

Vaccination: Beliefs and Cultural Aspects

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Abstract

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Title of the thesis Vaccination: Beliefs and Cultural Aspects		
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Abstract <p>The purpose of this thesis was to guide nursing students and health care providers to recognize common vaccination beliefs and understand culture's influence in vaccination. This study examined people's general views of vaccination, the way they received information and cultural factors' impact on vaccination hesitancy, criticism and acceptance.</p> <p>The goals of the study were to find out how culture affected vaccination decision-making and what beliefs shaped people's vaccination perception. Understanding of what different beliefs and cultural factors dictate vaccination hesitancy will help to develop a more effective vaccination education to the patients in the future.</p> <p>The literature review was written as part of the thesis. The data for the thesis was collected from scholarly sources and evidence-based articles relevant to the topic. The study approach was a qualitative method to understand the topic, reasonings and consequences better. The data was analysed by using an inductive content analysis.</p> <p>The results of the study showed that beliefs and culture did have an impact on how people view vaccination. This could be seen in vaccination coverage, expressed opinions in the findings and certain vaccine's uptake. Cultural perspectives and beliefs on vaccination were formed from many reasonings, such as mass information, negative side effects of the vaccines, lack of trust toward the authorities and public health's stance. Thus, health care providers need to create an open and respectful conversation with the patients.</p>		
Keywords Vaccination, Vaccination beliefs, Vaccination hesitancy, Cultural factors		

Tiivistelmä

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Tiivistelmä <p>Tämän opinnäytetyön tarkoituksena oli ohjata hoitotyön opiskelijoita ja terveydenhuollon ammattilaisia tunnistamaan yleiset rokotuskäsitykset ja ymmärtämään kulttuurin vaikutus rokotuksiin. Tässä tutkimuksessa tarkasteltiin ihmisten yleisiä näkemyksiä rokotuksista, tapaa, jolla he saivat tietoa, sekä kulttuuritekijöiden vaikutusta rokotusten epäröintiin, kritiikkiin ja hyväksymiseen.</p> <p>Tutkimuksen tavoitteena oli selvittää, kuinka kulttuuri vaikuttaa rokotuspäätökseen sekä mitkä uskomukset muokkaavat ihmisten rokotuskäsitystä. Ymmärrys siitä, mitkä eri uskomukset ja kulttuuriset tekijät määräävät rokotusepäpärintiä, auttaa kehittämään tehokkaamman rokotusohjauksen potilaille tulevaisuudessa.</p> <p>Kirjallisuuskatsaus on kirjoitettu osana opinnäytetyötä. Opinnäytetyön tiedot kerättiin tieteellisistä lähteistä ja aiheeseen liittyvistä näyttöön perustuvista artikkeleista. Tutkimusmenetelmä oli laadullinen menetelmä aiheen, perustelujen ja seurausten paremman ymmärtämisen vuoksi. Tiedot analysoitiin induktiivisella sisältöanalyysillä.</p> <p>Tutkimuksen tulokset osoittivat, että uskomukset ja kulttuuri vaikuttivat siihen, miten ihmiset suhtautuvat rokotuksiin. Tämä näkyi rokotusten kattavuudessa, mielipiteiden ilmaisussa ja tiettyjen rokotteiden ottamisessa. Kulttuuriset näkökulmat ja uskomukset rokotuksiin muodostuivat monista syistä, kuten massatiedosta, rokotteiden kielteisistä sivuvaikutuksista, luottamuksen puutteesta viranomaisia kohtaan ja kansanterveyden kannasta. Siksi, terveydenhuollon ammattilaisten on luotava avoin ja kunnioittava keskustelu potilaiden kanssa.</p>		
Asiasanat Rokotus, rokotuskäsitykset, rokotusepäpärinti, kulttuuriset tekijät		

Table of Contents

1. Introduction	1
2. Vaccination in Finland	2
2.1 Vaccination	2
2.2 National vaccination programme in Finland	3
2.3 Vaccination coverage amongst children in Finland	4
3. Vaccine hesitancy and beliefs	4
3.1 Vaccine hesitancy	4
3.1.1 Parental vaccine hesitancy	5
3.2 Vaccination beliefs and misconceptions	7
4. Cultural aspects	7
4.1 Cultural view on vaccination	7
4.2 Health care providers and cultural competence	9
5. Health care provider's role in vaccination	10
6. Aims, purpose and research questions	11
7. Implementation and methodology	11
7.1 Literature review	11
7.2 Data search and collection	12
7.3 Content analysis	15
8. Results	16
8.1 Health care provider's role in patient education	16
8.2 Knowledge and beliefs towards vaccination	18
8.3 The growing vaccine hesitancy amongst parents	20
8.4 Cultural factors in vaccination decision-making	22
8.5 Cross-cultural differences	25
9. Conclusion	27
10. Discussion	28
10.1 Review of thesis results	28
10.2 Ethics and reliability	30
10.3 Further research	31
List of references	32

Appendices

Appendix 1. National vaccinal programme

Appendix 2. 1st dose of DTaP-IPV-Hib vaccination coverage amongst Finnish children born in 2017

Appendix 3. Studies included in the literature review

Appendix 4. An example of inductive analysis content

Appendix 5. JBI Critical Appraisal Checklist for Systematic Reviews and Research Syntheses

Appendix 6. JBI Critical Appraisal Checklist for Text and Opinion Papers

Appendix 7. JBI Critical Appraisal Checklist for Qualitative Research

Appendix 8. JBI Critical Appraisal Checklist for Analytical Cross-Sectional Studies

Appendix 9. Evaluation of the quality of studies

1. Introduction

While vaccination is considered and recognized as one of the most successful medical inventions, the perception of its safety has been slowly changing in the recent years. A growing number of people have started to become more hesitant to take vaccines and question their effects. The phenomenon of vaccine hesitancy is caused by several beliefs and factors influencing individual decision-making. (Dube et al. 2013.)

Vaccination remains as a largely accepted public health method despite the rising critical attitude. Global vaccination coverage has stayed in a satisfactory level and the uptake of new vaccines have increased. During 2019, about 125 WHO's member states reached 90% of diphtheria-tetanus-pertussis vaccine (DTP3) coverage and 85% of the infants received doses of this same vaccine to protect them against serious and fatal diseases. The uptake of new vaccines and following the vaccination programmes have saved millions of lives, prevented deaths, and lowered mortality rate caused by many infectious diseases. (Dube et al. 2013; WHO 2020.)

However, vaccination acceptance should not be considered as an obvious feature of all communities. As a result of globalization, beliefs, cultures and media environments affect people in different countries quicker than before (Dube et al. 2013). This thesis aims to find out what beliefs have impacted people's perspective on vaccination and how culture affects decision-making of vaccination. The purpose of the thesis is to offer information to health care providers and nursing students to recognize culture's role in vaccination situations.

2. Vaccination in Finland

2.1 Vaccination

Vaccination is an important and effective method in health care that offers prevention and protection against infectious diseases. Vaccines are made from viral vectors, nucleic acids, fragments, weakened or killed micro-organisms that stimulate the body's own immune system to fight off the infection. A vaccinated person develops a specific protection against future contact of the same disease due to the body's immunological memory that triggers a quick response to the presence of a pathogen. (Olson et al. 2020.)

The effectiveness of the vaccine is based on the active substance, which is called an antigen. An antigen is used to teach the body's defense system to recognize and protect against pathogens, which are micro-organisms that cause the disease. Antigens trigger the body to make antibodies and cause immunity to either one or multiple, similar types of pathogens. Some vaccines, such as tetanus, diphtheria and pertussis vaccines provide protection against a toxin produced by a pathogen. Protection is based on the toxoids in the vaccine, which are harmless bacterial toxins. Toxoids help the body to produce antibodies that block the effects of the toxins. Additionally, vaccines contain sugars, salts, amino acids and adjuvants that are needed to provide and maintain a suitable composition or to improve the shelf life and efficacy of the vaccine. (Elonsalo 2016; THL 2020a.)

Because of the vaccine effectiveness, many major diseases, such as measles, mumps and poliomyelitis have become controllable. Smallpox and rubella used to be common diseases, but they are currently extinct in Finland due to immunization. As a result, complications caused by these diseases, such as polio-induced paralysis, measles-related encephalitis, developmental disability in a fetus by rubella, and deafness by mumps have also been eliminated. (THL 2019a; Olson et al. 2020.)

Since vaccine-preventable diseases have become rare, it is easy to think that vaccines are unnecessary. When people have not experienced these diseases or the complications, they do not understand to fear them. There are concrete incidents of the benefits and importance of vaccines. For example, the introduction of MMR vaccination in 1982 almost entirely eradicated measles from Finland by the mid-1990s. If no one were vaccinated, everyone would get sick since measles virus was one of the most contagious viruses. Lumio (2019) states that 97% of children should be vaccinated to keep measles gone. Additionally, MMR vaccinations prevent many cases of pneumonia, febrile convulsions, encephalitis, and a few deaths each year in Finland. (Lumio 2019; THL 2019b.)

Vaccines offer several benefits at individual, community and societal levels. The usage of national vaccination programme has freed health care resources to treat and prevent other diseases too instead of only focusing on infectious diseases. Getting vaccinated is also cheaper than paying for health care costs caused by preventable diseases. (THL 2019a.)

2.2 National vaccination programme in Finland

The purpose of the national vaccination programme is to protect the citizens from diseases preventable by vaccines. In Finland, the Ministry of Social Affairs and Health makes decisions concerning the vaccination programme along with the Finnish Institute for Health and Welfare (THL), who also monitors the preventable diseases. The municipalities are responsible for arranging the vaccination. Additionally, school health care services and health care centers give vaccines included in Finland's national vaccination programme free of charge. (Ministry of Social Affairs and Health 2013; THL 2020b.)

There are 16 vaccines in the Finnish vaccination programme (see Appendix 1). The programme is divided into two sections, children's and adult's vaccination, but there are also vaccines specifically for risk groups. Vaccines are scheduled in careful consideration of health care resources, maturity of the recipient's defense system and risk of illness. While vaccination is not compulsory, over 90% of the Finnish parents still vaccinate their children. (Ministry of Social Affairs and Health 2013; THL 2020b.)

Children and adolescents can get vaccination against 13 different diseases and their long-term harmful effects. The first vaccines are already given to a few months old baby and the amount increases as the child grows up. Children aged 10-12 years are offered injections of HPV vaccines to protect against cancers related to cervical and vaginal areas. Adults have the responsibility to take care that their vaccine shots against diphtheria, tetanus and whooping cough, and two MMR vaccine shots against measles, rubella and mumps are up to date. (THL 2021a.)

Vaccination schedule offers proper protection at the right time and avoids possible adverse effects. The Finnish national vaccination programme is affected by several factors: adverse effects, changes in risk groups, severity and incidence of the disease, vaccine development and protection by the vaccines. This means that the vaccination programme can be corrected and changed to fit the standard of the safety and effectiveness. The experts choose the vaccines after careful consideration and proper evaluation of the effects. (THL 2020b.)

2.3 Vaccination coverage amongst children in Finland

Vaccination coverage means that a certain amount of people in a population have been vaccinated against infectious diseases. When the vaccination coverage is high, some diseases become rare or non-existent due to less opportunity of spreading and more people having protection against them. If the vaccination coverage drops low, these diseases would become common again and cause outbreaks. The small amount of vaccinated people would not be able to protect unvaccinated people with herd immunity anymore. (THL 2020c.)

There are small variations between different regions and vaccines, but overall vaccination coverage amongst children in Finland is very high. Over 98% Finnish children born in 2017 have received vaccines protecting them from diphtheria, whooping cough, polio, tetanus and Hib diseases (see Appendix 2). MMR vaccine has been given to about 96% of the infants and three out of five municipalities have at least 95% of the vaccine coverage. There is also a high percentage of children vaccinated against pneumococcal, rotavirus and chickenpox. (THL 2020d.)

High vaccination coverage shows that most Finns trust vaccinations and how Finnish health care system is implementing them. Not only is it culturally accepted feat in maintaining health, but Finns generally have an optimistic attitude and outlook towards vaccines. With the way Finnish health care system has been built, vaccination is easily accessible for everyone who needs it. Vaccines in the national programme are free since they are financed from the government budget. (THL 2020b; THL 2020d.)

Generally, Finnish parents have been protecting their children well through vaccination. Only 1% of children under school age and 0.6% of school-aged children have not received basic vaccinations from the national vaccination programme. It is important for health care providers to keep building and amplifying trust in vaccination. (THL 2020d.)

3. Vaccine hesitancy and beliefs

3.1 Vaccine hesitancy

In 2019, World Health Organization stated that vaccine hesitancy is one of the ten global health threats. Vaccine hesitancy is described as *the reluctance or refusal to vaccinate despite the availability of vaccines*. Vaccine-hesitant individuals form a heterogenous group: some accept or choose selectively vaccines while being significantly concerned and others refuse or delay vaccinations purposely. (Dube et al. 2013; WHO 2019.)

