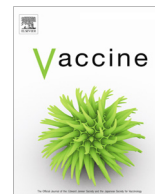




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Midwives' perceptions of vaccines and their role as vaccinators: The emergence of a new immunization corps

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ABSTRACT

Background: In France, midwives have recently been authorized to administer various vaccines to women (including pregnant women), newborns, and their family members. This is expected to enhance vaccine coverage. However, the French high level of vaccine hesitancy is also observed in some healthcare workers. We thus aimed to determine the perceptions of French midwives concerning vaccines.

Methods: We distributed an anonymous online questionnaire between September and December 2017, targeting midwives who were still in training or working in the public or private sector.

Results: A total of 917 questionnaires were analyzed (median age 26 years). Almost half of participants (44.5%) were students. On a scale of 0–100, the median perception of the usefulness, safety, and trust of vaccinations were 92, 80, and 85, respectively. The mean scores of students were significantly higher for each perception, whereas in professional midwives, age and perceptions were negatively correlated. When asked whether there were scientific, philosophical, or religious arguments not to vaccinate, 83.2%, 69.8%, and 77.8% of participants disagreed, respectively. The vast majority (91.6%) was very or mostly favorable to the pertussis vaccine after delivery, but only around half (51.5%) to the influenza vaccine during pregnancy; those favorable to the pertussis vaccine were younger. A high proportion of participants (88.3%) considered that midwives were in a good position to vaccinate, with this proportion being even higher among students.

Conclusions: These results suggest that the recent authorization regarding vaccine administration will result in better vaccine coverage of pregnant women and their families by midwives. The better perceptions of younger participants are also encouraging. However, the level of trust in vaccinations (only 80.1%) and the low number of participants favorable to the influenza vaccine during pregnancy suggest that initial and continuous training should be reinforced.

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1. Introduction

According to a 2016 international study in the general population, France faces one of the highest level of vaccine hesitancy in the world, with 41% of French participants disagreeing with the affirmation, “Overall, I think that vaccines are safe” [1]. This negative perception of immunization is polarized by safety concerns such as the hepatitis B vaccine triggering multiple sclerosis [2]. However, studies [3] show that a notable proportion of the population also consider that vaccines have poor efficiency (e.g., influenza vaccine), are useless (e.g., poliomyelitis and diphtheria vaccines), or should not be used because the infections are benign

(e.g., measles vaccine). A recent study in the context of pandemic swine flu H1N1 [4] identified 3 potential groups in France: those conducting “a continuous fight against vaccination in all its forms”; those who conduct “a cultural or political struggle which can include vaccination in all its forms”; and those who conduct “a cultural or political struggle that can, under certain limited conditions, include some vaccines”.

Such negative opinions are expressed not only by the general population, but also by healthcare professionals [5].

In parallel, vaccine coverage in different populations is below the objectives: 83.7% for measles-mumps-rubella (two doses) at 15 years of age [6]; 91.2% for pneumococcus (3 doses) at 2 years; 5% to 7% (non-pandemic season) [7,8] to 10% (2009 pandemic season) [9] for influenza in pregnant women; and 41.9% (last injection <15 years ago) for pertussis in the population over 16 years [10].

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As a whole, the rise in misconceptions and suboptimal vaccine coverage led the French government to enact legislation in January 2018 to make the following vaccines mandatory for infants: measles, rubella, mumps, hepatitis B, *Haemophilus influenzae* b, meningococcus C, pertussis, and pneumococcus (in addition to three already compulsory vaccines of tetanus, poliomyelitis, and diphtheria).

Midwives are an important group of healthcare workers. They accompany women during pregnancy, perform deliveries, and follow mothers and infants up to 8 weeks after childbirth. In the last three decades, their authorization to vaccinate was progressively extended to newborns (vaccines against hepatitis B and tuberculosis), and to women (vaccines against measles, mumps, rubella, tetanus, diphtheria, poliomyelitis, pertussis, hepatitis B, influenza, meningococcus C, varicella, and papillomaviruses). Moreover, in 2016, a decree [11] authorized midwives to vaccinate the family members of pregnant women and infants against measles, mumps, rubella, tetanus, diphtheria, poliomyelitis, pertussis, hepatitis B, influenza, meningococcus C, and *Haemophilus influenzae* b. They may therefore strongly participate in increasing vaccine coverage among pregnant women, family members of pregnant women and infants, and women of childbearing age.

