

Information Seeking and Trust on Vaccination Practices

Authors:

Olowo Emmanuel Opeyemi, Hamisah Hasan, Julia Wirza Mohd Zawawi
Universiti Putra Malaysia (UPM)

Corresponding Author:

Hamisah Hasan
Department of Communication
Faculty of Modern Languages and Communication
43400 Univ. Putra Malaysia, Serdang, Selangor
Tel: +6012-371 7054
Email: hamisah@upm.edu.my

Authors' Addresses

Olowo Emmanuel Opeyemi, Julia Wirza Mohd Zawawi
Department of Communication
Faculty of Modern Languages and Communication
43400 Univ. Putra Malaysia, Serdang, Selangor

Abstract

One of the successful health inventions of the 20th century is vaccine that has helped combat and prevent deadly diseases. The eradication of smallpox globally and the elimination of poliomyelitis from the world Health Organization (WHO) regions strongly reflects the success rate of the vaccination programs. However, for some unexplained reasons there were parents of children aged seven years and younger who were hesitant in getting their children vaccinated although these vaccinations may not cost them much. Therefore, it is interesting to examine the factors contributing to such behaviors by these parents. The aim of this paper is to review literature related to the studies on information seeking and trust on vaccination practices. Specifically, the review of literature is aimed at critically assessing past studies that has been conducted on information seeking of vaccination practices.

Keywords: Vaccine hesitancy, Health Information seeking, Trust, and Parents.

Introduction

Seeking information about one's health is increasingly in the rise in today's health conscious society. Wilson (1999) defined information seeking behavior as an activity an individual may engage in when the need for a specific information occurs, this would result to searching for the information in any way, to use or transfer the information to fulfill a particular need. Wilson (1999) says this behavior occurs due to the constant need of a user to fill up a gap in information need. The user could get this information from a formal or informal source, which may satisfy his need or not. (Wilson, 1981) says when the user is actively or passively searching for information, he/she might encounter barriers which could alter behavior after such information is encountered. Information need is the driving force of information seeking. An awareness that something is missing necessitates information seeking that contributes to understanding (Kassulke, Stenner-Day, Coory, & Ring, 1993).

Belkin, Oddy, and Brooks (1982) highlighted that an inadequate state of knowledge is a problem of which seeking out information might be a method to solve this problem. Information seeking behaviour helps us to understand why people search for information from sources they believe or trust best to fill their information need (Kim, 2017).

The phenomena is not new and as pointed out by Lambert and Loiselle (2007), there is an increasing documentation of key coping strategies in the promotional activities of health-related activities. The increase of access to knowledge through the internet has also contributed significantly to the increase in information seeking. Kim's (2017) report for ASC communications stated that 72% of consumers are using the internet to find healthcare information. Thus showing that consumers today are actively involved in information seeking where healthcare information is concerned. While the report showed that many were engaging in information seeking, it is interesting to note that there were also those who were still refusing precautionary measure and one of such example is the refusal of child vaccination.

Health information seeking behaviour

Health Information seeking behaviour (HISB) is a concept defined by some scholars as outlined below to explain the need to seek health information, who seeks what and why. Lenz (1984), stated that HISB can vary in two dimensions or concepts which are; a) extent depth and scope of the search b) method (information source used). Johnson (1997) defined Information seeking as knowledge obtained through a specific action, situation or event. HISB could also be defined as information sought or obtained to clarify an issue that is verbal or nonverbal (Corbo-Richert, Caty, & Barnes, 1993). Johnson (1997), espoused that information seeking is an act of purposive information acquisition. Czaja, Manfredi, & Price (2003) defined information seeking behaviour as the medium through which a person or an individual seeks an information. Rees and Bath (2001) defined HISB as when Individuals need to confront an urge or quest for knowledge by seeking information. These definitions show that people seek, need and use health-related information indirectly or directly. An individual can indirectly retrieve health-related information on the television or while listening to a radio or from a friend. This is a passive way of seeking out health information. While he/she can as well decide to deliberately seek out health-related information this is an active way of seeking out health information from sources such as parents, friends, clinic, internet or the media (Rees & Bath, 2001).

