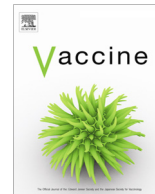


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Use of social networking sites and women's decision to receive vaccinations during pregnancy: A cross-sectional study in the UK

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ABSTRACT

In the UK, it is recommended that pregnant women receive the influenza and pertussis vaccination. However, uptake of these vaccinations in certain UK regions remains low. Previous studies show that pregnant women use the internet to access health information, yet it has not been previously explored whether the use of social networking sites (SNS) influences decisions about maternal vaccination uptake.

The aim of this study was to determine, if the use of SNS to gain information on pregnancy vaccinations, is associated with women's uptake of the influenza and pertussis vaccines during pregnancy.

This is a cross-sectional study with data collected using an online questionnaire posted on Mumsnet (an online parenting site), from 3rd to 24th August 2017. Women were included if they lived in the UK, were over 32 weeks pregnant, or had given birth in the last year. Participants were questioned about their pregnancy vaccination uptake, general SNS use and, their SNS use in relation to gathering information on vaccinations during pregnancy. The data was analysed using chi-square test, and univariable and multivariable logistic regression.

Out of a sample of 308 participants, 305 (99.3%) of women reported using SNS and 64/308 (20.8%) of women reported using SNS to gather information on vaccinations during pregnancy.

Women who reported using SNS to gather information on pregnancy vaccinations were 58% (adjusted odds ratio 0.42; 95% CI 0.21–0.87) less likely to receive the pertussis vaccination during pregnancy. However, the association was not statistically significant for the influenza vaccination (adjusted odds ratio 0.64; 95% CI 0.37–1.11).

The study showed many women use SNS to gather information on pregnancy vaccinations, and this is negatively associated with their likelihood of receiving the pertussis vaccine. Future studies are needed to analyse the accuracy and quality of the vaccination information, which women find on SNS.

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1. Introduction

Vaccinations during pregnancy can protect both mother and baby from disease [1–4]. In the UK, pregnant women are classed as a vulnerable group, and it is recommended that all pregnant women receive the influenza and pertussis vaccine [5].

The influenza vaccine has been recommended for pregnant women since 2009, to be given at any stage of their pregnancy during the period from September to February [5–7]. Studies have shown that women are more susceptible to influenza during pregnancy, and are more likely to develop severe disease, or die, compared to the non-pregnant population [4,8]. Influenza in pregnancy

is also linked to adverse pregnancy outcomes, such as miscarriage, preterm birth and stillbirth [8].

Pertussis poses a great risk to the health of babies, and can result in them developing pneumonia, or suffering seizures, brain damage, and can result in death [9]. The pertussis vaccine has been offered to pregnant women in the UK since 2012, after a national outbreak of the disease [10].

Deaths due to pertussis in babies less than 3 months of age had increased in 2016, with four babies succumbing to the disease [10,11]. It is recommended that women receive the vaccination from 16 and 32 weeks gestation [12]. However, it can be given up until a woman goes into labour [10,12]. Babies cannot be vaccinated until they are 8 weeks of age; however, immunity is passed on from mother to baby [10–12]. If a mother receives the pertussis vaccine, at least a week before giving birth, research shows that their babies have a 91% reduced risk of contracting whooping

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cough in the first 8 weeks of their lives, compared to the babies who are born to unvaccinated women [13,14].

In England, the average pertussis vaccine uptake in pregnant women, from January to March 2017 was 73.8% [15]. However, in London, only 63.2% of pregnant women had their pertussis vaccination during March, whereas in Yorkshire and Humber 79.7% of pregnant women received the vaccine [15]. Uptake of the influenza vaccine in England is even lower, with only 44.9% of pregnant women receiving the vaccination during September 2016 and January 2017 [16].

Social networking sites (SNS) are a popular form of social connection and peer support. Usage of such sites continue to increase, with on average in the United Kingdom a person spending 114 min a day on social media in 2017 [17]. A report by Ofcom [18] published in 2017, showed that within a weekly period 24% of women used the internet to search for health related topics [18], and 51% used the internet to access social media [18].

The terms social media and social networking sites are often used interchangeably; however, they are actually very different. *Social media* is the use of different technologies [19]; these technologies are used to upload communications, such as blogs or videos [19]. Social networking sites are services that let people create a profile that is within a restricted system [20]. They enable users to view the profiles of others and connect with people who share similar interests [20].

