the hearts of families capsulated by autism, for they felt they finally had knowledge of the cause for the disorder affecting their lives. Yet, the new research studies that reveal the absence of a link between the MMR vaccination and autism have not been extensively publicized. These studies have not reached the public to effectively change their beliefs. Although there has been a significant effort to tackle concerns about this vaccination, through items like brochures, websites, and fact sheets, limited evidence exists that these methods actually changed parental attitudes or relieved concerns over the safety of the vaccination. Even though there is plenty of scientific research and information on the vaccination, parents and the public still feel as though the information supplied is insufficient, incorrect, and biased (Wallace, Leask, & Trevena, 2005).

Response of American Health Officials

Soon after the release of Dr. Wakefield's study, United States health officials responded out of fear to the fact that the MMR-autism controversy could reach American soil (Gross, 2009). Leaders at the CDC teamed up with the Institute of Medicine (IOM) to help monitor vaccine safety. The IOM created a review panel, purposefully without experts who were interested in vaccine safety, to review the relationship between the MMR vaccination and autistic spectrum disorder. In their eighth and final report, the review panel concluded unanimously that there was no evidence of a causative link between the MMR vaccine and autism. They additionally concluded there was no evidence of potential biological mechanisms through the vaccination and autism. The review panel of the IOM then suggested that funding be provided for autism research in the "'most promising areas'" (Gross, 2009, p. 2).

Response of Parents of Autistic Children

One in four Americans currently believes that vaccines cause autism (Gross, 2009). Many of these people are the parents of children with autism. These parents are fighting, not only for their children's functionality and quality of life, but also for their children's actual lives. They are extremely passionate about their beliefs. Parents of autistic children, who truly believe their child's disorder was caused by vaccinations, have started several formal groups to speak out and inform others of their beliefs (Doja & Roberts, 2006). These groups include SafeMinds, Moms against Mercury, and Generation Rescue. They do not specifically target the MMR vaccine as the source of the child's autism but focus on vaccines in general. Some believe the United States is possibly over-vaccinating children through the recommended vaccination schedules

(SafeMinds, 2011). Others believe mercury used in the vaccines contributes in some way, yet mercury is not even an ingredient in the MMR vaccination (Generation Rescue, 2011). Their concern is about the idea that their children are getting too many vaccines. One mom from Moms against Mercury stated:

> My son was born a healthy child. As time went on and the more he was vaccinated, the more he started to change. Not knowing that mercury was in vaccines until he was four years old, I had no idea what was truly wrong with him… I was outraged that I was not told that the most powerful neurotoxin was going to be injected in my newborn child. It has devastated and changed our lives forever… (Doja & Roberts, 2006, p. 344)

One of the websites referenced a study that declared children have a greater risk to develop autism if they are vaccinated; this study referenced is one of the very few research studies that fail to reject Wakefield's original hypothesis (SafeMinds, 2011). This 2007 study concluded that, about 68% of autistic boys born from 1990 to 1996 were caused by vaccines. It further suggests that the risk of developing autism may be a one in seven chance (SafeMinds, 2011). This website goes on to state there has never been a retrospective study looking at the overall health result of vaccinated versus unvaccinated groups of children (SafeMinds, 2011)..

In a recent study of parents with autistic children, only ten seriously believed this immunization did not contribute to their child's autism, where 28 parents believed it was possible the vaccine contributed to their child's development of this disorder (Hilton et al., 2007). Many parents blame themselves and experience anger towards their child's diagnosis of autism, because they allowed their children to receive the vaccine that

potentially contributed to their disorder. Some parents felt they had "ignored early warning signs that their child was not healthy" (Hilton et al., 2007, p. 325) prior to their MMR immunization.

Parents are holding on to the Wakefield et al. study as truth so they can have an answer to their quest for a cause to autism. Since there is very little scientific evidence or results that provide any further causes or reasons for autism, parents grasp the vaccine link to the disorder so that they may rest their questioning minds of why their child developed this disorder and how it happened. There is research in progress that is trying to discover a cause to autism, whether it is a genetic mutation, stimulation by the environment, or some unknown reason. Healthcare professionals want to have an answer too so that they may effectively care and support autistic families (Hilton et al., 2007).

