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## **Vaccination against pertussis and influenza in pregnancy: a qualitative study of barriers and facilitators**

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1 **Vaccination against pertussis and influenza in pregnancy: a**  
2 **qualitative study of barriers and facilitators**

3

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## 22 **Abstract**

23 Objectives: Influenza and pertussis vaccination programmes have been in place for pregnant  
24 women in the UK since 2009 and 2012, respectively. In 2015, vaccine uptake rates were  
25 55% for influenza and 63% for pertussis in Northern Ireland. We conducted a qualitative  
26 study with the aim of learning about the views of pregnant women and identifying potential  
27 barriers to vaccination in pregnancy.

28 Study design: Qualitative study using focus groups and in-depth interviews.

29 Methods: We conducted focus group discussions and interviews on vaccination in  
30 pregnancy using a discussion guide developed in consultation with stakeholders and service  
31 users. Pregnant women were recruited on-street and through community networks. We  
32 performed inductive coding of transcripts and thematic analysis, using a phenomenological  
33 approach.

34 Results: Sixteen pregnant women participated. We identified six key themes. *Information*  
35 *and knowledge*: Vaccinated and unvaccinated women demonstrated similar levels of  
36 knowledge and desire for information, preferring direct communication with healthcare  
37 professionals. *The influence of others*: Some vaccinated participants reported firm  
38 endorsements of vaccination by healthcare professionals including midwives, while some  
39 unvaccinated women recalled neutral or reticent staff. *Acceptance and trust*: Most women  
40 expressed trust of health professionals. *Fear and distrust*: Vaccinated individuals expressed  
41 concerns about side-effects more than unvaccinated women. A few unvaccinated women  
42 expressed distrust of vaccines and healthcare systems. *Responsibility for the baby*: Both  
43 groups prioritised protecting the baby but unvaccinated participants were concerned about  
44 vaccine-related harm. *Accessing vaccination*: Multiple appointments, lack of childcare, time  
45 off work and having responsibility to organise vaccination hindered some participants from  
46 getting immunised. Some women were willing to be vaccinated but did not recall being  
47 offered vaccination, or were not sufficiently motivated to make arrangements themselves.

48 Conclusion: Healthcare professionals appear to have a vital influential role in pregnant  
49 women's decisions about vaccination. Involving midwives and improving convenience of  
50 vaccination access may increase uptake. Strategies to develop interventions should address  
51 the aforementioned barriers to meet the pregnant women's needs.

52

53 **Keywords**

54 Vaccination, Immunisation, Pregnancy, Qualitative Research, Influenza, Pertussis

55

56

## 57 **Introduction**

58 Seasonal influenza and pertussis are common, but potentially serious, communicable  
59 diseases that can be prevented by vaccination. Seasonal influenza infection during  
60 pregnancy may result in serious complications for the woman, and the new-born, who can  
61 catch the infection from the mother.<sup>1</sup> Since the 2009 influenza A/H1N1 pandemic, pregnant  
62 women have been eligible for influenza vaccination at any stage of pregnancy during the  
63 influenza season.<sup>2</sup> Uptake for the 2015/16 seasonal influenza vaccine by pregnant women in  
64 Northern Ireland (NI) was 55%<sup>3</sup> and 42% in England.<sup>4</sup> The childhood pertussis vaccine  
65 greatly reduces the incidence of pertussis, but infants are at risk of pertussis-related  
66 hospitalisation and death before they are vaccinated or develop an adequate immune  
67 response.<sup>5</sup> Babies of women who receive pertussis vaccination during their pregnancy have  
68 a 90% reduced risk of pertussis during the first two months of life.<sup>6,7</sup> In 2012, the United  
69 Kingdom experienced a national outbreak of pertussis in infants too young to be  
70 vaccinated<sup>8,9</sup>, leading to the recommendation that pregnant women be vaccinated for  
71 pertussis between 28 and 32 weeks of pregnancy to protect the infant via maternal  
72 antibodies.<sup>9</sup> This recommendation was extended and since 2016 pertussis vaccination can  
73 be given from week 16 of pregnancy.<sup>10</sup> In 2015, uptake of pertussis vaccination among  
74 pregnant women was estimated to be 63% in NI<sup>11</sup> and 58% in England.<sup>12</sup>

75 There is limited information available about whether low uptake of seasonal influenza and  
76 pertussis vaccinations by pregnant women is due to factors relating to the healthcare  
77 system, women's knowledge, attitudes and beliefs, social norms, or a combination of these  
78 factors. We designed and conducted a qualitative study to investigate the reasons why  
79 pregnant women receive, or do not receive, vaccination during pregnancy. The aim of the  
80 study was to provide information that would help us plan improvements to services that offer  
81 vaccinations to pregnant women.