Attitudes related to vaccine hesitancy range from full acceptance to total refusal. It is essential to remember that people's attitudes and opinions do not only fall into two

categories, but vary according to time, place and vaccine. The definition of vaccine hesitancy has also been examined through three Cs: Complacency, Convenience, and Confidence. This highlights that ideological vaccination hesitancy explains only part of non-vaccination. There may be practical reasons behind the hesitancy. (Sivelä et al. 2018.)

Anti-vaccine in this context means opposing the use of vaccines. Anti-vaccine movement and vaccine hesitancy can be related to each other and include a wide variety of different practices. While some vaccine-critical patients still take recommended vaccinations, others refuse all vaccines. Anti-vaccine attitudes stem from background factors, such as certain view of individualism and hierarchy, disgust, resistance and conspiracy theories. (Merriam-Webster 2005; Väliverronen et al. 2020.)

Additionally, it has been estimated that specifically after H1N1 influenza pandemic, vaccination attitudes have become more critical due to narcolepsy cases. H1N1 pandemic (more known as “swine flu pandemic”) in 2009–2010 and narcolepsy cases following vaccinations caused a stir in Finland. The narcolepsy epidemic was undeniably due to 2009 Pandemrix vaccines. Since most of the patients were minors and young adults, conversation about vaccine’s adverse effects and disadvantages became a long-lasting topic in media. However, it is good to remember that so-called ideological opposition and negative attitudes towards vaccines have already existed since the early days of vaccination. (Väliverronen et al. 2020; Lumio 2021.)

3.1.1 Parental vaccine hesitancy

Despite of Finland having an overall high vaccination coverage, health care providers and politicians have become more worried about the difference in vaccination coverage in different regions. There were a few measles cases in Pohjanmaa in 2018. Lower vaccination coverage in some regions were interpreted as criticism, hesitancy and mistrust towards vaccines. About 30-40% Finnish parents accept vaccination without questioning, 25-30% accept vaccination carefully, 20-30% are hesitant, 2-27% are selective or have delayed vaccination, and under 2% have refused vaccination. (Puumalainen et al. 2015; Nurmi et al 2019.)

Child health center is an important part of the Finnish health care system that is responsible for vaccinating infants and toddlers. Since children's vaccination has been strongly integrated into the system’s practice, parents do not necessarily refuse childhood vaccines. Hence, it is important to note that vaccine criticism does not always reflect directly in vaccination behavior. All parents allowing their children to be vaccinated are not necessarily

pro-vaccine either. Instead, there are other forms of silent resistance and resentment towards the health care system. (Nurmi et al. 2019; Väliverronen et al. 2020.)

There are many reasons for parental vaccine hesitancy. Some parents disagree with severity of certain diseases like measles and chickenpox and feel like it is exaggerated by health care providers to get people vaccinated. It is quite common that many Finnish parents encourage their children to play with children infected with chickenpox to get the disease instead of getting vaccinated. Feelings of vaccines being unnecessary if there is a lack of exposure or parents experiencing these diseases themselves with mild symptoms have caused them to become more cautious and hesitant towards vaccination. Parents also feel like the risk of getting complications from the vaccine-preventable diseases are low if the diseases are treated well enough. (Nurmi et al. 2019.)

There is also a difference between normal everyday thoughts and scientific thinking, especially when it comes to identification of risks, alternative care methods and lifestyle practices. Vaccine-hesitant parents might distance themselves from health care system's recommended care practices due to perceived unfairness in the use of power and authority by health care providers when it comes to influencing vaccination decision-making. Parents want to make the best conscious decision for their children without outside interference. (Nurmi et al. 2019.)

Some parents' growing vaccine hesitancy has stemmed specifically from the child health center visits. Parents feel like the child health center's workers are pressuring, scaring and threatening them about vaccination. This makes them question the providers' abilities and the obtained information – leading then to vaccine refusal or delay. Also, commotion caused by Pandemrix vaccine led to many parents becoming selective and hesitant towards vaccines, especially newer ones since they fear the repetition of the narcolepsy incident. (Nurmi et al. 2019.)

Since vaccination has a major role in the Finnish health care and culture, people tend to judge and blame parents who do not vaccinate their children. They see it as an irresponsible act. Anti-vaccination parents hide to avoid being controlled and restricted by peer pressure, health care provider's disapproval and public criticism. Therefore, health care providers need to recognize different influences and perspectives in vaccination decision-making, and support immunization policies' acceptance amongst the public with evidence-based information. Finding out common beliefs built within the society helps to understand why some parents have decided to get their children vaccinated and some not. (History of Vaccines 2018; Nurmi et al. 2019.)

3.2 Vaccination beliefs and misconceptions

Vaccine hesitancy is often based on various misconceptions and beliefs. A common vaccination belief is about the need for vaccines, as some people believe that adequate hygiene and good nutrition are sufficient to control diseases. While improved hygiene and nutrition have helped to lower the number of diseases, there are still plenty of other diseases left that are undependable on these factors. Vaccination is the only effective protection against these diseases. (Hermanson 2019.)

Some individuals believe that vaccines are not effective because people can still get sick despite being vaccinated. It is important to remember that while no vaccine offers 100% protection, most of the vaccination recipients do develop a strong immunity that also shield other vaccinated people who have not developed a proper protection. Also, in an epidemic situation, unvaccinated people have the biggest risk of getting the disease. (Hermanson 2019.)

It is also a common misconception that vaccines contain harmful substances that cause chronic diseases such as autism, MS, diabetes and various allergies. No scientific evidence supports this claim. There are only a small number of adjuvants in the vaccines, and they rarely cause any problems. People get bigger amounts of aluminum and formaldehyde from the environment. Additionally, there is no scientific support of alternative care choices being better options than vaccines in protecting from vaccine-preventable diseases. (Hermanson 2019.)

A challenge that health care providers face is that all opinions, beliefs and misconceptions, regardless of the knowledge base, are strongly displayed through social media. Petri Ruutu, a docent of medicine, considers it important that health care providers actively participate in social media forums' vaccination discussions to dispel inaccurate beliefs of vaccination. (Ruutu 2018.)

4. Cultural aspects

4.1 Cultural view on vaccination

Culture plays a significant role in a person's identity. It shapes the way people think, talk and act. Many opinions are based on beliefs built within an individual's own culture and environmental factors. Sometimes, the society's stance clashes with people's beliefs and stirs arguments. Vaccination is one of those topics that has caused intense public discussions and speculations due to several beliefs, attitudes and feelings surrounding it.

Cultural perspectives on vaccination come from politics, religion, distrust and public health care's stance. (The History of Vaccines 2018.)

Certain religion or family's beliefs affect vaccination perception by preferring alternative choices instead of getting vaccinated. There are beliefs of the body being pure so inserting substances in it might be tainting instead of healing. People believe that sickness should be healed by God so there is no need for any kind of medical intervention. For example, the Catholic Church understands the importance of vaccines in protection but prioritizes alternative choices since some vaccines are made from using aborted fetuses' cells. (The History of Vaccines 2018.)

Politics has also affected the way people perceive vaccination. Concepts such as individual rights and protection of the public's health are not always in harmony with each other. For example, in the United States, the state laws require mandatory vaccination to children in order to enter school. The U.S. law has a strong preference for vaccination, but its culture also has a solid emphasis on individuality and freedom of choices. This clash has led people to question the morality of compulsory vaccination and view some vaccines as a threat. People feel like their autonomies are being disregarded if they do not exercise their right to protect themselves by not getting vaccinated. (The History of Vaccines 2018.)

Public health care should try to balance both group needs and individual rights, but it is not easy to achieve that. Public health care regulations seek to protect the population, so it sometimes contradicts with individual stances in order to shield a large group of people. Prominent debates between individuals and public health raise tension. (The History of Vaccines 2018.)

The government and public health care can shape cultural viewpoints more positively with medical evidence, patient education and results of centuries-long vaccinations, but there is also a rising problem of people being more distrusting towards their own health care providers and politicians. Some communities have been affected by racism, which has caused suspicion of the vaccines. For example, African Americans' mistrust towards public health interventions was caused by denial of treatment opportunities. Certain countries in Asia and Africa do not trust vaccination due to beliefs of vaccines being weapons to harm non-Western people. Lack of trustworthy sources, living in an unsafe area, and experiencing negative cultural characteristics can lead to various conspiracy theories and concerns amongst the people. (The History of Vaccines 2018.)

In Europe, the controversy of Oxford-AstraZeneca COVID-19 vaccine causing thrombosis has been shared rapidly. People have been scared to get the vaccine due to the possible side effect of this vaccine brand. This has led to widespread of distrust and suspicion of

vaccine safety. The controversy blew up to the point where dozens of European countries decided to take the vaccine off the market temporarily. Finland decided to only vaccinate over 65 years old people with AstraZeneca. Despite this decision and European Medicines agency (European Union's drug regulator) statement of the vaccine not being linked to overall risk of thrombosis, many people remained worried and hesitant. THL (2021b) states that the incidence of thrombosis by AstraZeneca in Europe is estimated to be about 1/100 000 amongst the vaccinated people. While young age seems to be a predisposing factor to a higher thrombosis risk, the risk is still extremely rare. (The Economist 2021; THL 2021b.)

While some countries remain uncertain about vaccination and their own health care system, Finnish society and culture is built around trust within the national institutions, health care authorities and experts. Not only do Finns believe that vaccines are part of health protection, but it is also a social norm that everyone gets vaccinated. Minority of Finnish people favor voluntary vaccination since vaccination acceptance has been so deeply integrated in the culture. Vaccination becoming a social norm increases vaccination acceptance: immunization feels like an individual responsibility and duty for people to protect each other and maintain herd immunity. This kind of standard behavior leads to people following the majority's vaccination habit since it feels like a normal thing that everyone does. (Dube et al. 2013; Väliaverronen et al. 2020.)

4.2 Health care providers and cultural competence

The concept of cultural competence means respecting people from all cultural backgrounds and ensuring safe, non-judgmental atmosphere. The cultural competence of professionals consists of cultural awareness, knowledge, skills, encounters and motivation. It is important to remember some of these features when meeting patients from different cultures. Health care providers should respect the difference, be open and interested in other cultures, consider the individual needs, be flexible and ask the patient about their own values and culture. (THL 2021c.)

In the context of vaccination, encountering a patient from another culture requires cultural competence from a health care provider: organization of different services and making them accessible in order to fulfill the needs of people with different cultural backgrounds. Culture affects patients' vaccination decision-making so the health care provider must have the ability to accept different cultural needs and customs. On the other hand, the health care provider should be able to share evidence-based information to the patient regardless of cultural background. (THL 2021c.)

5. Health care provider's role in vaccination

A health care provider is a person who has obtained the right to practice or a license to practice under the Health Care Professionals Act. This person has the right to use the professional title of a health care professional, which is provided by the regulation. Based on the Health Care Professionals Act, doctors, dentists, pharmacists, psychologists, speech therapists, nutritionists, registered nurses, midwives, public health nurses, physiotherapists, laboratory nurses, radiologists, dental hygienists, occupational therapists, opticians and dental technicians are considered as health care providers. (Valvira 2015; Terveyskirjasto 2016.)

THL (2020) states that vaccine can only be given as an injection by a doctor, a suitably trained registered nurse, public health nurse, midwife, or a paramedic who is licensed as a nurse. The nationwide vaccination competence training package is used in almost all universities of applied sciences, where people can study to become a registered nurse, public health nurse, midwife, or paramedic. Completion of the competence training prepares the new worker for high-quality work and for proper planning, organization and implementation of vaccination activities. Therefore, the training package indirectly increases the citizens' access to evidence-based information of vaccination. It also supports the implementation of the national vaccination program. (THL 2020e.)

Health care providers have a key position in reducing vaccine hesitation and resistance. They have been trained to face doubting patients and relaying correct vaccination information while minding own personal attitude and the tone of delivering knowledge. Maintaining and strengthening confidence in vaccination through research-based interventions is part of health care providers' role. With thorough communication and education, it is possible to influence the patient's view on vaccination. Instead of direct prompts, a conversational and listening approach creates motivation and positivity towards vaccinations. (Sivelä et al. 2018; Hurmekoski 2020.)

By asking and listening, the health care provider can figure out what causes have influenced the patient's vaccination decision. The decision might be based on misconceptions that can be corrected. It could also be based on certain religious or ideological values. Although, it is important for the health care provider to note that sometimes correcting an incorrect information of vaccination could feed the patient's distrust. Especially, since social media, network search tools and algorithms tend to increase the visibility of certain vaccination topics. Negative attitudes towards vaccines spread easily and stay trending for a long time. Thus, the health care provider should acknowledge different personalities' influence in decision-making and adapt the vaccination education to fit each individual case. The basis

for all vaccination communication and education is that the health care provider is aware of the diseases that can be prevented by vaccinations, their complications, vaccines, and the side effects of vaccinations. (Strömberg & Leino 2005; Sivelä et al. 2018.)