Response of Science

Many of the scientific research articles published on this topic show evidence and facts against a link between the MMR vaccination and autism. One study found no historical association between the vaccine and the incidence of autistic diagnoses within one to two years after receiving the immunization. There was not even any evidence of a grouping of diagnoses within two to four months after receiving the immunization. A few studies have mentioned that if there is a correlation between autism and the MMR vaccine, then the risk of autism would be projected to stop increasing within a few years of the immunization being widely administered (Kaye, Melero-Montes, & Jick, 2001). Some researchers have discovered no correlation with the increasing diagnoses of autism and the widespread use of the MMR vaccine (Kaye et al., 2001). These conclusions have come because the percentage of administration of the MMR vaccine has remained about

the same throughout the population, so the incidence of autism would be expected to remain the same and not increase (Kaye et al., 2001).

Ecological studies. Ecological studies, that compare vaccination rates with autism diagnoses through utilizing large databases for investigation of this controversial association, have found no association between vaccinations and autism (Gerber & Offit, 2009). A 1999 study in the United Kingdom found absent changes in the rates of autism diagnoses after the launch of the MMR vaccine in 1987 (Gerber & Offit, 2009; Taylor et al., 1999). This study recognized no differences in the age of autism diagnosis between those vaccinated and not vaccinated, among the 498 autistic children evaluated who were born between 1979 and 1992. They also failed to find a grouping of diagnoses or developmental regression relating to the date of receiving the MMR vaccination (Doja & Roberts, 2006; Gerber & Offit, 2009; Taylor et al., 1999). This same research team, two years later, also determined there were no differences in autism rates among vaccinated and unvaccinated children when they had extended their research (Gerber & Offit, 2009). Further, an additional study, performed in the United Kingdom in 2001, used a time-trend analysis which found a rise in diagnoses among more than three million people, even with unchanging vaccination rates (Gerber & Offit, 2009; Kaye et al., 2001). Similarly, Californian researchers in 2001 found augmented autism diagnoses apart from the steady MMR vaccination rates (Gerber & Offit, 2009). Moreover, a 2006 Canadian study revealed an increase in diagnoses, even with a decrease in the vaccination rates in 27,749 children (Gerber & Offit, 2009). Those ecological studies are further backed by retrospective, observational studies that seem to exemplify the absence of any association.

Retrospective studies. Several retrospective studies exist that have addressed this obscure relationship between the vaccination and autism (Gerber & Offit, 2009). In fact, the majority of research studies over this issue have been retrospective studies (Doja & Roberts, 2006). The United Kingdom produced a study in 2001 that found no link relating the diagnosis of autism to the timing of the administration MMR vaccination (Gerber & Offit, 2009). This study compared the timing of doctors' consultation rates between 71 autistic children who had received the vaccine and 284 control children who had also received the vaccine (Gerber & Offit, 2009). A study done in Finland in 2002 examined hospital discharge registers of 535,544 children for changes in overall number of hospitalizations for autism after receiving the MMR vaccination between November 1982 and June 1986 (Makela et al., 2002). The researchers found no relative clustering of autism hospitalizations related to the time of vaccination (Gerber & Offit, 2009; Makela et al., 2002). Likewise, Denmark researchers in 2002, found no connection among autistic children, between the time of vaccination and the development of autism spectrum disorder after they analyzed 537,303 children's records born in a seven-year time span between 1991 and 1998 (Doja & Roberts, 2006; Gerber & Offit, 2009). This study has some of the most convincing evidence finding no increased risk of autism, whether vaccinated or not (Doja & Roberts, 2006; Gerber & Offit, 2009). Moreover, a 2004 study in Atlanta suggested that an early exposure to the MMR vaccine is not a risk factor for autism, after comparing 624 children diagnosed with autism spectrum disorder to 1824 control children. Lastly, a study done in Japan acknowledged there was in increasing rate in autism diagnosis at the same time as the MMR vaccination rates were declining (Doja & Roberts, 2006). In summary, these scientific studies keep on revealing

additional information to broaden the evidence showing there is no link between the MMR vaccine and autism.