82

## 83 **Methods**

### 84 Study design

85 We chose a qualitative study design to elicit information about pregnant women's  
86 knowledge, attitudes, beliefs and experiences relating to vaccination in pregnancy. We  
87 developed a discussion guide as part of a multidisciplinary group, including a midwife  
88 consultant, general practitioner, public health doctors and nurses, an epidemiological  
89 scientist, and an academic with experience of qualitative study design and conduct. The  
90 discussion guide was refined in consultation with members of a maternity services user  
91 reference group to ensure acceptability. We interviewed women in focus groups, separated  
92 by their vaccination status allowing freedom of different views to be expressed. In-depth  
93 interviews were planned with pregnant women from a migrant background to ensure the  
94 experience of migrant women was represented in the study. We commissioned a market  
95 research company that is accredited under the Interviewer Quality Control Scheme  
96 (<http://iqcs.org>) and certified to ISO 20252, ISO 9001 and ISO 27001 standards to recruit  
97 participants and facilitate focus group discussions at their facilities and in-depth interviews at  
98 the participant's home.

### 99 Research ethics statement

100 Research ethics approval was obtained from the NHS Health Research Authority, West  
101 Midlands - Coventry & Warwickshire Research Ethics Committee (REC reference number  
102 17/WM/0076).

### 103 Recruitment

104 Pregnant women were opportunistically approached on-street (Table 1). To ensure diversity,  
105 the market research company aimed to recruit participants of different ages, social grades  
106 and number of previous pregnancies for each group. Potential participants who meet the  
107 inclusion criteria received an information leaflet and had a discussion with the recruiter. They

108 had a 'cooling off' period before consent was taken and interviews were conducted. The  
109 number of potential participants who declined was not recorded. The market research  
110 company offered participants £35 for participation.

111 [TABLE 1]

### 112 Data collection

113 Three focus groups and one in-depth interview were conducted. All participants gave written  
114 informed consent for participation and audio-recording.

115 We originally planned two focus groups, each with only vaccinated (against influenza and/or  
116 pertussis) or only unvaccinated women. However, during the first focus group session with  
117 vaccinated participants, one participant admitted she was unvaccinated. To ensure the  
118 opportunity to hear views of vaccinated women without influence of the unvaccinated  
119 participant, another focus group was conducted with two additional participants. We aimed to  
120 recruit one vaccinated and one unvaccinated migrant woman for in-depth interviews.  
121 Recruitment was found to be challenging and only one person with a migrant background  
122 (who was vaccinated and spoke English) was successfully recruited for an in-depth  
123 interview. All sessions were semi-structured using a discussion guide, facilitated by an  
124 experienced female researcher (with a BSc Psychology) from the market research company,  
125 who explained and emphasised her neutral role in this project. Focus group sessions lasted  
126 approximately 90 minutes and the interview lasted 45 minutes. The sessions were audio-  
127 recorded and transcribed verbatim by the market research company. The transcripts were  
128 provided in anonymised form and analysed independently by two researchers. Transcripts  
129 were not returned to participants.

### 130 Analysis

131 Thematic analysis using a six-step process<sup>13</sup> and inductive coding of transcripts was  
132 performed independently by two researchers using qualitative analysis software (NVivo 10;

133 QSR International Pty Ltd. V.10, 2012). Analysis was undertaken through a  
134 phenomenological lens. After coding the transcripts, analyses were compared and  
135 agreement between researchers obtained for all final coded data. Thematic analysis was  
136 performed and discussed to agree on key themes and ensure consistency. COnsolidated  
137 criteria for REporting Qualitative research (COREQ) were applied for reporting, analysis and  
138 interpretation.<sup>14</sup> A list of initial codes is available from the authors upon request.

139

## 140 **Results**

### 141 **Study population**

142 Three focus group discussions and one interview took place in March and April 2017. Focus  
143 groups included fifteen participants of different ages, social grades and included first-time  
144 and mothers who had previous pregnancies (Table 2). All women were at least 16 weeks  
145 pregnant at the time of recruitment (February-March 2017) and hence, eligible for both  
146 vaccinations during their current pregnancy.