Additionally, health care providers go through ethical perspectives in their daily work on vaccination and working with families. How to maintain the vaccination coverage and build confidence for existing vaccines and new vaccines? Also, at what stage is it a case of child abuse if the child does not receive the needed vaccines and becomes seriously ill? (Hurmekoski 2020.)

6. Aims, purpose and research questions

The aims of this thesis are to find out how culture impacts vaccination decision-making and what beliefs affect people's way of perceiving vaccination through a literature review.

The purpose of this thesis is to help nursing students and health care providers to recognize common beliefs and understand culture's role in vaccination. By finding out cultural influences and general attitudes to vaccination, the results can be utilized to increase awareness of cultural impact on vaccination and decision-making.

Research questions of the thesis are the following:

1. What is health care provider's role in immunization?
2. What beliefs cause vaccination hesitancy?
3. How does culture affect vaccination decision-making?

7. Implementation and methodology

7.1 Literature review

Literature review is important for identifying previous studies, explainable trends and questions requiring more research. It provides theoretical foundation and contributes to collected knowledge by creating new theories. (Lau & Kuziemy 2016.)

There are three literature review types: descriptive, systematic and meta-analysis. The descriptive literature review was used in the thesis. The goal was to gather information and share results from previous studies of cultural aspects and beliefs influencing vaccination with the help of the literature review. The descriptive literature review introduces an opportunity to show selected, published data with different perspectives, key concepts and theories of the known information. It presents overall conclusions of the findings. (Salminen 2011; Lau & Kuziemy 2016.)

The descriptive literature review can be described as an overview without precise rules. While the collected data is broad and relevant, it still answers the specific topic's research questions. The descriptive review explains what is currently known about the researched phenomenon by describing the previous findings. The choice of material is not limited by methodological rules and the research questions are looser than in for example, meta-analysis. (Salminen 2011; Lau & Kuziemyky 2016.)

The descriptive literature review can be categorized into two categories, narrative and integrative review. This thesis used the narrative review. Methodologically it is the lightest form of literature review, which gives a broad picture of the research subject, its history and development. The narrative review aims to make a description of the phenomenon and its results easy to read by making inconsistent information organized and comprehensible. The narrative review can be further divided into three implementation methods: editorial, commentary and overview. This thesis used narrative overview, which summarizes previous studies. (Salminen 2011.)

The descriptive literature review is based around research questions. It displays qualitative and descriptive answer through chosen data. The review is defined by four stages, which are formulation of research questions, data selection, description creation and observation of the produced result. (Kangasniemi et al. 2013.)

Formulating research questions is an important first step. Research questions are essential for guiding the review methodology of searching a certain the type of information, selecting relevant literature and analyzing data content. After assessing quality of the studies and choosing a suitable material based on research questions, the extracted information is compared, organized, summarized and presented in a way that it provides qualitative and descriptive answer to the research questions. (Lau & Kuziemyky 2016.)

7.2 Data search and collection

Previous scientific research on the subject was used as a material for the literature review. The materials selected for the literature review were found in PubMed, EBSCO - Academic Search Elite and Cochrane Library databases. Google Scholar was also used to manually search for studies.

The search for suitable materials and retrieval started from the summer of 2020 onwards. Initial prewriting and drafting were also done during the same summer. The actual information retrieval along with writing, revision and editing were done mostly from the spring of 2021 onwards after becoming familiar with the research articles. As the thesis progressed,

manual search also helped to board the research and writing by complementing the information retrieved from the databases.

The words used for information retrieval were formed based on the research questions. Overall, search words include vaccination, vaccine hesitancy, anti-vaccine, cultural, beliefs, education, health care provider, nurse and combinations of those. Boolean search operators AND and OR were applied to discover the results of data that are related to the topic.

Search words used specifically in PubMed were vaccine hesitancy AND health care provider, vaccine hesitancy, anti-vaccine, cultural AND vaccination decisions, covid-19 AND attitudes AND values, nurs AND vaccination. Results were limited from 2009 to 2021, which showed total of 829 findings. From the results, 13 articles were selected. The chosen articles were in English and full text free for access.

The information was searched from EBSCO with search words, such as vaccination AND beliefs, vaccination AND hesitancy AND nurse. Results were limited from 2017 to 2021. From 131 results, two articles in English and full texts were chosen.

The used search words from Cochrane Library were vaccination AND education OR communication. Out of 13 results, two articles in English and in full texts were selected to be usable. Results were limited from 2015 to 2021.

Google Scholar offered 993 articles with the year limitation from 2020 to 2021 and with the search words of anti-vaccine attitudes. Only one article was selected since it fits with the topic the well.

Table 1 summarizes the search words used in the databases, the delimitations, and the results obtained. There were plenty of search results. First, it was inspected if the materials shown in the search by title corresponded well to the topic of the work. Based on the study summary, it was concluded whether the study was suitable for the work to answer the research questions. Finally, the study was looked at as a whole and the final choice was made to include the material if it met the inclusion criteria. A total of 18 materials from the databases were selected for the literature review. Appendix 3 describes the selected articles.

Databases	Search words	Delimitations	Results	Selected articles
PubMed	vaccine hesitancy AND health care provider	English, free full text, 2015-2021	156	3

	vaccine hesitancy	English, free full text, 2011-2021, Review	137	4
	anti-vaccine	2009-2021, Free full text, English	104	2
	cultural AND vaccination decisions	2016-2021, Free full text, English	216	2
	covid-19 AND attitudes AND values	2021, Free full text, English	137	1
	nurs AND vaccination	2015-2021, Free full text, English	79	1
EBSCO – Academic Search Elite	vaccination AND beliefs	2018-2021, Full Text	115	1
	vaccination AND hesitancy AND nurse	2017-2021, Full text	16	1
Cochrane Library	vaccination AND education OR communication	2015-2021	13	2
Manual search (Google Scholar)	anti-vaccine attitudes	2020-2021	993	1
Total				18

Table 1. Searched databases

The included studies were selected by using the inclusion and exclusion criteria. This happened by reading the titles, abstracts, and full texts of the studies. The inclusion criteria were the year of publication from 2009 to 2021, either Finnish or English language, the whole text had to be available, and the article had to answer the research question.

The material was collected mainly based on the newest and most up-to-date data, so that the information was current, reliable and evidence-based. One older work from 2009 was used as a material since the data was written cohesively in one article and the essential information had not changed drastically. The knowledge of the older study was compared to the newer studies, where the information was scattered in different article pieces, to make sure that it was still up-to-date with the topic. Publications that did not answer the research questions, were published before 2009, the text was not fully available, or it was in other language than English or Finnish were not included. Inclusion and exclusion criteria are presented in table 2.

Inclusion criteria	Exclusion criteria
Study published between 2009-2021	Study published before the year 2009

Language: English or Finnish	Language: other than English or Finnish
Free, full text available	Paid article, only abstract available
Studies addressing the research questions	Studies that do not address the research questions

Table 2. Inclusion and exclusion criteria

7.3 Content analysis

Qualitative content analysis was used to analyze and interpret data. Content analysis is a research method that is objective and systematic in quantifying and describing phenomenon. The goal is to get not only condensed, but also a broad description of the phenomena to make it more understandable. With the help of this method, it is possible to make inferences from data in order to provide facts, new insights, knowledge and interpretation. It is also possible to clarify the phenomenon further by making conceptual maps, categories and conceptual system. (Elo & Kyngäs 2007.)

There are no specific rules for analyzing data, but the essential feature of content analysis is that words of the text are classified to smaller content categories. Content analysis is also divided into inductive and deductive analyses. Inductive content analysis was used in this thesis. Since the aim was to be familiar with the written content, the selected material was read through multiple times to understand the insights and theories. In an inductive approach, specific matters are first observed and then combined into a more general statement. (Elo & Kyngäs 2007.)

The inductive content analysis process has three phases: open coding, creating categories and abstraction. In open coding, headings and notes are written down while reading through the texts that fit the research topic and answered the research questions. This helps to generate categories, describe and simplify the most important aspects of the content. The next step is to group data into lists of categories under higher order headings. Through interpretation and comparison to see the similarity and dissimilarity of the data, it is then decided which related findings will belong together in a particular category. The concepts are divided into upper and lower categories. Abstraction means the general description of the research topic through categories. (Elo & Kyngäs 2007.)

For this work, a total of 18 articles were selected from four databases and by a manual search. With the help of inductive content analysis, the notes were first written down in order to form categories. The higher order headings, simplified phrases, the sub category and the upper category were created. The findings were compared together before listing data under the categories. The sub category included categories, such as attitudes, religion, politics,

public health care, cross-culture, fear, effectiveness, misconception, parental concern, internet influence, child health center, communication, lack of information, information, and trust. Simplified phrases from data were grouped in a way that the contents fit together in a particular category. For example, phrases such as “anxiety” and “difficulty to find reliable sources” were put under lack of information – category since they fit into this category the most. Based on the sub categories, the main themes were created to answer the thesis questions. Those themes were cultural factors, beliefs, vaccine hesitancy and patient education. Appendix 4 shows an example of inductive analysis content.

8. Results

8.1 Health care provider’s role in patient education

Health care providers, especially nurses, are mostly responsible of administering vaccinations. They have an important role to play in the implementation of national vaccination programmes and in maintaining high vaccine coverage. The negative attitude towards vaccinations is mainly due to the lack of awareness, in which case the health care provider must be able to provide reliable and up-to-date information in a way that suits the patient. In the context of vaccination, the key elements of patient education are trust, health provider-patient relationship and communication. (Di Pietro et al. 2017.)

Those health care providers who are vaccinated themselves are more likely to recommend vaccination to their patients. Some of the health care providers believe that them personally being vaccinated could also create a reassuring example to patients. Most of the Finnish health care providers trust the benefits and safety of the vaccines. However, some health care providers perceive the opposite and are less willing to recommend vaccines to the patients. This brings up an ethical issue as the health care providers are often in a key role in patient’s vaccination decisions and keeping the vaccination coverage high. (Paterson et al. 2016; Karlsson et al. 2019.)

The lack of information has caused anxiety to the parents, and they wanted more information related to vaccination than they were provided. Parents would have wanted information about vaccination benefits and side effects clearly and simply. They felt like the health care providers were an important source of information for them. This highlights the fact that providing proper information for parents to acquire knowledge about vaccination is essential in order to reduce vaccine hesitancy. The way in which the information is provided is equally as important. (Kestenbaum et al. 2015; Ames et al. 2017.)

Kaufman et al. (2020) states that face-to-face meetings for providing information and educating the parents about early childhood vaccination have enhanced children’s

vaccination status. There has also been presumably light improvement on parents' knowledge and understanding of vaccination, and the intention to vaccinate. Face-to-face meetings for educating people about vaccination are effective, especially when it comes to easing the communication and improving the exchange of information. It is good for the health care provider and the client to see each other since using verbal and non-verbal communication, such as body language and facial expressions, makes it easier to respond to the client's feelings and concerns. The review shows that it is important to not only provide facts but also listen and pay attention to the client's concerns to change the negative attitudes and reduce anxiety. (Kaufman et al. 2020.)

Motivational interview has been proven to be an effective technique on vaccine hesitancy. It has resulted to a decrease in parents' vaccine hesitancy and increased growth in infants' vaccine status. A motivational interview is a collaboration with a client by interviewing. The purpose of the motivational interview is to strengthen a person's own motivation in relation to a particular issue. The motivational interview encourages the person to consider their own reasons for change in an open and accepting atmosphere. (Gagneur 2020.)

Motivational interviewing includes creating a partnership and trust, processes to promote the movement towards the objectives and using motivational interviewing skills to attend the specific concerns related to vaccination. Motivational interviewing skills include the use of open-ended questions to avoid doubts, affirmation to highlight strengths and reflective listening. The information is provided by using the elicit-share-elicite-technique, where the patient's baseline for a specific topic is asked first, and then supplemented with evidence-based information in a simple way. Lastly, the patient's understanding is ensured.

Motivational interview is a good tool for addressing vaccine hesitancy, because it provides knowledge about the patients' beliefs without them feeling judged. The educational session in motivational interviewing is designed regarding the patient's individual needs, concerns or questions, which improves their motivation to vaccinate. (Gagneur 2020.)

Active listening of the patient's fears and concerns helps the health care provider to understand and respond to the roots of the issue. Providing empathy, openness and non-judging attitude build trust with the patient and make them more willing to listen and receive information. Health care providers also need to have a lot of knowledge about vaccines to be able to share information and explain about the vaccine's purpose, efficacy, safety, and the possible side effects. Health care providers should provide a situation where the patient is in the best position to choose wisely regarding the vaccination. (Di Pietro et al. 2017; Possenti 2019.)