Additional studies. An additional study in Finland broadened the evidence against an association through the discovery of 31 children who developed gastrointestinal symptoms as an adverse effect to the MMR vaccine, between 1982 and 1996, where none of those children developed autism (Gerber & Offit, 2009; Smeeth et al., 2001). Moreover, a study in Sweden showed no evident increase in autism following vaccinations (Smeeth et al., 2001). Further investigation exposed no vaccine-linked diagnoses of autism amongst 1.8 million children (Gerber & Offit, 2009). A case-control study, performed in Massachusetts, concluded with strong evidence against the association of autism disease with exposure to the MMR vaccination (Hornig et al., 2008). This study was unable to find any correlation between the timing of the MMR vaccination and the onset of either autistic spectrum disorder or gastrointestinal complaints (Hornig et al., 2008). A literature review by Doja and Roberts (2006) found the vast majority of research studies relating to this MMR vaccine-autism debate rejected Wakefield's original published article. These studies have shown no causative relationship between the two. Doctors have mentioned that the diagnosis of autism spectrum disorder could be increasing due to the addition and changing of the defining characteristics of those with autism. There is also an increased awareness of autism, which could also lead to an increase in diagnoses (Doja & Roberts, 2006). A certain risk factor for a child to develop autism is a family history of the disorder (Smeeth et al., 2001). It is common for families to have more than one child with autism with some of their children receiving the MMR vaccination and some not.

Benefits of vaccinations. Vaccinations have benefitted the world since their existence; they are one of the greatest accomplishments of biomedical science. They prevent a large number of diseases that have saved countless lives, increased life expectancy, abolished suffering and disability, and improved the quality of life (Chatterjee, 2008). Across the ocean in the United Kingdom, there was a somewhat drastic change in the vaccination rates, down to about 80% of the population in 2003 to 2004 (Godlee, Smith, & Marcovitch, 2011). The year 2008 marked a measles epidemic within the United Kingdom due to the lack of children receiving recommended vaccinations over the previous years and due to the absence of true herd immunity (Godlee, Smith, & Marcovitch, 2011). The concept of herd immunity helps protect those who do not receive vaccinations for health care reasons from contracting the very viruses the immunizations are protecting the rest of the population against contracting. The World Health Organization recommends at least 95% of the population to be vaccinated in order for herd immunity to take effect (Godlee et al., 2011). The public needs to understand that a disease outbreak cannot be controlled through voluntary vaccination, which is why the United States implements vaccination requirements on its population (Perisic & Bauch, 2009). There is clear medical evidence that vaccinations are beneficial; the viruses and diseases they protect society against are capable of seriously destroying a person's health and life. Every medical intervention is supported with countless research studies in order to sustain or deny new, current, or old practices. If some treatment is found to be more effective than another is, then healthcare professionals would be quick to research the safety and efficacy of this treatment, in hopes of quickly bringing forth the treatment for the public to access. Vaccinations have

become subject to criticism due to Wakefield's research but they work to protect every human being from contracting horrible medical diseases like the measles, mumps, and rubella. Before the MMR vaccine, those three illnesses were harming and killing thousands of people on a yearly basis ("What would happen," 2010). In support of the MMR vaccine, the Canadian Pediatric Society, the American Academy of Pediatrics, and the World Health Organization have published statements agreeing with the numerous well-designed research studies describing that the current evidence does not support any correlation between autism and the MMR vaccination (Doja & Roberts, 2006). Hopefully, in response to this new information, the general public of the world can learn about the importance of protecting their loved ones through vaccinations.

Research Testimonial

A few months after the start of this research over the causative correlation between the MMR vaccination and autism, significant news was released regarding this modern day medical controversy. January 5, 2011 marked the release of the new information regarding Dr. Wakefield's debated research (Deer, 2011; Godlee, 2011). *The Lancet*, the England-based medical journal that originally published Wakefield's research study, recently retracted the article leading to a new surge of information available to the public (Deer, 2011; Godlee, 2011). Britain's General Medical Council ruled in January 2011 that Wakefield had "acted unethically and had shown 'callous disregard' for the children in his study, upon whom invasive tests were performed" (Eggertson, 2010, p. e199). The *British Medical Journal* was quick to publish at least three articles over the following few days calling Wakefield's autism research fraudulent (Deer, 2011; Godlee,

2011; Godlee et al., 2011). News teams around the world were swift to report on this topic as well.