147 [TABLE 2]

### 148 **Themes**

149 We identified six themes that described reasons why pregnant women choose to get or to  
150 not get vaccinated in pregnancy (Table 3).

151 [TABLE 3]

### 152 **Information and knowledge**

153 Participants received information on vaccinations in different ways, mostly from doctors and  
154 midwives, but also from friends and family. Most participants felt that some healthcare  
155 professionals did not spend enough time discussing benefits and risks of vaccination, or  
156 were not able to address their questions.



157 *Speak to us more instead of just giving you a leaflet, because no matter who you*  
158 *see, be it a doctor or a midwife, it's flooded with leaflets, they are rushed to get you in*  
159 *and out that door as quickly as possible. ... [P2-FG3, vaccinated]*

160 Generally, participants did not understand how vaccinations work. Most participants were  
161 more aware of influenza than pertussis. The influenza vaccine was often seen as pointless,  
162 with some believing it could cause influenza infection. A minority questioned the value of  
163 vaccination, regardless of vaccination status. Some believed that “too many” vaccinations  
164 were given. Some vaccines were thought to be more important than others. Some believed  
165 that as they had not previously been ill, they would not become ill in the future, and did not  
166 require vaccines.

167 Some women researched vaccination using different online sources to compare with  
168 information provided by the public health service. Most women reported that receiving the  
169 public health leaflets without further explanation was unhelpful, and some women were not  
170 sure if they received the leaflets. Participants felt there was a need for impartial information  
171 and advice from healthcare professionals.

172 *There's no impartial advice about vaccinations there, either, if you go in the internet,*  
173 *its either very positive or very negative. There's no, ok, this is exactly what could*  
174 *happen... [P4-FG1, vaccinated]*

## 175 **Influence of others**

176 Midwives had the potential to be a positive influence on pregnant women by encouraging  
177 vaccination. A lack of vaccine endorsement by the healthcare professionals led some to  
178 believe vaccination was not important. Many unvaccinated participants claimed they would  
179 have the vaccines if they had been recommended by a healthcare professional.

180 *... My midwives weren't pushy or anything towards it. 'You get vaccinated at this*  
181 *stage and you make your appointments.' They were quite laid back about it all, and I*

182 *think that's what made me laid back about it all. ... No one was forcing me to make*  
183 *the appointments to have it ... So I didn't think that it was very important...* [P1-FG2,  
184 unvaccinated]

185 Some participants suggested a need for better training for healthcare professionals on  
186 discussing vaccination, and allowing more time for discussion in face-to-face appointments  
187 may influence vaccine acceptance.

188 One unvaccinated woman said that she had been influenced by her partner, who was  
189 opposed to vaccination for reasons she ascribed to his cultural background.

190 *I wouldn't be so worried about it, vaccines and that, but he [partner] would be. ... And*  
191 *because of where he is from, he doesn't like them [participant's children] having it.*  
192 [P3-FG2, unvaccinated]

### 193 **Acceptance and trust**

194 Most participants, even if unvaccinated themselves, expressed acceptance of vaccination in  
195 pregnancy. These participants trusted healthcare professionals and were happy to follow  
196 their advice. Most thought vaccines would not be recommended if they caused harm and  
197 many women did not differentiate between vaccination during or outside pregnancy.

198 *Sure the baby gets vaccinated anyway. So if you are going to have your child*  
199 *vaccinated does it matter if it's during pregnancy or not? If it is that big of a risk, then*  
200 *they wouldn't offer it you.* [P7-FG2, unvaccinated]

201 Some mentioned difficulty building trust if they did not get to see the same healthcare  
202 professional during pregnancy.

203 *Like you never see the same midwife, you never, you're booking in appointments,*  
204 *you're there about two and a half hours when you are booking in, and I really think*

205 *that the midwife that books you in that she should pop in and see you every now and*  
206 *again. ... [P3-FG1, vaccinated]*

207 Another form of acceptance expressed by some participants was that “ignorance is bliss”  
208 and some felt that no further investigation into the topic of vaccinations was best.

### 209 **Fear and distrust**

210 Vaccinated participants expressed fear of pain of vaccination and early side-effects. Some  
211 unvaccinated women were concerned about unknown longer-term consequences. Some  
212 suspected healthcare professionals did not know, or would not truthfully disclose, information  
213 about possible risks.