Health care providers are the most trusted source and influencers regarding the vaccination and thus, play a great role in vaccination decisions. However, the capacity and confidence are on ordeal due to time constricts and increased amounts of vaccine-hesitant patients. Health care providers need more tools and training to face and answer the patients' questions and concerns. (Paterson et al. 2016)

8.2 Knowledge and beliefs towards vaccination

Vaccines cause a lot of debates and involve different kinds of beliefs and misinformation. Plenty of people believe strongly in vaccination but there are also opposition towards it. Reasons for vaccine hesitancy and refusal differ according to cultural and geographical contexts. Vaccine safety controversies have led to lack of trust in vaccinations, concerns of adverse events and adjuvants, and misconception. However, the scientific evidence on the benefits of vaccines is indisputable. Health care providers are key influencers in decision-making, so it is important that they recognize people's beliefs and attitudes towards vaccinations in order to provide suitable information with scientific evidence. (Geoghegan et al. 2020.)

Potential causes for vaccine hesitancy are usually complex since many cultural, social, political and personal factors influence decision-making. Past negative experiences, friends' opinions, access to information, values and religious background lead to universally common beliefs that cause vaccine hesitancy. For example, beliefs of immune system overload from overexposure and dishonesty from vaccine industry and health care system cause fear and conflicting feelings. (Succi 2018.)

Concerns about vaccine safety, side-effects and components of the vaccine can stem from difficulty of accessing health care services and vaccination programmes. For example, Irish Travellers experience inequality in registration with family doctors and lack of culturally sensitive immunization services. Misconceptions can be born from lack of information, low education opportunities and discrimination, marginalization, or stigmatization of a minority group. Other cultural differences such as language barrier, low social status and religion also contribute to misconceptions. (Fournet et al. 2018.)

Some anthroposophists (members of spiritual movement) think that breastfeeding and safe environment where mothers stay home build sufficient immune system for the children to fight against infectious diseases without vaccines. In addition, some of those parents think that pediatric diseases are necessary for their child's development. Vaccine preventable diseases are dangerous and cause a great deal of unnecessary suffering. For example,

measles is the most dangerous for small children, which highlights the need of MMR vaccination. (Fournet et al. 2018.)

At times, there are also rumors going on that some vaccines are linked to serious chronic diseases. One of the most common belief is that vaccinations cause autism, diabetes or allergies. Any evidence-based research data does not support this claim. The mechanisms behind the origins of these diseases are not precisely known so it is easy for people to link the diseases to the vaccines. For example, autism is blamed on vaccinations because the symptoms of autism often occur at the same time as most countries give MMR vaccination to children. However, anyone can get these chronic diseases regardless of whether they have been vaccinated or not. (Geoghegan et al. 2020.)

The link between mumps, measles and rubella vaccine and pediatric autism was brought up years after the Lancet published a study by Andrew Wakefield in 1998. According to the study, the vaccine was associated with autism spectrum disorders. This led to the decline of vaccination support and the incidence of measles cases increased. Allegations of an association between the MMR vaccine and pediatric autism have been found to be false by large studies. Even though Wakefield's research has been shown to be thoroughly untrue and it has already been retracted due to the misrepresentation of data, the article led to a broad media coverage. Fear of autism is still today many people's reason for vaccine refusal. (Geoghegan et al 2020.)

Since some parts of Europe do not believe in MMR vaccination protection, there have been sporadic outbreaks thorough years. There was a rubella outbreak in 2004 within an under-vaccinated religious community in the Netherlands, which then spread to Canada. This same under-vaccinated group has also caused two measles outbreaks in 2013 and 2014 with 2700 reported cases. There is a suspicion that non-vaccinated individuals in various groups in Europe share a common cultural and spiritual belief that God has send an outbreak for a reason and one should put trust in God instead of opposing the will. Since many of these groups live separately from the general population, they believe that vaccination is not necessary due to low exposure. There are also fears and anxieties regarding MMR vaccination due to talks about adverse effects and injection of foreign substances from the media. (Fournet et al. 2018.)

Many people believe that vaccines include toxic substances. Usually, vaccines contain a small amount of aluminum, which improves the effectiveness of the vaccine by stimulating the immune system's response to the vaccine's antigens. In many of vaccines, such as hepatitis A and B, the antigens are attached to aluminum salts. Compared to the environmental exposure, the amount of aluminum present in vaccines is so small that it does

not cause a safety concern. A person gets aluminum much more from room air, food and drinks. There have been studies about infants' exposure to aluminum and the results have shown that the cumulative amount of aluminum from breast milk and infant formula is bigger than from vaccines. Mercury has also been used as a preservative in vaccines in the past. Due to certain forms of mercury being known as toxic, people have had concerns about its safety in vaccines. However, the mercury used in the vaccines, ethylmercury, is not neurotoxic and does not accumulate in the body. Ethylmercury also breaks down very quickly in the body. (Geoghegan et al. 2020.)

Certain vaccines, such as rubella and hepatitis A, are manufactured in a way that they use human embryo cell lines. These vaccines contain residual DNA, which has caused concerns of the exposure being dangerous to the body. However, it is important to know that the minimal amount of DNA is fragmented and cannot attach itself into a new genome that easily. There is no real safety hazard to vaccine recipients. (Geoghegan et al. 2020.)

There is also a common belief, especially amongst new parents, that the sheer number of vaccines overload the children's immune system. However, all data refutes the concept that vaccines weaken the immune system. The body's defense system begins to develop early on, and the vaccination schedule is timed in a way that it takes into consideration the timing of vaccination effectiveness, maternal antibody and susceptibility of the disease. Thus, the combination of vaccines does not burden the child. (Geoghegan et al. 2020.)

Vaccinations have visibly changed the world because they have saved lives and continue to do so. Despite this, vaccines continue to share a lot of opinions, create fears and uncertainties as well as rumors and different beliefs. Many people have difficulties in distinguishing evidence-based data from incorrect information. This is one of the reasons why misunderstandings arise. When considering the rare side effects of vaccines, it is important to compare the risk of a side effect occurring and the risk of disease occurring if the vaccine is not given. Positive beliefs, such as vaccines having more benefits than risks, vaccines being effective and safe, and vaccines protecting the community, lead to a high percentage of people taking vaccination. (Dube et al. 2013; Geoghegan et al. 2020.)

8.3 The growing vaccine hesitancy amongst parents

One of the many challenges that health care providers encounter are new parents expressing concern and reluctance in vaccinating their children. Since the number of vaccine-hesitant parents have been rising recently, parental vaccine hesitancy is starting to become a public health concern. The less vaccinated children, the more increase in disease outbreaks and epidemics. Hence, it is important to observe general characteristics of

vaccine-hesitant parents: similarity in individual determinants and psychosocial factors tend to show the same vaccination beliefs. Lack of awareness, self-estimation and satisfaction in information are also associated with both vaccination refusal and acceptance. (Dube et al. 2013; Olson et al. 2020.)

Parents' beliefs of vaccines dictate their decision to accept, delay or refuse the vaccines offered to their children. In the US study, a large portion of parents share the same views regarding health. For example, vaccination is unnecessary with good hygiene and habits, vaccine substances are unsafe and cause autism or multiple sclerosis, and the immune system gets overloaded from the vaccines. CDC National Immunization Survey data from 2020 shows that more than one-third of U.S children below one-year-olds were not vaccinated according to the childhood vaccination schedule. Vaccines can be seen as something as disturbing rather than boosting for the child's immune system. A Dutch survey discovered that many parents thought that children were over-vaccinated and that vaccines interfered with natural development. (Dube et al. 2013; Olson et al 2020.)

Additionally, religious leaders have an influence in parents' vaccination decision-making. The idea of vaccination and religion being incompatible with each other dates back to the introduction of vaccines. Since moral convictions and religious beliefs play a part in overall view of health and immunity, it is not uncommon for parents to oppose vaccination due to the preference of natural immunity instead of "artificial" methods. Health care providers need to take parents' mental barriers into consideration when examining their risk perception and vaccination behavior. In the end, both childhood immunization and vaccination decision-making are based on parents' perceived benefit to the child. (Dube et al. 2013; Olson et al 2020.)

Concern based on parental instinct also spreads easily from one parent to another. Parents like to share experiences, beliefs and advice with each other in different outlets. New, confused parents who seek information through traditional media outlets and social media are exposed to misleading information. They usually end up trusting other parents with the same concern rather than scientifically proven information that lacks emotional aspects and parental views. Since misconceptions spread fast, vaccine-hesitant parents might believe that there are effective alternatives to vaccines and seek guidance from alternative medicine practitioners. Parental concern, internet influence, and the new experience as first-time parents can cause quite a stir in vaccine acceptance. With evidence-based information being buried under controversies, vaccination programmes and health care providers' communication methods suffer. (Olson et al. 2020.)

Besides few cases, patient-provider relationship and health care provider's attitude and knowledge towards vaccination are the main reasons for parents accepting a vaccine for their children. Trust is also an important factor since it is linked with parents' risk perception and decision-making. The less trust in the health care provider, the more likely is the parents' refusal for vaccination. Some parents' vaccination hesitancy is not due to vaccine safety, but how much authority the health care system has over people: parents might have had negative experiences with vaccine providers and felt like they were being pressured to get childhood vaccines. This has led to mistrust towards the public health care system and child's incomplete vaccination. There is also mistrust towards medical science's research and pharmaceutical industry's real intention. (Dube et al. 2013; Olson et al. 2020.)

The growing vaccine hesitancy amongst parents have led to some of them delaying their children's vaccination. Since many parents have not received proper vaccination education, they end up believing misinformation about MMR and DTP vaccines causing immune overload. Thus, they might try to avoid official vaccination schedule by following own "alternative vaccination schedule". Doubtful parents feel unsupported by health care providers and want to delay certain vaccines as long as possible to avoid adverse events. Although, this ends up increasing the time of the child being unprotected. (Dube et al. 2013; Succi 2018.)

The reasons behind vaccine hesitancy are complicated. All personal factors, such as doubts, concerns and fears over adverse events and mistrust about the need of the vaccines, vaccine efficacy and safety, impact heavily parents' decision-making. Since hesitant parents tend to share the same views of modern medication's effectiveness and preventive measures, the importance of health care provider's role in being a guiding figure and sharing reliable resources increases. (Succi 2018.)

8.4 Cultural factors in vaccination decision-making

People generally know that the vaccine's purpose is to protect them from vaccine-preventable disease and death. Although, this fact alone does not push people to get vaccinated. Many factors contribute to vaccination decision-making. Social, cultural, scientific and temporal trends have strong impacts on how people view vaccination (Poland et al. 2009).

Health care providers have an important role in guiding the patient with the best decision. Their knowledge and attitudes are important determinants for vaccine uptake. Even though health care providers generally encourage vaccination, there are some vaccine-hesitant individuals in the field too. For example, some professionals are reluctant to take seasonal

influenza vaccines. Many nurses rely on their autonomies to protect themselves from peer pressure and trust traditional health beliefs rather than evidence-based medicine in vaccination decision-making. A common belief in workplace culture is that healthy lifestyle and natural immune system is enough to protect from influenza. (Dube et al 2013; Pless et al 2017.)

While nurses might not express their opinions to the clients openly, beliefs circulating within the workplace can affect other professionals' views on influenza vaccines. This can lead to them conforming to workplace culture by changing their vaccination attitude, behavior and decision-making. It becomes a problem if the general public notices health care providers' changing attitude towards certain vaccines. Rejection of influenza vaccines might cause people to question other vaccines too and lose their trust in vaccination overall. To empower the nurses to take influenza vaccines, there needs to be more promotion of decision-making skills, teaching of evidence-based decision-making in workplace and a training programme. (Pless et al. 2017.)

Health care providers are not the only ones relying on their peers. Many vaccine-hesitant individuals search the internet to help them with their dilemma. If they want to confirm or debunk their fears, many global networks offer personal experiences and opinions. If an individual wants to find a link between MMR vaccination and autism by Googling, about only 51% of the websites provide correct information of false association. The anti-vaccine culture paired with media-based consumerism have a negative effect on population-level health. In the UK, the rumor about measles vaccine having an association with autism led to actual population-level decrease in vaccine use. There was a period of resurgence of measles-related hospitalization and deaths. (Poland et al. 2009; Dube et al. 2013.)

Since people consume internet as a source of information where all texts are seen as equally credible, expertise does not really matter anymore. People have moved from evidence-based to media-based medicine. Anti-vaccine websites argue against vaccination usefulness and safety with different conspiracy theories. They will appeal with emotional aspects like personal stories of vaccine damage. The websites also use fake experts and purposively show texts that only support their own agenda while discrediting opposite views. This kind of domineering presence can be convincing to unsuspecting people who are genuinely struggling with vaccination decision-making. Many non-official websites seem trustworthy with their immaculate wording, but in reality, they are often misleading and manipulative. (Poland et al. 2009; Dube et al. 2013.)

Whitehead and Perry (2020) report that cultural factors such as politics and religion are associated with anti-vaccine attitudes. Their findings reveal that Christian nationalism and

political conservatism show belief in parents' being ultimate authority figures to vaccination decision-making for their children and skepticism towards drug companies and doctors. Religious and political conservatism prefer individualist and hierarchical thinking instead of trusting science. (Whitehead & Perry 2020.)

