Promoting informed decision making about maternal pertussis vaccination

English Summary

Pertussis, commonly known as whooping cough, is a worldwide health concern for babies. Newborns who are not vaccinated yet are particularly vulnerable to it; infection can lead to hospitalisation, brain damage, or even death. In the Netherlands, pertussis is also prevalent, causing babies to get infected every year. Therefore, maternal pertussis vaccination (MPV) was introduced in the National Immunisation Programme in 2019. MPV consists of one injection given to a pregnant individual at 22 weeks of pregnancy. Maternal immunisation is passed on to the baby, giving them protection against pertussis from birth. However, uptake of MPV had room for improvement with 70% of pregnant individuals choosing to get MPV in 2020. Therefore, this thesis focused on decision making about MPV by pregnant individuals.

This thesis had three complementary aims: (1) to gain a deeper understanding of the needs of pregnant individuals in decision making about Maternal Pertussis Vaccination (MPV), (2) to systematically develop and pre-test two interventions promoting MPV uptake and informed decision-making about MPV, and (3) to experimentally test the interventions for effects on MPV uptake, level of informed decision making, use and acceptability of the interventions. To reach these aims, we used the Intervention Mapping (IM) protocol. IM provides a framework for the systematic, evidence-based development of interventions, and consists of 6 steps: (1) a needs assessment; (2) specification of change objectives; (3) selection of theory-based intervention methods and practical applications; (4) production of the intervention programme; (5) planning of programme implementation; and (6) a process and effect evaluation. The needs assessment is reported in **Chapters 2** and **3**. **Chapters 4** and **5** describe the intervention development. **Chapters 6, 7** and **8** describe the effect and process evaluations of the interventions.

Chapter 2 describes a survey study about the determinants of the intention to accept MPV among pregnant individuals in the Netherlands. Our findings confirmed studies from other countries: main determinants associated with intention to accept MPV were attitude about MPV, beliefs about safety of MPV, moral norms, the belief about the effectiveness of MPV, injunctive norm (the belief that most pregnant individuals will get MPV), anticipated regret of vaccinating, and decisional certainty. In our sample, decisional certainty was further found to be moderating the relationship between attitude about MPV and intention to accept MPV, meaning that we were less able to explain intention under low decisional certainty than under high decisional certainty. Furthermore, average intention and attitude regarding MPV was lower among pregnant individuals compared to the non-pregnant individuals in our sample, indicating that affective factors may also

play a role. These results were the groundwork for the development of the interventions to promote informed decision making about MPV described in chapter 5.

Chapter 3 provided insight into the preferences and information needs of pregnant individuals regarding MPV. This survey study showed that pregnant individuals want to receive information about side-effects for themselves and the baby, the effectiveness of the vaccine, and the risk for babies to get pertussis with or without a vaccination. They, by order of preference, wanted to receive information about the vaccine from their midwife, their gynaecologist or their general practitioner (GP). Participants preferred to be informed ahead of getting the vaccine, at the beginning of pregnancy or at 20 weeks of pregnancy. Participants indicated that they would prefer to receive the vaccine from their obstetric care provider or their GP. There is a discrepancy between the preferences of pregnant individuals and the way MPV injections are organised, because MPV is currently administered at the Youth Health Services (JGZ).

Chapter 4 describes an exploration on how to address negative affect about MPV. With literature on effective strategies to address negative affect in decision making about vaccinations lacking, we designed an experiment to test emotion regulation strategies in MPV decision making. Participants were requested to apply cognitive reappraisal or acceptance strategies when experiencing negative affect. We found that negative affect was inversely associated with intention to accept MPV. Over time, negative affect decreased in all groups, including the control group. Although we did not find effects of the emotion regulation strategies on negative affect directly, the acceptance strategy appeared to decrease the influence of negative affect on intention to accept MPV. This study emphasised the importance of considering emotions and affective states in communication about vaccinations, and the acceptance strategy is worth researching further.

Chapter 5 describes the design of the two interventions using IM. We focused on promoting informed decision making (IDM) as a vehicle to increase uptake of MPV. The information from the needs assessment was integrated into a theoretical framework, in which determinants were linked to theory-based methods of behavioural change. These methods were then developed into practical applications. We created an online tailored decision aid (DA), applying user-centred design to develop and test the intervention with pregnant individuals, including people with low literacy, in four iterations. Participants evaluated prototypes of the intervention positively on relevance and usability. In addition, a Centering Pregnancy (CP) intervention was developed with midwives. CP is group-based antenatal care, where individual consultations are replaced with 2-hour group sessions with 8-12 participants. Our intervention consisted of a CP session, led by a midwife, in which MPV was discussed.

Chapter 6 describes the effect-evaluation of the online DA. The aim of this evaluation was to study the effects of the DA on MPV uptake, IDM and determinants of MPV compared to usual care (no DA). We recruited participants via midwifery clinics and social media for a randomised controlled trial. Uptake of MPV was high in our sample (92.3%). No significant effect of the DA condition on MPV uptake was found compared to the control condition. We found that the DA increased IDM and its component knowledge about MPV. We also found an increase in decisional certainty, perceived susceptibility and severity of pertussis, and positive affect about MPV. Among participants in the intervention condition, 79.0% used the DA at least once. There was an association between level of use of the intervention and MPV uptake, indicating that increasing the use of the intervention could be beneficial for its effects on MPV uptake.

Chapter 7 describes the process evaluation of the online DA. To interpret the results from the effects evaluation and to identify ways in which the decision aid can be improved, we looked at how the DA was used by participants in the intervention group and studied the acceptability of the DA. Participants evaluated the DA positively, reflecting the user-centred design approach. Reach of the DA was adequate, with 79% of the participants visiting the DA. However, use of the DA left room for improvement, with only 4.25 minutes spent on the DA on average.

Chapter 8 shows the results of a feasibility study of the CP intervention. We were not able to conduct a large-scale trial due to the COVID-19 pandemic, hence we studied the CP intervention in a smaller setting once pandemic-related regulations were relaxed. Interviews and surveys showed that the CP intervention was implemented as intended in almost all groups. Participants were positive about the interactive CP-methods used to discuss MPV, and most participants preferred hearing from other participants about their experiences with MPV and opinions of MPV. Participants and facilitators evaluated the intervention as positive and relevant, although the intervention was time-consuming, and some participants had already made the de decision about MPV. However, those who had not yet decided indicated that the session was helpful for the decision.

In the general discussion in **Chapter 9**, we summarised the results from the studies, and described recommendations and implications for future research and practice. We emphasised that attention for affect and emotions in research and communication about vaccination decisions are essential. We recommend future interventions to be developed systematically and with user-centred design. Although IM is a time-consuming process, the systematic development of the DA has already served as a blueprint for two other decision aids (i.e., for COVID-19 vaccinations and for HPV-vaccinations). It is important to ensure reach and use of the interventions among vulnerable groups such low-literate

people. Obstetric care providers can play an essential role in promoting the DA. Furthermore, we recommend that both the CP intervention and the DA are implemented on a national scale, given their potential to increase IDM and uptake of MPV.