A national survey in United States of America showed that the number of people who seek health-related information on the internet is rising (Taylor & Leitman, 2004). Fox and Rainie (2002) argued that, people intentionally seek out health-related information about a particular health issue or a trending health topic. The type of information sought will determine the choice of the source and search. However, searching on the internet would be different from searching on a print or broadcast media (Johnson, 1997). When it comes to information seeking the internet is a vast field of information, and this information is never ending as updates come almost every second from all corners of the globe. This information might be helpful, inaccurate, accurate or detrimental (Meric et al., 2002; Sandvik, 1991). A survey by Pew Internet & American life poll found that over 6 million people go online in search of health information each day, and this is more than the regular visit to a health care provider or facility (Fox & Rainie, 2002). Taylor and Leitman (2004) stated that 74-80 percent of American adults who have internet access searched for health information on the internet at least once a year. This results shows that people search for information from the internet and other sources. It is thus, important to examine information seekers from a demographic perspective.

Gender

According to studies (Fox & Fallows, 2003; Fox & Rainie, 2002) women seek health information more frequently than men online because they (women) are more likely to seek multiple types of health information or be seeking an information on behalf of someone else. In a survey to identify women's information needs, Bakar (2011), found that 80 women in Malaysia, depend mostly on the print (magazines and newspapers) and broadcast (television and radio) media for health-related information. Of which they prefer magazines with popular health sections. The survey also says 10% percent of women turn to the internet for health information using relevant web pages and sites. In Pennsylvania, USA, 42% of 184 female respondents aged 18 and above reported that they visited the library monthly, while 36% visited weekly. Prior literature by also shows that females trust the print media, television, and internet as a source of health information as compared to males (Wingfield & Reese, 2009). Kassulke, Stenner-Day, Coory, and Ring (1993) asserted that although male and female respondents seek and use the same health information sources (medical practitioner). However, as argued by Fidishun (2007), women search or seek health information more than men because women search for health information for themselves and their family members.

Age

Fox and Fallows (2003) also argued that people aged 30 and 64 search for more health information than those aged 29 and below as well as those that are 65 and above. Gavvani, Qeisari, & Asghari (2013) stated that among library users in Iran who seek health-related information, 37% were between 21-30 years old and about 33.5% were between 11-20 years old. 52.5% of respondents had a university degree, 25% of respondents were high school students, 24% of respondents were currently employed. Findings from Gollop (1997), showed that people from sixty-three to 88 years of age seek health-related information from their physicians, the mass media, family members and close friends. Individuals over 65 years seek the internet more as a source of health information unlike those from 65 years and below (Wingfield & Reese, 2009). Seeking health related information has no age grade, the search for the information has to do with the individuals need for the information.

Race and environment

A study shows that Hispanics (75%) were the lowest to seek out health information when compared to African-Americans (76%) and Whites (82%) (Fox & Fallows, 2003). An individual with a higher level of education is more likely to search for a health information online (Fox & Fallows, 2003). Although the internet was the choice for health-related information using search engines like Yahoo and Google to find information (Fidishun, 2007). A survey in Canada shows that among 253 respondents living in rural areas, 85% of the respondent seek health information for personal use while 18% search for health information on behalf of someone else. The results also show doctors and the internet were the most frequent source of health-related information as cited in (Gavgani, Qeisari, & Asghari, 2013).

A study carried out in USA shows that a patient gets 13-16 minutes with his or her physician. This time is limited to discuss major health-related issues, thus patients may be forced to seek more insights about their health challenges or other health-related information from a local library (CAPHISIMLA, 1996). Health topics are always confusing to people especially with a lot of promotional materials they have access too. It is always difficult to understand since these materials or messages are not targeted to a certain group of people. People with different level of knowledge, age, gender, and race may have varying level of understanding of the information received might have to turn to their physician for advice or explanation on any health-related issue they seem to lack understanding about. This is also applicable when a parent seeks out vaccine related information, as discussed below.

Salmon et al. (1999) examined the source of vaccine information that parents have access to or seek actively influence their vaccine beliefs or impact their vaccination behaviour. The source could be from health providers, hospitals, clinics, parents, family members, friends, religious leaders, the internet, magazines or libraries. This may vary by ethnicity as African Americans use or trust newspapers for health-related information, while non-Hispanic Whites trust health providers and also seek them out for health-related information. Mexican Americans talk to friends about health information but trust more in what their mothers had to say and build strong vaccine beliefs on them. Nevertheless, the internet is the most popular source for health-related information (Moran, Frank, Chatterjee, Murphy, & Beazonde-Garbanati, 2015)