Anti-vaccine culture holds many negative beliefs of vaccination. The most common ones are about doctors and drug companies not being honest about risks and side-effects, vaccines giving autism, parents having the right to decide for their children, vaccines not protecting from dangerous diseases, and children getting too many vaccines. Former U.S. President Donald Trump, who has a significant political and cultural influence on people, has made comments against COVID-19 vaccination, which has increased an anti-vaccine discussion in the U.S. Cultural beliefs and an influential political character together affect significantly decision-making and vaccination uptake. (Whitehead & Perry 2020.)

The public health care also influences vaccination decision-making. A recent example of individual right and public health care's clash would be how COVID-19 vaccines have been viewed in the United States. The U.S. citizens generally value individual freedom and the right to control own choices without interference. Thus, with public health authorities and political officials working together to dismantle the pandemic and urging people to get vaccinated, the citizens feel like the response to COVID-19 has become too politicized. People feel like their individual rights are being violated with the possibility of tampered COVID-19 information by political interference in health care settings. Public health agencies' credibility has lowered due to distrust. There are also beliefs of the government requiring personal information for the vaccine and experimenting on people. There is no confidence and trust in vaccine safety since people do not feel respected. Therefore, it is important for the public health care authorities to develop and implement programmes that focus on spreading informed decision-making to increase vaccination acceptance and collaborating with the communities to show their trustworthiness. (Salmon et al. 2021.)

To conclude, it is crucial to understand culture's effect in vaccination decision-making. Cultural ideologies promote views and beliefs in a way that they affect significantly general population's attitudes on vaccination. Acknowledging possible barriers, attitudes and negative consequences that stem from an environmental culture helps to find even more effective response to strengthen vaccination decision-making. (Whitehead & Perry 2020.)

8.5 Cross-cultural differences

There is a difference in influenza vaccine coverage between countries and age groups, which suggests that cultural-specific factors are associated with household members' vaccination decisions. (Taylor et al. 2015.)

Household members are very diverse people with different vaccine opinions. Some are more supportive of vaccination than others. Close contacts and different vaccination behaviors raise the probability of contracting a contagious pathogen. The members might also affect each other's thinking and behavior with direct or indirect influence since environmental determinants and similar opinions dictate vaccination uptake. The findings express that understanding cultural factors and clustering vaccine opinions within households will help the public health to improve ways of controlling influenza epidemics in the future. (Taylor et al. 2015.)

Eastern cultures tend to be more collectivistic while western cultures are more individualistic. Individualistic culture encourages autonomy and making own decisions. Therefore, eastern people are more influenced by the household than western people. In addition, age plays a factor in how much influence it holds in eastern and western cultures. For example, eastern people's culture emphasizes on the importance of the elderly members. In western countries, age stratification places older people lower than younger adults. This means that western household members do not necessarily rely on elderly people in decision-making. In eastern countries, elderly people have more status and power than younger people, so they impact the younger household members' vaccination decisions strongly. Direct influence, such as advising someone to get vaccinated, affects vaccination uptake in several countries. (Taylor et al. 2015.)

Public health acting directly by promoting influenza vaccination, for example, through advertising campaigns, helps the households who are against vaccines to be more informed about the benefits of the vaccination. When the message of public health reaches the target audience, it indirectly reaches the households through individuals who deliver the messages to the members. For example, the UK's public health's indirect communication of influenza vaccination programme for children reached the parents, who showed strong support towards it. Parental awareness and giving advice to older teens were critical for the programme's success. While this was success in a western country, this was not the case in an eastern country. For example, public health messages that promoted advising the Japanese elderly population about the influenza vaccine fell short due to reluctance to advice elders in the eastern culture. Younger household members were more likely to

receive the advice rather than elderly household members. Cultural differences attributed to cross-national differences in willingness to advise household members. (Taylor et al. 2015.)

There are two plausible explanations for the east-west differences in vaccination. First, giving advice to another person shows that the advisor cares about them. Despite assumptions, eastern countries hold more negative views and attitudes towards their elderly household members than western countries. This could explain why there is a lack of advice-giving to elderly people in certain eastern countries compared to western countries. Secondly, Asians seem to be more dutiful and respectful towards their elderly members than their western counterparts. Therefore, due to this cultural feat, younger household members do not engage in advice-giving, an expression that could unintentionally imply more power and status than the elderly person. These features might contribute to smaller influenza vaccination uptake in eastern countries. (Taylor et al. 2015.)

The difference in advice-giving based on environment's cultural norms, ages between the household members and cultural dimensions cause difficulty in unifying all household members. Diverse views and attitudes lead to clustering of different vaccination behaviors and decision-making. Hence, in order to enhance trust in vaccination and increase the uptake in households, campaigns should aim for their strategies and messages to be more culture-specific. (Taylor et al. 2015.)

9. Conclusion

Based on the results of this thesis, it can be concluded that decision-making related to vaccination is a complex phenomenon. Many different factors lead to beliefs as well as misunderstandings that influence patients' decision-making. The thesis revealed that many beliefs are due to fear and lack of trust. People easily draw conclusions about vaccinations based on information spread on social media, among other things, because they are unable to distinguish between evidence-based information and false information. Moreover, the results of this thesis showed that beliefs are influenced by cultural, social, and political factors.

Based on the research results, it can be noted that culture plays a role in vaccine uptake. Cultural factors, such as norms, values and behavior, shape people's attitudes and might be partially a reason why anti-vaccine culture has been on a rise recently. In addition, vaccination decision-making is guided by autonomy, religion, experiences, political authorities and campaigns.

In general, it can be stated that health care providers play a big role in maintaining vaccine coverage since patients perceive them as a reliable source of information. Based on the results of the study, patients felt that they had received too little information about vaccinations: they wanted a clear information about the benefits as well as the disadvantages. With the growing number of anti-vaccine patients, it would be important to be able to meet their needs properly in vaccination guidance.

10. Discussion

10.1 Review of thesis results

The aim of this thesis was to discover and describe how culture influences the vaccination decision and what beliefs affect people's perception of vaccination. The research questions of this thesis are: "What is the health care provider's role in immunization?", "What beliefs cause vaccination hesitancy?" and "How does culture affect vaccination decision-making?". The aims of the work were fulfilled, and the answers to the research questions could be deduced from the results of the literature review. The results are viewed from the perspective of the research questions.

Health care providers are generally trusted in vaccine matters. Still, many patients feel like they do not receive enough information to be able to make vaccination decisions. Patients want truthful information about both the benefits and possible harms of vaccinations. (Ames et al. 2017.) With the growing number of vaccine-hesitant patients, health care providers are required to have vaccine expertise as well as tools for proper and respectful vaccination guidance.

It is important that patients receive reliable information from health care providers and do not draw their own conclusions from, for example, the incorrect texts on social media. Dube et al. (2013) and Poland et al. (2009) agree that media-based consumerism has been a trend worthy to acknowledge since it affects vaccination views. Many individuals rely on their peers and seek guidance from the internet where all kinds of information about the vaccines are visible. Dube et al. (2013) also highlights that anti-vaccine websites often use personal stories about vaccination to appeal to people's emotions. These websites rely on personal aspects and hoaxing tactics to gain trust and drive attention away from authority websites that actually contain evidence-based information. Thus, it is essential for health care providers to understand the media's role and impact on vaccination attitudes and address the patients' concerns by providing reliable sources.

There are many ways to provide vaccination guidance. Face-to-face meetings and motivational interviews have been proven to be effective. Those techniques increase the ability of health care providers to provide reliable information to patients, which leads to a reduction in anxiety. Both face-to-face meetings and the use of motivational interviews improve patients' motivation to be vaccinated. (Kaufman et al. 2020; Gagneur 2020.) In vaccination guidance, it is important that it is designed for a specific patient because everyone has different needs and concerns. Karlsson et al. (2019) and Pless et. al (2017) emphasize that health care providers' own opinions do have an impact in their willingness to

recommend vaccinations to the patients. In addition, there is an ethical aspect to who is responsible for a child that becomes ill from a vaccine-preventable disease in a case where parents have not received enough information from the health care provider.

Most of the selected articles brought out similar beliefs about vaccination that can be explained by fear and lack of information. Beliefs related to vaccination include the harmful substances in vaccines, the fear of immune system overload, and the connection of vaccines to chronic diseases, such as the link between MMR vaccine and pediatric autism, which has been proved to be untrue (Geoghegan et al. 2020). Fournet et al. 2018 also states that some parents think that vaccine-preventable diseases are good for children and therefore, vaccines are not necessary. The articles also commented that patients' decision to not vaccinate was often based on some specific reason, such as discrimination, negative previous experiences, or rumors.

Beliefs and deficiencies in scientific data are not the only reasons for vaccination criticism. Dube et al. (2013) and Succi (2018) emphasize that in addition to personal opinions, there are cultural factors such as religious, social and political reasons behind the vaccine hesitancy. For example, Christian nationalism and political conservatism support autonomy in vaccination decision-making as well as doubts against pharmaceutical companies and the health care system. In addition, individuals with a lot of cultural and political power can easily affect people's vaccination decision-making, such as the former U.S. President Donald Trump, who commented on COVID-19 vaccination and influenced the recent COVID-19 anti-vaccine movement. (Whitehead & Perry 2020.)

Many cultural characteristics affect the decision-making of vaccination. Salmon et al. (2021) comments that for example, the U.S. citizens value individual freedom and the right to control their own choices. Hence, they have become more hesitant to get vaccinated due to political interference. The U.S. citizens feel like the government is intervening with their individual freedom and forcing them to get vaccinated instead of respecting their decisions and choices. This affects negatively in the decision-making of vaccination and how the vaccination is viewed. Also, according to Taylor et al. (2015), western cultures are more individualistic while eastern cultures tend to be more collectivistic. This influences the attitudes towards autonomy, the peer effect on one's own behavior, and thoughts about vaccination. Several environmental factors in culture affect directly and indirectly vaccination opinions and vaccination uptake. Taylor et al. (2015) continues to state that age and valuation of the elderly people are indirect cultural influences on vaccination decision-making in households.

The results summarize the importance of health care provider's role in vaccination education and in giving advice based on environment's cultural factors. Since beliefs and culture together have an effect on the view and decision-making of vaccination, it is important to address doubts, concerns and fears related to vaccines in order to guide the patients to make the most suitable choice for them.

10.2 Ethics and reliability

The purpose of research ethics is to cover ethical viewpoints related to research. It refers to an action that is ethically responsible in research while preventing fraud and dishonesty. Research integrity focuses on honesty when adopting research activities. (TENK 2012.)

The research for this thesis has been conducted according to the responsible conduct of research. The study uses appropriate research methods, such as citing other researchers while publishing the results, using information accurately and presenting scientific knowledge in an open and responsible fashion. There was no need to consider ethical aspects of acquiring research permits since the thesis relied on literature review instead of external participants. (TENK 2012.)

The data was searched and gathered from credible databases and mostly up-to-date sources. For example, Google Scholar, PudMed and Cochrane library were utilized for their trustworthiness. Few older works were also selected since the information was found to be in a more coherent format than in some more recent works. The consistency, reliability and validity of the information were checked to be in effect when compared to other newer studies. Otherwise, during data search, the aim was to find the most recent information that answered the research questions and opened the topic further for the readers.

Data search and collection were done attentively for a long period in order to get answers for the research questions. After the materials had been read multiple times to select the most fitting information for the topic, the key concepts were written down and used in content analysis to form categories in order to further analyze and interpret the data reliably.

Also, to increase the reliability of this thesis, Joanna Briggs Institute (JBI) critical appraisal tools were used to assess the research quality. The JBI has formed 13 tools in which systematic reviews (Appendix 5), text and opinion writings (Appendix 6), qualitative research (Appendix 7), and analytical cross-sectional studies (Appendix 8) were used on this thesis' literature review materials. JBI critical appraisal tool contains questions about methodological choices and short multiple-choice answers to these questions. Not only does the tool evaluate methodological quality, but it also determines the possibility of addressed bias in the study's analysis, conduct and design. Research studies are included based on

the answers. (Luciani et al. 2019; JBI 2020.) Two appraisers were involved in examining the studies selected for inclusion.

In qualitative studies, quality assessment scores were calculated on a scale of 1-10, in cross-sectional studies on a scale of 1-8, in systematic reviews on a scale of 1-11, and in text and opinion papers on a scale of 1-6. The criterion was scored in a way that if the criterion was met, one point was awarded. No points were awarded if the criterion was not met, if the situation was unclear, or if the criterion was not applicable. The scores were added up according to the fulfillment of the criteria. In the quality assessment, the aim was to obtain as high score as possible for each study to ensure a high level of quality. The minimum percentage of the score was about 60%, which was considered sufficient enough for inclusion.