214 *That’s why they aren’t giving you information out because they don’t have enough*  
215 *information themselves. Like even today when I just got the Whooping one... my*  
216 *arm’s getting sore now, like I wasn’t told that was the way it would go, that there are*  
217 *side effects or what to look out for or anything. [P4-FG1, vaccinated]*

218 Amongst unvaccinated participants, two expressed clear anti-vaccination views. One thought  
219 that components of vaccines could harm their baby. Some participants referred to the  
220 measles-mumps-rubella (MMR) vaccine, relating it to the (discredited) autism scare of the  
221 1990s.

222 *I think I am inclined that if I definitely had to have a vaccination, then I wouldn’t take it*  
223 *during pregnancy. The chances of the baby being infected by the things in there, the*  
224 *levels of mercury and aluminium, if that’s ingested and the baby is going through a*  
225 *key development early on, it can affect their kidneys, liver, organs. [P5-FG2,*  
226 *unvaccinated]*

227 The opinion that nature was best for your body was also expressed by some. Some  
228 participants reported they were anxious about taking medication during pregnancy, and  
229 found the advice about vaccination inconsistent with this view.

230 **Responsibility for the baby**

231 Many participants expressed responsibility for their baby and described being very protective  
232 once becoming pregnant, especially with a first child. Both groups expressed that it was  
233 more important to protect the baby than themselves. However, not all recognised that  
234 vaccinations are intended to protect the baby. Some unvaccinated participants wanted to  
235 protect the baby from a vaccine they considered to be potentially harmful.

236 One vaccinated participant expressed anticipated regret, saying she would blame herself if  
237 her baby became sick due to being unvaccinated. Conversely, another vaccinated  
238 participant said that she would blame herself if her child became unwell due to being  
239 vaccinated.

240 *That's why I went for it, because I had listened to so much information, and my gut*  
241 *was telling me so. Because of the baby inside me, I couldn't take the risk of anything*  
242 *happening and then me blaming myself ... I didn't really want to know anything else*  
243 *about it, because too much information was going to confuse me. [P3-FG1,*  
244 *vaccinated]*

245 **Accessing vaccination**

246 Most vaccinated women had not experienced difficulties accessing vaccination. In the  
247 unvaccinated group, some said they simply did not get around to booking their  
248 appointments. Some reported they were not offered vaccinations.

249 *Like with me, I am just really lazy with these kinds of things. Like people say that you*  
250 *need to put an appointment on, but they don't push you, so if you don't do it, then you*  
251 *don't do it. Like, I never really got round to making it the first time, so what difference*  
252 *does it make this time? [P3-FG2, unvaccinated]*

253 Some women thought attending a general practitioner (GP) for vaccination was  
254 inconvenient. One suggestion to improve access to vaccination was to have fewer

255 appointments and to coincide the vaccination with antenatal appointments, possibly given by  
256 midwives. Lack of time, responsibility of organising appointments, time off work and difficulty  
257 accessing childcare were among barriers participants mentioned.

## 258 Discussion

259 Vaccination against pertussis and influenza during pregnancy is a safe, simple and  
260 potentially life-saving intervention. A sizeable minority of the eligible population does not get  
261 vaccinated. We identified possible reasons for women not being vaccinated, and suggest  
262 strategies that might improve uptake.

263 There has been little previous research about the factors affecting vaccination of women in  
264 pregnancy against influenza and pertussis, particularly in the context of the UK.<sup>15</sup> Winslade  
265 *et al.*<sup>12</sup> recently reported findings of a qualitative study of views of women about pertussis  
266 vaccination in London. Many of the findings of our study and Winslade *et al.* are in  
267 alignment, despite differences in study design (individual interviews versus focus groups),  
268 vaccination of focus (pertussis only versus pertussis and influenza), and context  
269 (socioeconomic and cultural differences between London and Northern Ireland). Participants  
270 in the Winslade study were not required to be currently pregnant.

271 Some women claimed to be willing to be vaccinated but said vaccination was not offered,  
272 which is consistent with other studies.<sup>12,16</sup> If this is an omission on the part of healthcare  
273 professionals, then a system design approach could be applied to increase the number of  
274 pregnant women offered vaccines. One solution might be to introduce a checklist for  
275 maternity appointments, such as that suggested by Winslade *et al.*<sup>12</sup> It is possible that  
276 healthcare professionals offer vaccination in such a way that some women do not recognise  
277 the pertinence of vaccination and thus do not remember this advice. A full understanding of  
278 the system in which women are treated might maximise opportunities to implement clearer  
279 and more effective communication strategies.