Omer et al. (2006) highlighted that parents seek vaccine information on the internet more than the traditional means of a health practitioner. Such a parents with more internet vaccine exposure are more likely to seek nonmedical exemptions from vaccination. Salmon et al. (1999) argued that parents who rely on other media and library hold lesser vaccine beliefs as to parents who rely on the internet. Parents who use interpersonal sources (e.g. family and friends) hold lesser beliefs as those who use the internet. Parents who perceive Internet to obtain information about vaccines are more likely to delay vaccination and hold anti-vaccine beliefs, as well as parents who used interpersonal sources (e.g. family and friends), media sources and library (Salmon et al., 1999). However, a survey by Hesse et al. (2005) indicated that 62.4% respondents expressed physicians remains the most highly trusted source for vaccine information despite the availability of the internet and other sources. Their reason is that Physicians give a better understanding and clearer picture of the whole vaccination process.

Vaccination beliefs are affected by the source of vaccine information. The providers serve as the very first knowledge and impression a parent would have about vaccination. Poor

communication or inadequate communication channels and medium can result to vaccine hesitancy. For example, if a message about vaccination is disseminated and such a message omits key details such as why vaccines are recommended or the effectiveness and safety of the recommended vaccine, this could lead to hesitancy because the message lacks key details about vaccination. The concept of vaccine hesitancy does not apply when there is low or no availability of vaccine or vaccine programs.

Vaccine hesitancy

Vaccine hesitancy can be defined as the refusal or delay in acceptance of vaccines despite availability (WHO-SAGE, 2014). Vaccine hesitancy could be context-specific, complex, varying across time, influenced by factors such as convenience, confidence, and complacency as defined by Strategic Advisory Group of Experts in conjunction with World Health Organization (WHO-SAGE, 2014). Confidence is defined as trust in the safety and effectiveness of vaccines and vaccinations. This is evaluated by the competence, reliability, and durability of healthcare providers. This is seen as the very first step towards vaccinations. If this trust is broken, then prevention of vaccine hesitation is almost impossible (WHO-SAGE, 2014). Complacency is defined as when a parent or an individual's perceived risks of Vaccine-preventable diseases (VPD) as low, leading such individual to erroneously conclude that vaccination is not necessary. This attitude could be towards a certain vaccine or vaccines. The ability of an individual or parents to make a call on whether to vaccinate or not depending on the risk gives a degree to which complacency can cause hesitancy (WHO-SAGE, 2014). Convenience is defined or measured by the affordability, availability, willingness to pay, accessibility, and ability to understand health language or vaccine contents. These factors can make a parent hesitant towards vaccination. Safety concerns are often related to vaccine hesitancy, a death or a serious side effect from a vaccine can trigger hesitancy globally, if not managed and addressed properly (WHO-SAGE, 2014).

As a conclusion, vaccine safety (trust in vaccination practice) can be associated with vaccine hesitancy. Thus, it is important to not exercise strong caution concerning the concept of “vaccine hesitancy” and “vaccine safety”, as vaccine safety (trust in vaccination practice) is one of the drivers of vaccine hesitancy. Trust is a concept defined under the term “vaccine safety” this concept explains an individual's willingness to accept a vaccine.

Trust on vaccination process

Trust often plays a central role in any medical decision making, and this affect an individual's willingness to accept a care, medical recommendations or decisions (Gilkey et al., 2014) The level of confidence and trust in a medical factional or healthcare vaccine providers also influences vaccine hesitancy (Glanz et al., 2013). Parents choose or make vaccine decisions before the child is born or during pregnancy, and as such might decide to discuss with their doctor. This might be in situations where parents feel or understand that the pediatrician lacks adequate vaccine knowledge, and this may result in vaccine refusal or delay. Glanz et al. (2013) also reported that 70% of parents who have a lower level of confidence or trust in their pediatrician's advice will mostly refuse or delay vaccination. These parents also believe pediatricians also report or advise them on only the benefits of vaccines and not the risk or side effects if any. So this makes them question the of the integrity of the information received. (Glanz et al., 2013). A report by

Immunizations American Academy of Paediatrics (2017) indicated that at least once a year, 74% of pediatricians reports confirms a parent who refused or delayed a certain vaccination.

A study by Thornock (2017) showed the fallout in the relationship between parents and physicians. Equally, a lack of trust in Physician's recommendations made parents either refuse or delay vaccination of their children.