The quality assessment was performed separately, and the scores were compared with each other. In studies where the scoring was unclear, re-evaluation was done. There were little dissenting opinions and an agreement on quality scoring was reached by discussing and evaluating together. For the quality assessment, a total of 18 studies were selected and assessed. The scores of the quality assessment are presented in the Appendix 9.

10.3 Further research

Since the thesis results showed the importance of health care providers' role in vaccination education, it would be good to study the health care providers' experiences of their own vaccination skills in further studies. How they encounter specifically vaccine-critical people and how their vaccination skills could be developed further to make the discussion about vaccination more open and trust-inspiring for the patients.

Further review should also focus on how health care providers should address the patients' beliefs and cultural backgrounds when they plan and personalize individual vaccination education.

List of references

- Ames, H., Glenton, C. & Lewin, S. 2017. Parents' and informal caregivers' views and experiences of communication about routine childhood vaccination: a synthesis of qualitative evidence. John Wiley & Sons, Ltd. Retrieved on 26 March 2021. Available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5461870/>
- Di Pietro, M., Poscia, A., Telesman, A., Maged, D. & Ricciardi, W. 2017. Vaccine hesitancy: parental, professional and public responsibility. *Ann Ist Super Sanità*. Vol 53, No. 2. Retrieved on 28 March 2021. Available at https://www.iss.it/documents/20126/45616/ANN_17_02_13.pdf
- Dube, E., Laberge, C., Guay, M., Bramadat, P., Roy, R. & Bettinger, J. 2013. Vaccine hesitancy. *Landes Bioscience*. Retrieved 29 July 2020. Available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3906279/>
- Elo, S. & Kyngäs, H. 2007. The qualitative content analysis process. *Journal of Advanced Nursing*. Vol 62, No. 1. Retrieved on 4 August 2021. Available at <https://academic.csuohio.edu/kneudorf/c63309/ArticlesFromClassMembers/Amy.pdf>
- Elonsalo, U. 2016. Rokotteiden koostumus. Retrieved on 17 March 2021. Available at <https://www.terveyskirjasto.fi/dlk00799>
- Fournet, N., Mollema, L., Ruijs, W.L., Harmsen, I. A., Keck, F., Durand, J. Y., Cunha, M.P., Wamsiedel, M., Reis, R., French, J., Smit, E.G., Kitching, A. & van Steenberghe, J.E. 2018. Under-vaccinated groups in Europe and their beliefs, attitudes and reasons for non-vaccination; two systematic reviews. *BMC Public Health*. Retrieved on 17 March 2021. Available at <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-018-5103-8>
- Gagneur, A. 2020. Motivational interviewing: A powerful tool to address vaccine hesitancy. *PMC*. Retrieved on 26 March 2021. Available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7145430/>
- Geoghegan S., O'Callaghan K., and Offit P. 2020. Vaccine Safety: Myths and Misinformation. Geoghegan, O'Callaghan and Offit. Retrieved on 23 March 2021. Available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7090020/>
- Hermanson, E. 2019. Rokottaminen. Retrieved on 19 March 2021. Available at <https://www.terveyskirjasto.fi/kot00701>
- Hurmekoski, M. 2020. Ro-ko-tus-luot-ta-muk-sen heikentyminen haastaa ter-vey-den-hoi-to-työs-sä työs-ken-te-le-viä eettiseen pohdintaan. *Terveydenhoitajaliitto*. Retrieved on 25 August 2021. Available at https://www.terveydenhoitajaliitto.fi/uutishuone/blogi/rokotusluottamuksen_heikentyminen_haastaa_terveydenhoitotyossa_tyoskentelevia_eettiseen_pohdintaan.1281.blog
- JBI. 2020. Critical Appraisal Tools. Retrieved on 6 September 2021. Available at <https://jbi.global/critical-appraisal-tools>
- JBI. 2020. JBI Critical Appraisal Checklist for Analytical Cross-Sectional Studies. Referenced on 3 September 2021. Available at https://jbi.global/sites/default/files/2021-03/Checklist_for_Analytical_Cross_Sectional_Studies.docx
- JBI. 2020. JBI Critical Appraisal Checklist for Systematic Reviews and Research Syntheses. Referenced on 3 September 2021. Available at https://jbi.global/sites/default/files/2021-03/Checklist_for_Systematic_Reviews_and_Research_Syntheses.docx

- JBI. 2020. JBI Critical Appraisal Checklist for Qualitative Research. Referenced on 3 September 2021. Available at https://jbi.global/sites/default/files/2021-03/Checklist_for_Qualitative_Research.docx
- JBI. 2020. JBI Critical Appraisal Checklist for Text and Opinion Papers. Referenced on 3 September 2021. Available at https://jbi.global/sites/default/files/2021-03/Checklist_for_Text_and_Opinion.docx
- Kangasniemi, M., Utrainen, K., Ahonen, S., Pietilä, A., Jääskeläinen, P. 2013. Kuvaileva kirjallisuuskatsaus: eteneminen tutkimuskysymyksestä jäsenettyyn tietoon. *Hoitotiede*. Vol 25, No. 4. Retrieved on 19 July 2021. Available at <https://www.proquest.com/docview/1469873650?pq-origsite=gscholar&fromopenview=true>
- Karlsson, L. C., Lewandowsky, S., Antfolk, J., Salo, P., Lindfelt, M., Oksanen, T., Kivimäki, M. & Soveri, A. 2019. The association between vaccination confidence, vaccination behavior, and willingness to recommend vaccines among Finnish healthcare workers. Karlsson et al. Retrieved on 26 March 2021. Available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6822763/>
- Kaufman, J., Ryan, R., Walsh, L., Horey, D., Leask, J., Robinson, P. & Hill, S. 2018. Face-to-face interventions for informing or educating parents about early childhood vaccination. John Wiley & Sons, Ltd. Retrieved on 26 March 2021. Available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6494431/>
- Kestenbaum, L. & Feemster K. 2015. Identifying and addressing vaccine hesitancy. SLACK Incorporated. Retrieved on 26 March 2021. Available at <https://pubmed.ncbi.nlm.nih.gov/25875982/>
- Lau, F. & Kuziemy, C. 2016. Handbook of eHealth Evaluation: An Evidence-based Approach. University of Victoria. Retrieved on 16 July 2021. Available at <https://www.ncbi.nlm.nih.gov/books/NBK481583/>
- Luciani, M., Campbell, K., Whitmore, C. & Di Mauro, S. 2019. How to critically appraise a qualitative health research study. *Professioni Infermieristiche*. Vol 72, No. 4. Retrieved on 6 September 2021. Available at https://www.researchgate.net/publication/340272730_How_to_critically_appraise_a_qualitative_health_research_study
- Lumio, J. 2019. Tuhkarokko (morbilli) Retrieved on 17 March 2021. Available at <https://www.terveyskirjasto.fi/dlk00612>
- Lumio, J. 2021. Sikainfluenssa-pandemia 2009–2010 ja rokotuksia seurannut narkolepsia. Retrieved on 23 March 2021. Available at <https://www.terveyskirjasto.fi/dlk00908>
- Merriam-Webster. 2005. Anti-vaccine. Retrieved on 25 August 2021. Available at <https://www.merriam-webster.com/dictionary/anti-vaccine>
- Ministry of Social Affairs and Health. 2013. Vaccinations. Retrieved on 29 July 2020. Available at <https://stm.fi/en/vaccinations>
- Nurmi, J. & Salmenniemi, S. 2019. Konfliktien välttelyä ja piiloon hakeutumista, Rokotekriittisten vanhempien vastustustaktiikat. Tampere University Press & Nurmi et al. Retrieved on 28 May 2021. Available at <https://library.oapen.org/bitstream/handle/20.500.12657/25743/978-952-359-000-7.pdf?sequence=1#page=66>
- Olson, O., Berry, C. & Kumar, N. 2020. Addressing Parental Vaccine Hesitancy towards Childhood Vaccines in the United States: A Systematic Literature Review of Communication

- Interventions and Strategies. Olson et al. Retrieved on 28 May 2020. Available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7712553/>
- Paterson, P., Meurice, F., Stanberry, L., Glismann, S., Rosenthal, S. & Larson, H. 2016. Vaccine hesitancy and healthcare providers. Elsevier Ltd. Vol 24, No. 52. Retrieved on 26 March 2021. Available at <https://www.sciencedirect.com/science/article/pii/S0264410X1630977X?via%3Dihub>
- Pless, A., McLennan, S., Nicca, D., Shaw, D. & Elger, B. 2017. Reasons why nurses decline influenza vaccination: qualitative study. Pless et al. Retrieved on 3 May 2021. Available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5410084/>
- Poland, G., Jacobson, R. & Ovsyannikova, I. 2009. Trends affecting the future of vaccine development and delivery: The role of demographics, regulatory science, the anti-vaccine movement, and vaccinomics. PMC. Retrieved on 3 May 2021. Available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2693340/>
- Possenti, V., Luzi, A., Colluci, A. & De Mei, B. 2019. Communication and basic health counselling skills to tackle vaccine hesitancy. Ann Ist Super Sanità. Vol 55, No. 2. Retrieved on 26 March 2021. Available at https://www.iss.it/documents/20126/45616/ANN_19_02_12.pdf
- Puumalainen, T., Nohynek, H. & Launis, V. 2015. Onko Suomi muuttumassa rokotuskriittiseksi? Suomen Lääkärilehti 36/2015. Retrieved on 15 April 2021. Available at <https://www.julkari.fi/bitstream/handle/10024/126877/SLL362015-2222.pdf?sequence=1&isAllowed=y>
- Ruutu, P. 2018. Lähdekritiikkiä rokotuskeskusteluun. Suomen Lääkärilehti 10/2018. Retrieved on 25 August 2021. Available at <https://www.laakarilehti.fi/ajassa/paakirjoitukset-tiede/lahdekritiikkia-rokotuskeskusteluun/>
- Salminen, A. 2011. Mikä on kirjallisuuskatsaus? Vaasan yliopisto. Retrieved on 16 July 2021. Available at https://osuva.uwasa.fi/bitstream/handle/10024/7961/isbn_978-952-476-349-3.pdf?sequence=1
- Salmon, D., Dudley, M., Brewer, J., Kan, L., Gerber, J., Budigan, H., Proveaux, T., Bernier, R., Rimal, R. & Schwartz, B. 2021. COVID-19 vaccination attitudes, values and intentions among United States adults prior to emergency use authorization. Elsevier Ltd. Retrieved on 28 May 2021. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7988387/>
- Sivelä, J., Launis, V., Jääskeläinen, S., Puumalainen, T. & Nohynek, H. 2018. Käsitukset rokotuksista ja rokotuskattavuuteen vaikuttavat tekijät. Suomen Lääkärilehti 10/2018. Retrieved on 25 August 2021. Available at <https://www.laakarilehti.fi/tieteessa/katsausartikkeli/kasitykset-rokotuksista-ja-rokotuskattavuuteen-vaikuttavat-tekijat/>
- Strömberg, N. & Leino, T. 2005. Miten kohtaan rokotuksiin kriittisesti suhtautuvan vanhemman? Kansanterveys 2-3. Retrieved on 25 August 2021. Available at <https://www.julkari.fi/bitstream/handle/10024/101753/nro2ja3web05.pdf?sequence=1&isAllowed=y>
- Succi, R. 2018. Vaccine refusal – what we need to know. Journal de Pediatria. Vol 94, No. 6. Retrieved 29 July 2020. Available at <https://www.sciencedirect.com/science/article/pii/S0021755717310045?via%3Dihub>
- Taylor, E., Atkins, K., Medlock, J., Chapman, G., Galvani, A. 2015. Cross-cultural household influence on vaccination decisions. PMC. Retrieved on 31 May 2021. Available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4683113/>

TENK Tutkimuseettinen neuvottelukunta. 2012. Hyvä tieteellinen käytäntö ja sen loukkausepäilyjen käsitteleminen Suomessa. Retrieved on 6 September 2021. Available at https://tenk.fi/sites/tenk.fi/files/HTK_ohje_2012.pdf

Terveyskirjasto. 2016. Terveystieteiden laillistettu ammattihenkilö. Kustannus Oy Duodecim. Retrieved on 25 August 2021. Available at <https://www.terveyskirjasto.fi/ltt03437>

The Economist. 2021. Increasingly, Europeans do not trust AstraZeneca's vaccine. The Economist Group. Retrieved on 27 August 2021. Available at <https://www.economist.com/graphic-detail/2021/03/22/increasingly-europeans-do-not-trust-astrazenecas-vaccine>

The History of Vaccines. 2018. Cultural Perspectives on Vaccination. The College of Physicians of Philadelphia. Retrieved on 30 April 2021. Available at <https://www.historyofvaccines.org/content/articles/cultural-perspectives-vaccination>

THL. 1st dose of DTaP-IPV-Hib vaccination coverage amongst Finnish children born in 2017. Referenced on 17 May 2021. Available at <https://www.thl.fi/roko/rokotusrekisteri/atlas/public/atlas.html?show=infantbc>