280 Other women had not made appointments to be vaccinated. Vaccine uptake among  
281 pregnant women tends to be higher when recommended by a healthcare professional.<sup>17-20</sup>  
282 Midwives are pivotal<sup>21</sup> and were among the most trusted in our study.

283 We found, as have previous reports, that pregnant women preferred to discuss vaccination  
284 face-to-face with a trusted healthcare professional.<sup>12,17,21,22</sup> The role of healthcare  
285 professionals, especially midwives, is crucial in providing impartial information and  
286 reassuring pregnant women about the safety of the vaccine and its benefits for mother and  
287 child. In an online survey with pregnant women and women with children under two years of  
288 age in the UK the majority indicated they would definitely or probably accept a nationally-  
289 approved pertussis vaccine offered by their midwife or GP during pregnancy to protect  
290 themselves and/or their baby.<sup>23</sup> If the vaccine is more promoted for protecting the new-born  
291 than the mother, participants seem more willing to accept the vaccine<sup>21,24</sup>, which is also  
292 suggested by our finding that protecting the baby was a main theme in both groups. High  
293 vaccination uptake has been attributed to the involvement of GPs<sup>25</sup> and several studies have  
294 reported that women are much more likely to accept vaccination in pregnancy when advised  
295 and recommended by a healthcare professional.<sup>19-21</sup> Endorsement of the vaccine by  
296 healthcare professionals, particularly midwives, was very important to many pregnant  
297 women in our study. The apparent lack of endorsement by healthcare professionals warrants  
298 further study. Possible reasons include lack of knowledge, belief, time or confidence  
299 speaking about vaccine decision-making. Healthcare professionals' confidence can be  
300 increased by training.<sup>26</sup>

301 We found that vaccinated women were not necessarily better-informed than unvaccinated  
302 women, and that information provision did not necessarily promote informed decision-  
303 making, as wrong information and knowledge were relatively common. Confronting incorrect  
304 information about vaccines is challenging: drawing attention to the information even to  
305 discredit it might risk promoting it.<sup>27</sup>

306 A small number of unvaccinated women in our study were vaccine-refusers and discussed  
307 their belief that vaccines would cause harm. However, efforts should be targeted to  
308 unvaccinated but willing individuals as most vaccinated participants accepted vaccines  
309 despite some concerns.

310 We found some participants were concerned about vaccination during pregnancy.  
311 Counterintuitively, vaccinated individuals expressed more concern about vaccine side-  
312 effects. Previous studies described mixed views about vaccine safety as a major  
313 concern.<sup>15,16</sup> It may be possible to address these concerns in direct discussions with  
314 healthcare professionals.

315 Ethnicity may have an impact on the decision to get vaccinated.<sup>17,18</sup> We were not able to  
316 explore this in any depth in our study as we were able to recruit only one participant who  
317 was a migrant, and she was vaccinated. Future studies should explore this in greater detail,  
318 perhaps recruiting people from different migrant backgrounds.

319 Our study was limited by funding and relatively short timescales. Participants were from a  
320 small geographical area around Belfast; therefore, generalisability of findings to individuals  
321 from other regions may be limited. Inclusion of an unvaccinated participant in the first  
322 vaccinated group might have influenced other participants. However, the content of  
323 discussion in an additional focus group was similar, suggesting there was no significant  
324 influence, although data saturation was not discussed. We cannot be confident that data  
325 saturation was reached with respect to the views of immigrant women as only one woman  
326 was interviewed and therefore further interviews would need to be undertaken. Due to  
327 difficulties recruiting migrant women, a dedicated recruitment strategy would be necessary in  
328 future studies

329 Our study highlights the critical role of healthcare professionals, especially midwives, in  
330 recommending vaccination in pregnancy. We also highlighted the need for a better approach  
331 to vaccination reminders, appointments and delivery. As a result of this study, we are  
332 exploring new approaches to vaccines being delivered by midwives in routine ante-natal  
333 care appointments.

334



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- 406

407 **Table Captions**

408

409 Table 1: Description of the study inclusion and exclusion criteria.

410 Table 2: Description of the study population.

411 Table 3: Names of the themes that emerged from analyses.

412

413 **Supplemental Files**

414

415 **Supplementary file 1: C**Onsolidated criteria for REporting Qualitative research (COREQ)  
416 checklist