Sanita (2008) illustrated that lack of information resulted to delay and non-vaccination of the Measles Mumps and Rubella (MMR) vaccines in Italy. Personal experience, level of trust and value system of vaccine policies plays a fundamental role in parental decisions about vaccination (Julie, Chapman, Hawe, & Burgess, 2006). A study which was carried out in Australia highlighted that mothers of children (infants) belief its best to discuss vaccine issues and risks with an expert or professional before taking vaccine-related decisions (Julie et al., 2006). Trust in a child's doctor plays a distinguishing factor in a parent's acceptance or refusal of vaccine (Gust et al., 2004). Gust et al. 2004 further emphasized that low trust in a child's or family's doctor means low trust in vaccination.

One of the key factors influencing vaccinations is parental confidence in vaccination programs (Tickner, Leman, & Woodcock, 2006). Parents are always keen to safety issues, which drops or affects vaccination rates especially when these issues are not clearly defined or resolved. (McCauley, Kennedy, Basket, & Sheedy, 2012) stated that 63.1% of parents reported being "very confident" and 35.5% reported that they are "somewhat" confident in the safety level of vaccines (immunizations). Low confidence in vaccines is a threat to vaccination programs. Most parents tend to be very protective and worry over the inadequate information's about vaccines (Dube et al., 2013). Weiner, Fisher, Nowak, Basket, & Gellin (2015) argued that 81.4% of expectant mothers in their second to third trimester of pregnancy believed in the effectiveness of childhood vaccines, while 73.5% had confidence in the safety of childhood vaccines.

Vaccine safety scares has always played an integral role in public confidence in vaccination and in turn can result to outbreaks of deadly diseases and death. Even in England, vaccine safety scare can motivate sustained and rapid reductions in vaccine coverage. The (MMR) vaccine coverage went from 91.8% to 79.9% in 2004 prior to scare of the vaccine (Health and social care information, 2014). Public confidence in vaccines can drop any time due to negative media reportage. This can increase vaccine scare and drop vaccine acceptance from 80 to 30% (Nicoll, Elliman, & Ross, 1998). In Australia, febrile reactions in children following influenza vaccination in April 2010 lead to an adverse event signal, here by slowing and reducing vaccination process and acceptance (Bishop, 2010). This vaccine safety can undermine vaccine confidence and thus reduce immunization rates, many parents illustrated that lack of proper information and continuous update about a vaccine crisis such as the influenza vaccine in Australia, left parents unsure about the vaccine and made them worry about the safety level of the vaccine (King & Leask, 2017). A study by Kennedy, LaVail, Nowak, Basket, & Landry (2011) pointed out that high confidence in vaccines doesn't necessarily or mean "high immunization rates".

The eradication of smallpox and control of infectious diseases such as rubella, measles, polio, and tetanus all over the world is recognized as the great success of vaccines (WHO, 2005). However recent outbreaks of measles in the United Kingdom (UK), and the United States of America (USA) raised concerns about vaccination (Gastanaduy, Redd, Fiebelkorn, Rota, & Rota,

2018). Other studies by (Wakefield, Murch, Anthony, Linnell, & Casson, 1998; Taylor, Miller, Farrington, Petropoulos, & Favot-Mayaud, 1991) emphasize that the link of “autism” to (MMR) vaccines against mumps, rubella, measles, is a case that aroused fear and distrust in vaccination. This may therefore, contribute to vaccine hesitancy by parents. Gust et al. (2003) explained that vaccine hesitancy can take several forms. Parents reported hesitant towards vaccination, either refuse or delay only a certain type of vaccine (Gust et al., 2003). In 2009, Freed, Clark, Butchart, Singer, & MM (2009) reported 11.5% of parents had refused a certain vaccine for their kids. This refusal occurred mostly with varicella 32% and human papillomavirus 56% vaccines. Dempsey and Patel (2010), also reported that parents (86%) refused the (H1N1) vaccines and parents (76%) refused the (seasonal influenza) vaccines respectively.

However, no medication is without risk of adverse reaction, an occurrence of Adverse events following immunization (AEFI) such as mild fever and a sore arm, these effects can settle without treatment and don't have a long-term consequence (WHO, 2005) In countries like Europe, to a few Asian and African countries, AEFI is one of the perceived cause for loss of public trust in vaccination process, and the resurgence of vaccine-preventable diseases (VPD) and change in health policies (WHO, 2005) Since vaccines are given to healthy people to prevent diseases unlike other health medications which is to control or cure a sick person, there has been a lower tolerance for AEFI and risk is at its minimum (WHO, 2012). Reddening, pain, swelling, irritation, and fever are the most common AEFI of vaccinations (WHO, 2002).