Deer's Research

The first of the articles released was written by London journalist Brian Deer, who had been investigating Wakefield's study for seven years (Godlee, 2011). This article was rapidly spread worldwide. Brian Deer (2011) first discussed a conversation, in his January 5 article, which he held with a father of one of the children in Wakefield's study. The father was told by Wakefield that his son was number 13 of the study, but since there were only 12 children in the study, this did not make sense. Another contradiction occurred when the father affirmed, "that's not true" (Deer, 2011) regarding the interval between the time of MMR vaccination and the symptoms occurring. *The Lancet* published that in one child in the study, symptoms occurred at 15 months old about a week after his MMR vaccination, when in reality his symptoms began to appear at 13 months of age, which was two months prior to when the child received the vaccination. Another parental interaction depicted yet another mismatch of information when child two's mother stated that her child had experienced symptoms about six months after his vaccine rather than the two weeks that was reported by Dr. Wakefield. Deer went on to discuss how unannounced to the parents of the children within the study, Wakefield was working on a lawsuit against the vaccine's manufacturers. Deer further mentioned the many discrepancies regarding the actual children used in the study to the children who were portrayed in the published version of the study. In his article, Deer refuted every child's actual living case with the cases presented in Wakefield's published

study. He stated, "No case was free of misreporting or alteration" (Deer, 2011, Case Selection section, para. 14).

Further News Releases

With Deer's newly published findings, the rest of the media was free to distribute his conclusion of Wakefield's fraudulence around the world. The next few articles released followed suit based on Deer's primary article. Two more articles were published in the *British Medical Journal* talking about the deception behind the MMR scare. Even news stations like CBS and FOX heard of this information the very same day that Deer's article was published (FOX News, 2011a; Katz, 2011). FOX news released an article on January 6, 2011 that summarized the three *British Medical Journal* articles (FOX News, 2011a). FOX produced another news release questioning whether this new evidence will make a difference in the vaccine world through titling the article "Will Autism Fraud Report be a Vaccine Booster" (Fox News, 2011b). The FOX News article answered its questioning title with the assertion that Deer's journal release may not have a big impact on vaccination numbers in the United States, for Wakefield's name did not ring a bell for many people. Additionally, the article stated that it might take a celebrity to promote this news in order for it to reach America's society (Fox News, 2011b).

Likewise, Dr. Wakefield's research study was heavily analyzed when the *Sunday Times* published an article in 2004 revealing that at least five of the 12 participants in the study were entangled in a lawsuit with the vaccination producers before the study actually began (Doja & Roberts, 2006). Apparently, Wakefield was being paid for his contribution by helping these parents win in the courts against the manufacturers of

vaccines. At this time, the majority of co-authors have retracted their names from the original study (Doja & Roberts, 2006).

Fortunately, Wakefield's research over autism spectrum disorder really had not taken much of a toll on the overall vaccination rates in the United States (FOX News, 2011b). However, it did give some parents the strong belief that vaccinations can cause various diseases, which led to serious outbreaks of the Hib virus and measles in 2008 in children who were not vaccinated. Children in Europe are still affected by this MMR vaccine and autism controversy to the point that they are dying (Chatterjee, 2008). Although it is uncertain how this recent news will eventually affect the number of administered vaccinations, it seems to demonstrate that Wakefield's study was falsified.

Wakefield's Rebuttal

In an interview with CNN on January 5, 2011, Wakefield defended himself and his research regarding the study (Katz, 2011). He claimed Brian Deer is "a hit man who has been brought in to take [him] down" (Katz, 2011, para. 12). This statement by Wakefield has to be questioned, since 10 of the 13 co-authors of Wakefield's study had retracted their names from the study. Wakefield even has lost his medical license in Britain because of this fraud (Katz, 2011).

Identifying the Cause of Autism

Perhaps this new information over the falsification of Wakefield's study will not only probe people to see the value in immunizations, but perhaps will encourage more people to ask "What actually does cause autism spectrum disorder?" since the MMR vaccination does not. Hopefully, this new questioning will intrigue the minds of medical researchers to find an answer to the reason for autism. Though an answer may not be

necessary, it surely can help ease the minds of parents and help advance knowledge in the medical field. Medical science has identified countless diseases, viruses, and infections they are unable to treat because of lack of knowledge or lack of research. Autism definitely fits into this category.