THL. 2019a. Miksi rokotuksia tarvitaan? Retrieved on 19 July 2020. Available at <https://thl.fi/fi/web/infektiotaudit-ja-rokotukset/tietoa-rokotuksista/miksi-rokotuksia-tarvitaan->

THL. 2019b. Tuhkarokko on Suomessa harvinainen – Hyvä rokotuskattavuus suojaa epidemioilta. Retrieved on 17 March 2021. Available at <https://thl.fi/fi/-/tuhkarokko-on-suomessa-harvinainen-hyva-rokotuskattavuus-suoja-epidemioilta>

THL. 2020a. Mitä rokotteet sisältävät? Retrieved on 18 March 2021. Available at <https://thl.fi/fi/web/infektiotaudit-ja-rokotukset/tietoa-rokotuksista/usein-kysytty-rokotuksista/mita-rokotteet-sisaltavat->

THL. 2020b. Finnish National Vaccination Programme. Retrieved on 29 July 2020. Available at <https://thl.fi/en/web/infectious-diseases-and-vaccinations/information-about-vaccinations/finnish-national-vaccination-programme>

THL. 2020c. Vaccination coverage. Retrieved on 28 May 2020. Available at <https://thl.fi/en/web/infectious-diseases-and-vaccinations/information-about-vaccinations/vaccination-coverage>

THL. 2020. Vaccination programme by age. Retrieved on 13 August 2021. Available at <https://thl.fi/en/web/infectious-diseases-and-vaccinations/information-about-vaccinations/vaccination-programme-for-children-and-adults>

THL. 2020d. The vaccination coverage of children in Finland is very good – less than one percent of school-age children have not been vaccinated. Retrieved on 29 July 2020. Available at <https://thl.fi/en/web/thlfi-en/-/the-vaccination-coverage-of-children-in-finland-is-very-good-less-than-one-per-cent-of-school-age-children-have-not-been-vaccinated->

THL. 2020e. Rokotusosaamisen osoittaminen. Retrieved on 25 August 2021. Available at <https://thl.fi/fi/web/infektiotaudit-ja-rokotukset/tietoa-rokotuksista/rokotusosaamisen-osoittaminen>

THL. 2021a. Rokotusohjelma lapsille ja aikuisille. Retrieved on 30 April 2021. Available at <https://thl.fi/fi/web/infektiotaudit-ja-rokotukset/tietoa-rokotuksista/kansallinen-rokotusohjelma/rokotusohjelma-lapsille-ja-aikuisille>

THL. 2021b. AstraZeneca Covid-19 koronavirusrokote. Retrieved on 30 April 2021. Available at <https://thl.fi/fi/web/infektiotaudit-ja-rokotukset/rokotteet-a-o/koronavirusrokotteet-eli-covid-19-rokotteet-ohjeita-ammattilaisille/astrazeneca-covid-19-koronavirusrokote>

THL. 2021c. Kulttuurisensitiivinen työote. Retrieved on 15 March 2021. Available at <https://thl.fi/fi/web/maahanmuutto-ja-kulttuurinen-moninaisuus/tyon-tueksi/hyvia-kaytantoja/kulttuurisensitiivinen-tyoote>

Valvira. 2015. Nimikkeiden käytöstä. Retrieved on 25 August 2021. Available at https://www.valvira.fi/terveydenhuolto/ammattioikeudet/koulutus-suomessa/nimikkeiden_kaytosta

Väliverronen, E., Sivelä, J. & Nohynek, H. 2020. Suomalaisten suhde rokotuksiin - mitä tuoreet kyselytutkimukset kertovat. Sosiaalilääketieteellinen aikakauslehti. Vol 57, No. 3. Retrieved on 28 May 2021. Available at <https://www.julkari.fi/bitstream/handle/10024/141223/Suomalaisten%20suhde%20rokotuksiin.pdf?sequence=1&isAllowed=y>

WHO. 2019. Ten threats to global health in 2019. Retrieved on 29 July 2020. Available at <https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-2019>

WHO. 2020. Immunization coverage. Retrieved on 27 July 2020. Available at <https://www.who.int/news-room/fact-sheets/detail/immunization-coverage>

Whitehead, A. & Perry, S. 2020. How Culture Wars Delay Herd Immunity: Christian Nationalism and Anti-vaccine Attitudes. SAGE Journals. Retrieved on 3 May 2021. Available at <https://journals.sagepub.com/doi/full/10.1177/2378023120977727>

Appendices

Appendix 1. Vaccination programme by age

Age	Disease prevented by vaccine	Vaccine
2 months	Rotavirus diarrhoea	Rotavirus
3 months	Meningitis, pneumonia, blood poisoning and ear infection	Pneumococcal conjugate (PCV)
3 months	Rotavirus diarrhoea	Rotavirus
3 months	Diphtheria, tetanus, pertussis, polio and Hib diseases such as meningitis, epiglottitis and blood poisoning	5-in-1 vaccine (DTaP-IPV-Hib)
5 months	Meningitis, pneumonia, blood poisoning and ear infection	Pneumococcal conjugate (PCV)
5 months	Rotavirus diarrhoea	Rotavirus
5 months	Diphtheria, tetanus, pertussis, polio and Hib diseases such as meningitis, epiglottitis and blood poisoning	5-in-1 vaccine (DTaP-IPV-Hib)
12 months	Meningitis, pneumonia, blood poisoning and ear infection	Pneumococcal conjugate (PCV)
12 months	Diphtheria, tetanus, pertussis, polio and Hib diseases such as meningitis, epiglottitis and blood poisoning	5-in-1 vaccine (DTaP-IPV-Hib)
12–18 months *	Measles, mumps, rubella	MMR
6 mos. – 6 yrs.	Influenza (annually)	Influenza
1.5 to 11 yrs.	Varicella (chickenpox)	Varicella **
4 yrs.	Diphtheria, tetanus, pertussis, polio	4-in-1 vaccine (DTaP-IPV)
6 yrs.	Measles, mumps, rubella, varicella	MMRV
6 or 12 yrs.	Varicella (chickenpox)	Varicella ***
Girls aged 10–12	Cancers caused by the human papillomavirus, such as cervical cancer, and cancers of the vagina and vulva, and the head and neck area	HPV
14–15 yrs.	Diphtheria, tetanus, pertussis	dtap booster
25 yrs.	Diphtheria, tetanus, pertussis	dtap booster
45 yrs.	Diphtheria, tetanus	dT booster
65 yrs.	Diphtheria, tetanus	dT booster

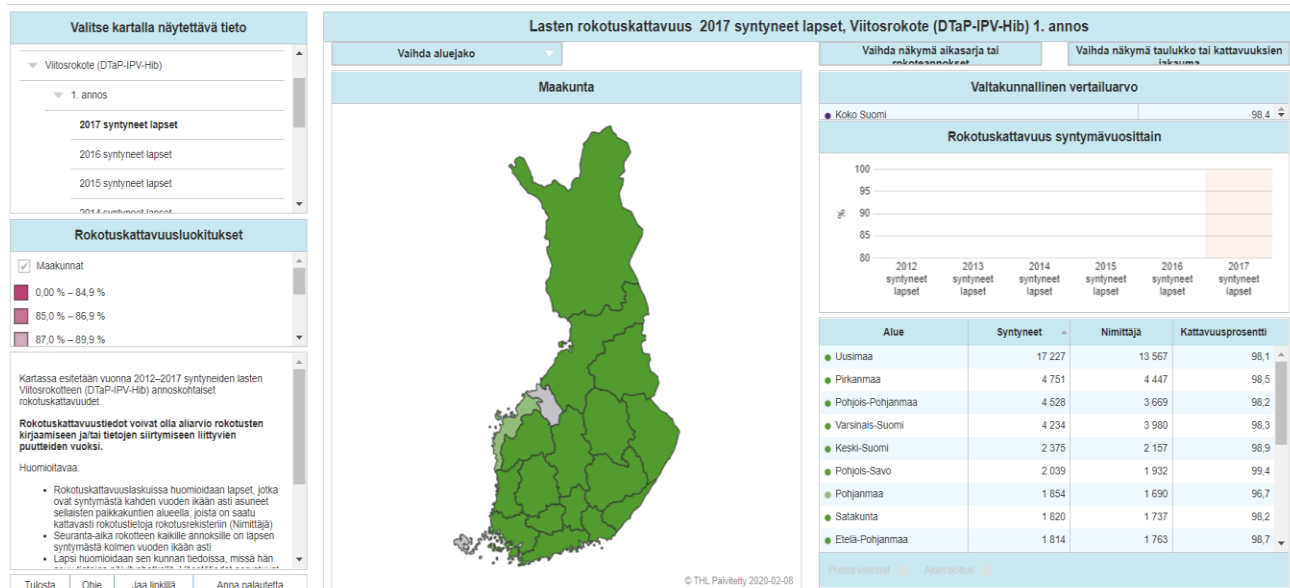
65 yrs.

Influenza

Influenza

Appendix 2. 1st dose of DTaP-IPV-Hib vaccination coverage amongst Finnish children born in 2017

thl Rokotuskattavuus



Valtakunnallinen rokoterokisteri ja rokotosohjelman seuranta | rokoterokisteri@thl.fi

Tietoa palvelusta

Appendix 3. Studies included in the literature review

Authors, publication, year	Purpose of the study	Research design	Main results
Ames, H., Glenton, C & Lewin, S. Parents' and informal caregivers' views and experiences of communication about routine childhood vaccination: a synthesis of qualitative evidence. 2017.	The article explores through the qualitative study the experiences of parents and health care providers about communicating in relation to child vaccination and its impact on decision making.	Qualitative evidence synthesis. Data collection was done with the help of purposive sampling, thematic analysis and matrix model.	The article shows that the parents are lacking the information about vaccination and would want more balanced information. Parents find it difficult to find trustworthy information and consider the health care providers as a reliable source of information.
Di Pietro, M., Poscia, A., Telemann, A., Maged, D. & Ricciardi, W. Vaccine hesitancy: parental, professional and	The article provides an analysis of vaccine hesitancy from an ethical perspective of parental, professional and public responsibilities.	Article.	The article emphasizes how difficult it is to come up with right or wrong solution for such complex problems. The article highlights the importance of dialogue between the

public responsibility. 2017.			parents and health care provider.
Dube, E., Laberge, C., Guay, M., Bramadat, P., Roy, R. & Bettinger, J. Vaccine hesitancy. 2013.	The review is designed to provide an overview of vaccine resistance. The review examines the concept as a phenomenon and the possible reasons for it.	An overview, which is framed by a conceptual model that is adapted from summary of experts' discussions.	The review shows that vaccine hesitancy is on the rise and is associated with many different factors such as emotional, cultural, social, spiritual and political factors.
Fournet, N., Mollema, L., Ruijs, W.L., Harmsen, I. A., Keck, F., Durand, J. Y., Cunha, M.P., Wamsiedel, M., Reis, R., French, J., Smit, E.G., Kitching, A. & van Steenberg, J.E. Under-vaccinated groups in Europe and their beliefs, attitudes and reasons for non-vaccination; two systematic reviews. 2018.	The review identifies under vaccinated groups in Europe and describes their beliefs, attitudes and reasons for non-vaccination.	Two systematic literature reviews. The first one described a group with low vaccination coverage and the second one described factors associated with non-vaccination.	The review reports as the results for non-vaccination the non-severity of traditional childhood diseases, fear of vaccine side effects and lack of knowledge about vaccination.
Gagneur, A. Motivational interviewing: A powerful tool to address vaccine hesitancy. 2020.	The article defines the motivational interviewing as a concept and shows how it could be helpful against vaccine hesitancy.	Article.	The article states that motivational interview is a powerful tool that has been shown to be effective at increasing vaccine acceptance.
Geoghegan S., O'Callaghan K., and Offit P. Vaccine Safety: Myths and Misinformation. 2020.	The article brings out the common myths and misinformation regarding vaccination and refutes them based on scientific evidence.	Article discussing and summarizing available data and research studies.	The article discusses common vaccine safety controversies such as the association of vaccines with autism or autoimmune diseases, the side effects and adjuvants of vaccines. The review refutes incorrect allegations by substantiating with the information examined.