Severe reactions may include, “hyporeactivity” and inconsolable persistent crying, convulsions, thrombocytopenia, and episodes of “hypotonia” which are usually characterized by spontaneous remission with no sequelae. They can also have a significant impact on health (WHO, 2002). Another rare yet severe reaction is “Anaphylaxis”, this can be fatal unless treated on time (Organization, Pan American Health, 2002). These reactions play a major role on parental trust in vaccinations and decisions to vaccinate. Most parents tend to want to worry more about the AEFI than the risk of possible exposure to disease (Lantos et al., 2010). Other studies by (Burnett et al., 2012; Larson, Cooper, Eskola, Katz, & Ratzan, 2011), highlighted that lack of trust in information sources such as health providers or scientific research or the government due to a misinformation or personal disbelief will lead to vaccine hesitancy.

Behavioural and social factors related to belief systems, cultural issues shape a parent's mind about the level of trust for vaccination (Gust et al., 2004). Gust et al. (2004) further explained that a parental level of education contributes to vaccine hesitancy, parents with 12 years or less education are more likely to distrust the medical information, therefore seek traditional methods or advice from parents, friends or family members within the same community. Opel et al. (2011) found in their own study a different result to that of (Gust et al., 2004) they found that parents with a higher level of education, worry more about the safety of vaccination as to parents with a low level of education. This paranoia makes them hesitant towards vaccination, especially if or when they don't get convincing answers to their worries. Findings of Smith, Kennedy, Wooten, Gust, & Pickering (2006) also compliments results of Opel et al. (2011). Smith et al. (2006) found that college-educated parents had the most refusal rate of childhood vaccination as compared to parents with no college education.

W

Opel et al. (2011) argued that socioeconomic background affects parental vaccine beliefs as parents with high-income show lesser vaccine beliefs as compared with parents of lower-

incomes. Vaccine safety beliefs may differ according to the parental socioeconomic background and community. Parents with a higher level of education or income as well as exposure might perceive this meaning as “autism” or “autoimmune” disease, while parents with a lower educational background, income, might perceive it as fever, soreness. Although further studies may help throw more light on this (Charitha & Amanda, 2013).

Improving Trust in vaccine process

An important driver of vaccination is safety, building public trust in vaccines is a key step towards a successful vaccination programme. This can only be achieved through communicating the right, simple and transparent information to the target audience. Vaccine-related information, should contain i.e. schedule of the vaccine, supplies of syringes, the content of vaccines, after effects if any and how to manage AEFI should the need arise (WHO, 2002). Risk of serious adverse effects could be minimized by following contraindications, this is because it is almost impossible to predict who will have or may not have a serious reaction to the vaccine (WHO, 2012). The media also plays a big role in handling damage control of a vaccine issue. For example, Casiday (2005) highlighted that parents lost interest in vaccination and were unsure how to approach vaccination decisions because of media coverage on the United Kingdom (UK) MMR vaccine issue confused parents, invoked fear and made them anxious. When there is a communication crisis about a vaccination process the organization in charge should think of possible ways to manage the crisis. The communication process to the public should be transparent as possible so in as much as it provides knowledge about the situation, it should not invoke fear to the highest level (WHO, 2005). In order to reduce vaccine hesitation and improve vaccine safety, effective and efficient communication becomes a key success factor. Therefore, the success of any vaccination program is based on effective and efficient communication. Communication is a major link between vaccination acceptance and refusal because, the medium through which information about vaccination is disseminated determines how it will be accepted by the end users (WHO, 2012).

The internet provides a lot of unfiltered vaccine information which reflects poorly designed and misleading summaries. This information (from the internet) have not improved vaccine confidence or trust (cdc.gov, 2018). However, online platforms mirror avenues that have been created to help parents answer any vaccine questions they might have webpages such as (<http://www.cdc.gov/vaccines/conversations>). Building parent-physician relationship is key to improving vaccine trust (WHO, 2012). This relationship will make the parents feel comfortable enough to share their worries about vaccinations and get all possible information and help available. With the advancement of technology today it would be nice to see if “oral vaccinations” can replace “injections”. This would help parents worry less about the pain of vaccination. The dosage of vaccination is also a thing to look into because some parents belief vaccination doses are too much and could be affecting a child’s immune system (Charitha & Amanda, 2013).