Bodeker et al. conducted a cross-sectional study in Germany and found that 47.6% of women thought the internet, a useful and important source of information on vaccination during pregnancy [21]. Campbell et al. [22] also found that 13.2% of women had heard about the pertussis vaccination programme in the UK, via the internet, with 15.3% of women preferring to use the internet, to obtain information on vaccines [22]. Internet use has increased dramatically over the last two years, and so these figures may be much higher. This study was also conducted when the pertussis vaccination had only been available in the UK for 3 months [22], and so women may not have used the internet to gather information on it because it was not available to them.

Previous studies have shown that high numbers of women use the internet to find health information in pregnancy [23–26], and social networking sites are used to search for pregnancy related health information, such as exercise and nutrition [24]. A cross-sectional study by Lagan et al., found that 13% of women reported that the internet was the only source they used, when wanting to gain information about pregnancy [26] and another prospective study by O'Higgins et al. [25] in Ireland, found that 70% of women reported using discussion forums, and 67% used social networks to gain information on pregnancy health.

Women reported using internet sites because they appreciated the ease and quickness of the available results [23]. A cross-sectional study in Sweden by Bjelke et al. also found that 46.5% of women reported that the lack of time available to them, to ask health professional questions, was a reason why they accessed the internet and social networking sites to gain information [24]. In addition, 48.6% of women reported in a cross-sectional study by Lagan et al. in Northern Ireland [26], that they used these sites because they were dissatisfied with the information that they received from their health care providers.

Lagan et al. also reported that almost 94% of women supplemented the information they had received from their health provider, with information they also found on internet sites [26], and that 83% of women stated they used the internet to influence their decision making in pregnancy [26]. However, this study was conducted in 2006, and, with the frequency of internet usage greatly increased since then, and changes in medical care, these results are unlikely to represent views of women today.

A cross-sectional study conducted in Italy by Bert et al., stated that 15% of multiparous women and 9% of primiparous women took part in online discussions about pregnancy [23]. However, this study only surveyed women that had healthy pregnancies, and so, the same results may not be repeated for those that experience complications in pregnancy. Half the women also included in this study used internet sites because they wanted to further their knowledge [23], but a cross-sectional study by Bodeker et al., determined that those women, who used the internet, as well as radio and TV to source information, had on average, lower vaccination knowledge and were less likely to receive a vaccination [21].

The current literature shows that there are many factors that contribute to a woman's decision to receive vaccinations during pregnancy. These factors include ethnicity, age, marital status, education, number of pregnancies, the perceived effectiveness and safety of the vaccines, whether or not a woman has an underlying medical condition or a high risk pregnancy or, if she has received a recommendation to have a vaccine [22,27–34]. To our knowledge, there is no evidence investigating the association between a woman's use of SNS, with their decision to be vaccinated.

This study aims to investigate if, and how women use social networking sites to gather information on pregnancy vaccinations, and whether this is associated with vaccination uptake during pregnancy.

2. Methods

This is a cross-sectional study using an online questionnaire. Women, who live in the UK, were over 32 weeks pregnant, or had given birth within the last year, were eligible to take part in this study. This criteria was set because the UK vaccination schedule recommends that pregnant women receive their seasonal influenza vaccine during any trimester of their pregnancy from September to February [5], and that they should receive their pertussis vaccine by 32 weeks gestation [12]. The year after the birth of a child has been set as an upper cut-off point, to try to reduce recall bias, as it is hoped that women are likely to still remember if they received their vaccinations, and if they have used SNS to gain information about vaccination, at this point in time.

An online questionnaire was used to collect data from participants. The questionnaire was developed by the researchers and published using iSurvey, which is a survey tool used to generate and distribute online questionnaires. By using iSurvey, all information is stored on the University server, which uses secure encryption and ensures that any data cannot be accessed by third parties. The questionnaire did not collect any identifiable information, to ensure that all participants' identities were anonymous. The questionnaire included 23 questions that gathered socio-demographic information, and questioned participants about their pregnancy vaccination uptake, general SNS use and their SNS use in relation to gathering information on vaccinations during pregnancy. The online questionnaire aimed to answer the following six research questions:

- What is the proportion of women, who used SNS to gain information on vaccinations in pregnancy?
- What is the frequency women used SNS to gather information on vaccinations in pregnancy?
- What is the proportion of women, who are aware of why they should be vaccinated in pregnancy?
- What are the different sources women use to gather information on pregnancy vaccinations?

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