<p>Karlsson, L. C., Lewandowsky, S., Antfolk, J., Salo, P., Lindfelt, M., Oksanen, T., Kivimäki, M. & Soveri, A.</p> <p>The association between vaccination confidence, vaccination behavior, and willingness to recommend vaccines among Finnish healthcare workers. 2019.</p>	<p>The study explores the associations between Finnish health care workers' vaccination confidence, their decisions to vaccinate themselves and their children, and their willingness to recommend vaccines to patients.</p>	<p>Cross-sectional study, which analyzes data with structural equation analysis.</p>	<p>The study shows that the attitudes of Finnish health care providers towards vaccines matters for their willingness to recommend vaccines to the patients.</p>
<p>Kaufman, J., Ryan, R., Walsh, L., Horey, D., Leask, J., Robinson, P. & Hill, S.</p> <p>Face-to-face interventions for informing or educating parents about early childhood vaccination. 2018.</p>	<p>The review assesses the impacts of face to face interventions for educating parents about childhood vaccination on immunization or understanding the vaccinations.</p>	<p>Systematic literature review. Used randomised controlled trials and cluster-RCTs and Cochrane's methodological procedures to evaluate and analyze results.</p>	<p>The review suggests that face to face interventions to educate parents about childhood vaccination have little to no impact on vaccination rate, or knowledge of vaccination.</p>
<p>Kestenbaum, L. & Feemster K.</p> <p>Identifying and addressing vaccine hesitancy. 2015.</p>	<p>The review examines the history of vaccine hesitancy and its causes. The review suggests approaches for reducing hesitancy and strengthening vaccine acceptance.</p>	<p>Review.</p>	<p>The review explains that the phenomenon of vaccine hesitancy has developed due to the social, cultural, political and personal factors. The review also highlights the importance of health professionals and their recommendations.</p>
<p>Olson, O., Berry, C. & Kumar, N.</p> <p>Addressing Parental Vaccine Hesitancy towards Childhood Vaccines in the United States: A Systematic Literature Review of Communication</p>	<p>The review attempts to help health professionals with communication interventions and strategies to address and prevent parental vaccine hesitancy in the long term.</p>	<p>Systematic literature review.</p>	<p>The review recommends for example to build trust, use caution when addressing misinformation, target the information for individuals and use dialogue with the parents as</p>

Interventions and Strategies. 2020.			preventing vaccine hesitancy.
Paterson, P., Meurice, F., Stanberry, L., Glismann, S., Rosenthal, S. & Larson, H. Vaccine hesitancy and healthcare providers. 2016.	The review explains the concept of vaccine hesitancy among health care providers, and the influences of their own vaccination behavior on their vaccination.	Systematic literature review that uses descriptive analysis.	The review shows that health care providers have a lot of impact on patients' vaccination decisions. Health care providers need support on coping with the growing number of vaccine-hesitant patients.
Pless, A., McLennan, S., Nicca, D., Shaw, D. & Elger, B. Reasons why nurses decline influenza vaccination: qualitative study. 2017.	The study explores the reasons why nursing staff decline the influenza vaccination by collecting data of 18 nurses for interviewing.	A qualitative study. Individual semi-structured interviews with nurses were done to collect data.	The study shows three reasons for vaccine refusal which are the idea of maintaining a strong and healthy body, having decisional autonomy and nurses' view of being in untrustworthy environment.
Poland, G., Jacobson, R. & Ovsyannikova, I. Trends affecting the future of vaccine development and delivery: The role of demographics, regulatory science, the anti-vaccine movement, and vaccinomics. 2009.	The review ponders the connection of demographics, regulatory science, individualized medicine and anti-vaccine movement on vaccine development and delivery.	Review.	The review explains that the factors mentioned above are making an impact on the future of vaccinology.
Possenti, V., Luzi, A., Colluci, A. & De Mei, B. Communication and basic health counselling skills to tackle vaccine hesitancy. 2019.	The study points out the communication approaches and health educating skills to be used by health care providers to the population with vaccine deficit.	Review.	The study mentions the skills for tackling the vaccine resistance such as active listening, relational skills, sufficient knowledge and self-awareness.
Salmon, D., Dudley, M., Brewer, J., Kan, L., Gerber, J., Budigan, H., Proveaux, T., Bernier, R., Rimal, R., and Schwartzg, B.	The study identifies the attitudes and values regarding the COVID-19 vaccination in the US. It measures citizens' intention to take the covid-19	Cross-sectional study using a national panel survey.	The study shows that only half of US adults intend to accept COVID-19 vaccine, 10 % report having already made up their mind to not vaccinate and 40%

COVID-19 vaccination attitudes, values and intentions among United States adults prior to emergency use authorization. 2021.	vaccine as well as their confidence in health authorities.		were uncertain if they will accept COVID-19 vaccines. Based on the study characterizing COVID-19 vaccine attitudes, intentions and trust in health authorities are essential as they impact vaccine decision-making.
Succi, R. Vaccine refusal – what we need to know. 2018.	The review educates health care providers about vaccine hesitancy, its causes and consequences, and makes suggestions.	Review article, which summarizes the collected data by using a comprehensive and non-systematic search method in the PubMed, LILACS, and ScieLo databases.	The review shows that health care providers are playing a major role in transmit information, resolve doubts and increase confidence in vaccines.
Taylor, E., Atkins, K., Medlock, J., Chapman, G., Galvani, A. Cross-cultural household influence on vaccination decisions. 2015.	The review studies whether household members in different cultures give advice regarding the influenza vaccination for each other and what is the impact of that. Study was implemented by international survey.	Cross-sectional study done by conducting an international survey on the internet.	The review shows that household members across the world advise one another to vaccinate to some extent, and that advice appears with an increase in the number of taken vaccinations.
Whitehead, A. & Perry, S. How Culture Wars Delay Herd Immunity: Christian Nationalism and Anti-vaccine Attitudes. 2020.	The article discusses the relationship between politics and religion on vaccine attitudes and their effects on covid-19 vaccine intake.	Cross-sectional study, which analyzes survey answers from Chapman University Survey of American Fears.	Christian nationalism is clearly associated with anti-vaccine attitudes. It is likely that Christian nationalist ideology will be a barrier to a minority of Americans' voluntarily receiving a COVID-19 vaccination.

Appendix 4. An example of inductive analysis content

Simplified phrases	Sub category	Upper category
<ul style="list-style-type: none"> • Personal feelings • Social norm • Behavior of others 	Attitudes	

<ul style="list-style-type: none"> • Anti-vaccine/pro-vaccine opinions 		Cultural factors
<ul style="list-style-type: none"> • Beliefs of the body being “pure” • Sickness should be healed by God • Prioritizing alternative choices • Religious convictions and strong family stances 	Religion	
<ul style="list-style-type: none"> • Individual rights • Voluntary/mandatory vaccination • Autonomy • Public discussions • Authority figures 	Politics	
<ul style="list-style-type: none"> • Campaigns and guidance • Influence of media-based medicine • Regulations seek to protect the population • Health care providers’ attitude 	Public health care	
<ul style="list-style-type: none"> • Collectivistic • Individualistic • Age groups • Geographical determinants 	Cross-culture	
<ul style="list-style-type: none"> • Safety concerns • Adverse events and adjuvants • The link between vaccines and chronic diseases • Own experiences • Distrust of doctors and drug companies 	Fear	Beliefs
<ul style="list-style-type: none"> • Sufficient protection • Prevents the most serious forms of the disease • More benefits than risks 	Effectiveness	
<ul style="list-style-type: none"> • Low education • Lack of information • Language barrier • Low social status • Discrimination 	Misconception	

<ul style="list-style-type: none"> • Increase of disease outbreaks • Delay vaccination decision-making • Refusal or selective vaccination 	Parental concern	Vaccine hesitancy
<ul style="list-style-type: none"> • Misleading information • Controversies • Social media • Spread of untrustworthy information • Visibility of unreliable websites 	Internet influence	
<ul style="list-style-type: none"> • Staff's attitude • Responsible of vaccination of babies 	Child health center	
<ul style="list-style-type: none"> • Active and reflective listening • Verbal and non-verbal • Motivational interview • Open-ended questions • Face to face meeting 	Communication	Patient education
<ul style="list-style-type: none"> • Anxiety • Difficulty to find reliable sources 	Lack of information	
<ul style="list-style-type: none"> • Reliable and up-to-date information • Simple, suitable and understandable to the patient • Elicit-share-elicite – technique • Health care provider's knowledge 	Information	
<ul style="list-style-type: none"> • Health care provider-patient relationship • No judgement • Accepting atmosphere • Empathy and openness 	Trust	

Appendix 5. JBI Critical Appraisal Checklist for Systematic Reviews and Research Syntheses

JBI CRITICAL APPRAISAL CHECKLIST FOR SYSTEMATIC REVIEWS AND RESEARCH SYNTHESSES

Reviewer _____ Date _____

Author _____ Year _____ Record Number _____

	Yes	No	Unclear	Not applicable
1. Is the review question clearly and explicitly stated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Were the inclusion criteria appropriate for the review question?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Was the search strategy appropriate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Were the sources and resources used to search for studies adequate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Were the criteria for appraising studies appropriate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Was critical appraisal conducted by two or more reviewers independently?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Were there methods to minimize errors in data extraction?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Were the methods used to combine studies appropriate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Was the likelihood of publication bias assessed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Were recommendations for policy and/or practice supported by the reported data?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Were the specific directives for new research appropriate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overall appraisal: Include Exclude Seek further info

Comments (including reason for exclusion)

Appendix 6. JBI Critical Appraisal Checklist for Text and Opinion Papers

JBI CRITICAL APPRAISAL CHECKLIST FOR TEXT AND OPINION PAPERS

Reviewer _____ Date _____

Author _____ Year _____ Record Number _____

	Yes	No	Unclear	Not applicable
1. Is the source of the opinion clearly identified?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Does the source of opinion have standing in the field of expertise?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Are the interests of the relevant population the central focus of the opinion?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Is the stated position the result of an analytical process, and is there logic in the opinion expressed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Is there reference to the extant literature?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Is any incongruence with the literature/sources logically defended?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overall appraisal: Include Exclude Seek further info

Comments (including reason for exclusion)

Appendix 7. JBI Critical Appraisal Checklist for Qualitative Research

JBI CRITICAL APPRAISAL CHECKLIST FOR QUALITATIVE RESEARCH

Reviewer _____ Date _____

Author _____ Year _____ Record Number _____

	Yes	No	Unclear	Not applicable
1. Is there congruity between the stated philosophical perspective and the research methodology?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Is there congruity between the research methodology and the research question or objectives?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Is there congruity between the research methodology and the methods used to collect data?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Is there congruity between the research methodology and the representation and analysis of data?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Is there congruity between the research methodology and the interpretation of results?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Is there a statement locating the researcher culturally or theoretically?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Is the influence of the researcher on the research, and vice-versa, addressed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Are participants, and their voices, adequately represented?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overall appraisal: Include Exclude Seek further info

Comments (Including reason for exclusion)

Appendix 8. JBI Critical Appraisal Checklist for Analytical Cross-Sectional Studies

JBI CRITICAL APPRAISAL CHECKLIST FOR ANALYTICAL CROSS SECTIONAL STUDIES

Reviewer _____ Date _____

Author _____ Year _____ Record Number _____

	Yes	No	Unclear	Not applicable
1. Were the criteria for inclusion in the sample clearly defined?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Were the study subjects and the setting described in detail?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Was the exposure measured in a valid and reliable way?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Were objective, standard criteria used for measurement of the condition?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Were confounding factors identified?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Were strategies to deal with confounding factors stated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Were the outcomes measured in a valid and reliable way?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Was appropriate statistical analysis used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overall appraisal: Include Exclude Seek further info

Comments (Including reason for exclusion)

Appendix 9. Evaluation of the quality of studies

Study		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Total
Ames et al. 2017	@	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	10/11
Di Pietro et al. 2017	#	Y	?	Y	Y	Y	N						4/6
Dube et al. 2013	#	Y	Y	Y	Y	Y	Y						6/6
Fournet et al. 2018	@	Y	Y	Y	Y	?	?	Y	Y	N	Y	N	7/11
Gagneur 2020	#	Y	Y	Y	Y	Y	Y						6/6
Geoghegan et al. 2020	#	Y	?	Y	Y	Y	Y						5/6
Karlsson et al. 2019	%	Y	Y	?	?	Y	Y	Y	Y				6/8
Kaufman et al. 2018	@	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	10/11
Kestenbaum et al. 2015	#	Y	Y	Y	Y	Y	Y						6/6
Olson et al. 2020	@	Y	Y	Y	Y	?	?	N	Y	Y	Y	Y	8/11
Paterson et al. 2016	@	Y	Y	Y	Y	?	?	Y	Y	N	Y	Y	8/11
Pless et al. 2017	α	Y	Y	Y	Y	Y	Y	N	Y	Y	Y		9/10
Poland et al. 2009	#	Y	Y	Y	Y	Y	Y						6/6
Possenti et al. 2019	#	Y	?	Y	Y	Y	Y						5/6
Salmon et al. 2021	%	Y	Y	Y	?	N	N	Y	Y				5/8

Succi 2018	#	Y	Y	Y	Y	Y	Y						6/6
Taylor et al. 2015	%	Y	Y	?	?	Y	Y	Y	Y				6/8
Whitehead et al. 2020	%	Y	Y	?	Y	N	N	Y	Y				5/8

Q = question, Y = yes, N = no, ? = Unclear, JBI critical appraisal checklist for qualitative research (⌘) / text and opinion papers (#) / analytical cross-sectional studies (%) / systematic reviews and research syntheses (@)