CONCLUSION

Parental hesitancy for vaccination is a major public health concern that can be influenced by certain factors such as environmental, vaccine safety, or personal beliefs. These factors don’t come into play if the parent or individual don’t seek out vaccine-related information or passively view them. This calls for vaccine-related information to be readdressed and tailored

in a way that it gets to the target audience. Secondly with the advancement of technology, it would be helpful to develop vaccine information that is easy to assess and understand. Health practitioners/workers should be trained on how best to pass vaccination messages to their clients because poor communication can result in lack of confidence which can make a parent hesitant towards vaccination.

REFERENCES

- (CAPHISIMLA), M. L. (1996). *The librarian's role in the provision of consumer health information and patient education*. Retrieved from Bull Med Library Association: www.ncbi.nlm.nih.gov/pmc/articles/PMC299415/pdf/mlab00375-0088.pdf.
- Bakar, A. B. (2011). Information seeking behaviour of rural women in Malaysia. *Library Philosophy and Practice*, 461.
- Belkin, N., Oddy, R., & Brooks, H. (1982). Ask for information retrieval: Part 1. Background and theory. *Journal of Documentation*, 38, 61-7.
- Bishop, J. (2010). *Seasonal flu vaccine and young children* [media release]. Retrieved from <http://www.health.gov.au/internet/main/publishing.nsf/Content/mr-yr10-dept-dept230410.htm>
- Burnett, R. J., Larson, H. J., Moloji, M. H., Tshatsinde, E. A., Meheus, A., Paterson, P., & Francois, G. (2012). Addressing public questions and concerns about vaccinations in South Africa: A guide for healthcare workers. *Vaccine*, 30, C72-C78.
- Casiday, R. (2005). Risk and trust in vaccine decision making. *Durham Anthropology Journal*, 13, 1-4.
- Cdc.gov. (2018). vaccine conversations. Retrieved from *Centers for Disease Control and Prevention*: <http://www.cdc.gov/vaccines/conversations>.
- Charitha, G., & Amanda, F. D. (2013). The rise and fall of parental vaccine hesitancy. *Human Vaccines and Immunotherapeutics*, 9(8), 1755-1762.
- Corbo-Richert, B., Caty, S., & Barnes, C. M. (1993). Coping behaviors of children hospitalized for cardiac surgery: A secondary analysis. *Maternal-Child Nursing Journal*, 21(3), 27-36.
- Czaja, R., Manfredi, C., & Price, J. (2003). The determinant and consequences of information-seeking among cancer patients. *Journal of Health Communication*, 8, 529-562.
- Gust, D. A., Strine, T. W., Maurice, E., Smith, P., Yusuf, M., M., Wilkonson, B., & Schwartz, B. (2004). Underimmunization among children: Effects of vaccine safety concerns on immunization status. *Pediatrics*, 114, e16-e22.
- Dempsey, A., & Patel, D. (2010). HPV vaccine acceptance, utilization and expected impacts in the U.S.: Where are we now? *Human Vaccines*, 6(9), 715-720.