Many researchers have already taken interest in trying to answer this call to finding the etiology of autism spectrum disorder. Some research has already been conducted over roughly the past ten years. A study was released in 2010, showing a correlation in term infants who developed psychological disorders, including autism, with a diagnosis of neonatal jaundice (Burke, 2011). Additionally, infants born to a parous mother or between the months of October and March had a 67% higher risk of developing autism spectrum disorder (Burke, 2011). The risk for the same disorders was not present if an infant was born to a primiparous mother, or born between the months of April and September (Burke, 2011). Moreover, various research studies have suggested autism has a multifactorial inheritance with an overall heritability of 90%, which leaves some room for environmental influences ("Genetics of autism," 2006; Mendelsohn & Schaefer, 2008). Chromosomal abnormalities are the most consistently reported cause of autism spectrum disorders, but mutations have been found in quite a few chromosomes, which makes it difficult to isolate any diseased genes. Yet, a new theory suggests that low serotonin plasma levels could play a role in the etiology of autism by potentially being used as a "detectable biomarker" for those diagnosed with autism (Connors et al., 2006, p. 4). Another possible contributing factor was unintentionally identified by a research study performed in Costa Rica (Connors et al., 2006). This study found 21 out of the 35 autistic children studied experienced obstetric complications or an Apgar score

less than six at one minute of age (McInnes et al., 2005). Lastly, a meta-analysis in 2008 examined 50 prenatal factors for an association with autism (Gardener, Spiegelman, & Buka, 2008). This study determined the possible associated risk factors for autism include advanced maternal and paternal age at birth, maternal use of psychotropic drugs during pregnancy, gestational diabetes, gestational bleeding firstborn child, and mothers born abroad (Gardener, Spiegelman, & Buka, 2008).

Though these research studies and findings may not define a cause to autism, they at least identify some correlating risks associated with its development. These findings may very well be a way along the extensive path to finding the etiology of autism spectrum disorders.

Treatments

Various treatments for autism spectrum disorder do exist, but it is unknown how effective these treatments are and what combinations are best. There is not sufficient data, but some cases of autism are resolved in a persons' lifetime (Herbert et al., 2006). Some people with the disorder appear to have a spontaneous recovery, while others might be related to behavior or biomedical interventions. These improvements and resolutions of autism are poorly studied, so it is hard to draw any conclusions from the occurrences. A barrier to these recoveries is that people might state that the people who recover from autism never actually had it, but nothing in the definition of autism says that it must follow a normal disease course; rather, treatments may have helped. Most of the treatments for autism are aimed at treating the core deficits and associated conditions (Herbert et al., 2006; Levy, Mandell, & Schultz, 2009). It is believed that if these interventions are started earlier, autistic children will have a better chance of recovery,

which makes early diagnosing critical (Levy et al., 2009). The treatment interventions used now include social skills training, communication interventions, assistive communications, behavior interventions, and some psychopharmacology. The pharmacology of interventions is used to help address the co-morbid symptoms such as hyperactivity, anxiety, irritability, aggression, sleep disruption, and attention deficits rather than treat the actual autism (Levy et al., 2009). Some specific issues can include insomnia, picky eating, sensory impairments, and a lesser quality of life (Ghanizadeh, Alishahi, & Ashkani, 2009). It appears that most of these children with an autism spectrum disorder need interventions within their households and educational systems in order to get the greatest levels of functioning (Levy et al., 2009). Families need to be included in the plan of care for children with autism (Ghanizadeh et al., 2009). If a specific etiology were found for autism, the treatment of the disorder could drastically be improved.

Conclusion

The MMR vaccination does not correlate with, cause, or have an association with autism spectrum disorder, as evidenced by the mentioned scientific research studies with the exception of the controversy started by Wakefield et al. This is further identified by the detections by Brian Deer of the falsification of Wakefield's study. Those affected by the disorder yearn for knowledge of the cause of autism so they can rest their questions of why and how. Their answer could be near since researchers are constantly working and trying to find a cause for this pervasive developmental disorder. Many aspects need to be researched for autism, for it may not be only genetic or environmental factors causing the disorder, but perhaps a mix of the two. Families need to be educated and supported by

healthcare professionals with the most recent and truthful research studies so that they can be more proactive about their health. In turn, healthcare professionals need to remain up-to-date with current and new studies about autism spectrum disorders and vaccinations in general, so they are able to truthfully and knowledgably inform families in their care. Eventually, with further research, specific causes may be identified for autism spectrum disorders. One has to imagine that early identification of the disorder through a specific cause could possibly allow a child eventually to have normal development.

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