- Dube, E., Laberge, C., Guay, M., Bramadat, P., Roy, R., & Bettinger, J. (2013). Vaccine hesitancy: *An overview. Human Vaccine Immunother*, 9(8), 1763-1773.
- Fidishun, D. (2007). Women and the public library: Using technology, using the library. *Johns Hopkins University Press*, 56(2), 328-343.
- Fox, S., & Fallows, D. (2003). *Internet health resources: Health searches and email have become more commonplace, but there is room for improvement in searches and overall*. Retrieved May 10, 2018, from The Pew Internet & American Life Project: <http://www.pewinternet.org>
- Fox, S., & Rainie, L. (2002). *Vital decisions: How internet users decide what information to trust when then or their loved ones are sick*. Retrieved June 01, 2018, from The Pew internet & American life project: <http://www.pewinternet.org>
- Freed, G., Clark, S., Butchart, A., Singer, D., & MM, D. (2009). *Parental vaccine safety concerns. Pediatrics*(125), 654-659.
- Gastanaduy, P., Redd, S., Fiebelkorn, A., Rota, J., & Rota, P. (2018). *Measles in the United States*. New-York: Morbidity and mortality weekly report (MMWR).
- Gavgani, V. Z., Qeisari, E., & Asghari, J. M. (2013). Health information seeking behavior (HISB): A Study of a developing country. *Library philosophy and practice* (e-journal), 902.
- Gilkey, M., Magnus, B., Reiter, P., McReed, A., Dempsey, A., & Brewer, N. (2014). The vaccination confidence scale: *A brief measure of parents' vaccination beliefs. Vaccine* (32), 6259-6265.
- Glanz, J. M., Wagner, N. M., Narwaney, K. J., Shoup, J. A., McClure, D. L., McCormick, E. V., & Daley, M. F. (2013). *A mixed methods study of parental vaccine decision making and Parent-Provider-Trust. Academic Pediatrics*, 13(5), 481-488.
- Gollop, C. J. (1997). Health-information seeking behaviour and older African American women. *Bulletin of the Medical library association*, 85(2), 141-146.
- Gust, D., Brown, C., Sheedy, K., Hibbs, B., Weaver, D., & Nowak, G. (2003). Immunization attitudes and beliefs among parents: *Beyond a dichotomous perspective. Am Journal of Health Behaviour*(29), 81-92.
- Health and social care information. (2018). *NHS Immunisation statistics*. Retrieved from NHS Digital: <https://digital.nhs.uk/data-and-information/publications/statistical/nhs-immunisation-statistics/nhs-immunisation-statistics-england-2014-15>.
- Hesse, B. W., Nelson, D. E., Kreps, G. L., Croyle, R. T., Arora, N. K., Rimer, K. B., & Viswanath, K. (2005). Trust and sources of health information. The impact of the internet and its implications for health care providers: Findings from the first health information national trends survey. *Arch Internal Medicine* , 165(22), 2618-2624.
- Johnson, J. D. (1997). *Cancer-related information seeking*. Cresskill, NJ: Hampton press.

- Julie, L., Chapman, S., Hawe, P., & Burgess, M. (2006). What maintains parental support for vaccination when challenged by anti-vaccination messages? A qualitative study. *Vaccine* (24), 7238-7245.
- Kassulke, D., Stenner-Day, K., Coory, M., & Ring, I. (1993). Information-seeking behaviour and sources of health information: Associations with risk factor status in an analysis of three Queensland electorates. *Australian Journal of Public Health*, 17(1), 51-57.
- Kennedy, A., LaVail, K., Nowak, G., Basket, M., & Landry, S. (2011). Confidence about vaccines in the United States: Understanding parent's perceptions. *Health Aff* (Millwood), 0396.
- Kim. (2017). Computer supported cooperative work and social computing. *The 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing*, (pp. 09-03). NJ, USA.
- King, C., & Leask, J. (2017). The impact of a vaccine scare on parental views, trust and information needs: A qualitative study in Sydney. *Australia BMC Public Health*(17), 4032-4037.
- Kuhlthau, C. (1999). A principle of uncertainty for information seeking. *Journal of Documentation* , 49(4), 339-355.
- Lambert, D. S., & Loisel, G. C. (2007). Health information seeking behaviour. *Qualitative Health Research* , 8, 1006-1019.
- Lantos, J., Jackson, M., Opel, D., Marcuse, E., Myers, A., & Connelly, B. (2010). Controversies in vaccine mandates. *Curr. Probl. Pediatr. Adolesc. Health Care*, 40, 38-58.
- Larson, H., Cooper, L., Eskola, J., Katz, S., & Ratzan, S. (2011). Addressing the vaccine confidence gap. *Lancet*(378), 526-535.
- Lenz, E. (1984). Information seeking: A component of client decisions and health behavior. *ANS*, 6(3), 59-71.
- McCauley, M., Kennedy, A., Basket, M., & Sheedy, K. (2012). Exploring the choice to refuse or delay vaccines: A national survey of parents of 6- through 23-month olds. *Academic Pediatre*, 12(5), 375-383.
- Meric, F., Bernstam, E. V., Mirza, N. Q., Hunt, K. K., Ames, F. C., Ross, M. I., . . . Singletary, S. E. (2002). Breast cancer on the World Wide Web: A Cross-sectional survey of quality of information and popularity of Web sites. *British Medical Journal*(324), 577-581.
- Moran, M., Frank, L., Chatterjee, J., Murphy, S., & Beazonde-Garbanati, L. (2015). Information scanning and vaccine safety concerns among African American, Mexican American, and non-Hispanic White women. *Patient Education Couns*, 99(1), 147-53.
- Nicoll, A., Elliman, D., & Ross, E. (1998). MMR vaccination and autism: Deja-vu, pertussis and brain damage 1974? . *BMJ*, 316(7133), 715-716.

- Omer, S., Salmon, D., Orenstein, W., DeHart, M., N., & Halsey. (2006). Vaccine refusal, mandatory immunization, and the risks of vaccine-preventable diseases. *Journal of Medicine* (360), 1981-1988.
- Opel, D., Taylor, J., Mangione-Smith, R., Solomon, C., Zhao, C., & Catz, S. (2011). Validity and reliability of a survey to identify vaccine-hesitant parent. *Vaccine* (29), 6598-6605.
- Organization, P. A. (2002). Immunization Safety. How to address events allegedly? Attributable to vaccination or immunization. Washington, DC. USA: PAHO/WHO.
- Rees, C. E., & Bath, P. A. (2001). Information-seeking behaviours of women with breast cancer. *ONF*, 28(5), 899-907.
- Salmon, D., Haber, M., Gangarosa, E., Phillips, L., Smith, N., & Chen, R. (1999). Health consequences of religious and philosophical exemptions from immunization laws: Individual and societal risk of measles. *JAMA*(282), 47-53.
- Sandvik, H. (1991). Health information and interaction on the Internet: A survey of female urinary incontinence. *British Medical Journal*(319), 29-32.
- Sanita, I. S. (2008). *National vaccination coverage survey among children and adolescents*. Rapporti ISTISAN. Rome: (ICONA) Working Group.
- Smith, P., Kennedy, A., Wooten, K., Gust, D., & Pickering, L. (2006). Association between health care providers' influence on parents who have concerns about vaccine safety and vaccination coverage. *Pediatrics*(118), e1287-92.
- Taylor, B., Miller, E., Farrington, C., Petropoulos, M., & Favot-Mayaud, I. (1991). Autism and measles, mumps, and rubella vaccine: No epidemiological evidence for a causal association. *The Lancet* (353), 2026-2029.
- Taylor, H. (2004a). *Harris Poll no. 3*. . Retrieved from More than one-third of Internet users now have broadband. : www.harrisinteractive.com/harris_poll/index.asp?PID=432.
- Taylor, H., & Leitman, R. (2004). No significant change in the number of "cyberchondriacs" – those who go online for healthcare information. *Health Care News*(4), 7.
- Thornock, B. (2017). Heralding the pariahs: What the narratives of vaccine hesitant parents can teach us about the backfire effect and physician-patient relationships. *Ann Public Health reports*, 1(1), 15-21.
- Tickner, S., Leman, P., & Woodcock, A. (2006). Factors underlying suboptimal childhood immunisation. *Vaccine* , 24(49-50), 7030-7036.
- Wakefield, A., Murch, S., Anthony, A., Linnell, J., & Casson, D. (1998). Retracted: Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children. *The Lancet*(351), 637-641.

- Weiner, J., Fisher, A., Nowak, G., Basket, M., & Gellin, B. (2015). Childhood immunizations: First-time expectant mothers' knowledge, beliefs, intentions and behaviors. *Am J Prev Med*(49), S426-432.
- WHO. (2002). *Safety of mass immunization campaigns*. Retrieved April 25, 2018, from World Health Organization: http://www.who.int/immunization_safety/aefi/en
- WHO. (2005). *Outbreak communication guidelines*. Geneva. Retrieved from World Health Organization: www.who.int/infectious-disease_news/IDdocs/whocds200528/whocds2018-04-2828en.pdf.
- WHO. (2012). *Global vaccine safety blueprint; WHO/IVB/2012.07; Quality, safety, and standards unit of the department of immunization, vaccines, and biologicals: Geneva, Switzerland*. Retrieved April 20, 2018, from World Health Organization: http://www.who.int/injection_safety/toolbox/en/AM_SafetyCampaigns.pdf.
- WHO-SAGE. (2014). Report of the (SAGE) *working group on Vaccine Hesitancy*. Retrieved from World Health Organization: www.who.int/immunization/sagemeetings/2014/october/1Report_WORKING_GROUP_vaccine_hesitancy_final.pdf
- Wilson, T. (1981). *On user studies and information needs*. *Journal of Documentation*(37), 315.
- Wilson, T. (1999). *Models in information behaviour research*. *Journal of Documentation*, 55(3), 249-270.
- Wingfield, J., & Reese, L. (2009). *Trust for health information: Differences by race, age, education, and gender*. Department of community health/preventive medicine, more house school of medicines. Washington, DC.: Poster presented at the 3rd Health information national trends survey (HINTS) Data users meeting.