In this study, we aimed to determine the perceptions of vaccination among student and professional midwives in France and assess the extent to which they would administer the authorized vaccinations, including the recent additions.

2. Material and methods

We elaborated a questionnaire exploring sociodemographic data, type of health facility (private/public), vaccine perception in general, influenza and pertussis vaccine perception, perception of the immunization of pregnant women, as well as their attitude toward the immunization of pregnant women, women of childbearing age, infants, and families of infants and pregnant women. Vaccine status for influenza (strongly recommended) and pertussis (mandatory for midwives and students in midwifery) was also explored.

The questionnaire was placed online on the Lymequery® (Hamburg, Germany) website, thus enabling investigators to have the complete ownership of the data. Professional and student midwives were invited to anonymously complete the questionnaire, with the website link being shared by various electronic means: educational institutions, a professional directory, and the website of the *Ordre National des Sages-Femmes* (French National Midwifery Council). The study was open from September 6 to December 14, 2017.

The perceptions of the vaccines in general was explored by asking participants to rate on a 0–100 score to what extent they think that vaccines were (1) useful and (2) safe, and (3) what trust they express toward vaccines.

A score was obtained based on the responses to the questions concerning the scientific, philosophical, and religious arguments for not vaccinating, the trust in authorities regarding vaccines, the lack of scientific data on vaccinations, the safety of vaccine production, the comprehensiveness of adverse effect reporting, the risk of disease from vaccination, and the influence of the vaccine industry on related policies. For each question, a five-point Likert scale was used, with the highest value corresponding to the most negative view about vaccinations. A score was built by summing these values, and termed the “negativity score.”

Quantitative variables are expressed as median and 25–75th interquartile. The association between two qualitative variables was explored using Chi2 test. The variation of quantitative variables in two groups was explored with the Mann-Whitney test.

The correlation between two groups of quantitative variables was explored using the Spearman test.

3. Results

3.1. Population

In France, in 2017, according to the French Midwifery Council, 22,787 professional midwives were working, whereas 4011 student midwives were in training in 35 educational institutions.

During the 70 days of the study, 917 participants completed the online questionnaire (3.5% of the population, resulting in a margin error of 3%). Overall, 896 (97.0%) were female; median age was 26 years (IQT 25–75: 22–39, range 16–72). Students accounted for 46.6% of participants, and professionals had graduated a median of 13 years prior (IQT 25–75: 5–23, range 0–59). More than half (58.8%) worked in a public health institution. Among professionals, 51.8% cared for pregnant women and 42.3% for newborns (39.6% were doing both); 55.5% regularly prescribed vaccines, and 63.3% regularly administered immunizations (47.8% were doing both).

3.2. Perception of vaccination

On a 0–100 score, the median perceived usefulness and safety of vaccines were 92 (25–75th IQT: 80–100, range 10–100) and 80 (25–75th IQT: 65–90, range 0–100), respectively, whereas the median trust of vaccinations was 85 [25–75th IQT: 72–85, range 2–100). Each score was positively correlated with the two others (trust-usefulness: $R = 0.76$, $p < 0.0001$) (Fig. 1); trust-safety: $R = 0.85$, $p < 0.0001$; safety-usefulness $R = 0.70$, $p < 0.0001$). Student scores were higher for usefulness (median 95 vs 91, $p = 0.0011$), safety (median 81 vs 78, $p < 0.0001$), and trust (median 90 vs 80, $p < 0.0001$) (Fig. 2). Moreover, among professional midwives, age was negatively correlated to each score (usefulness: $R = -0.10$, $p < 0.0001$; safety, $R = -0.12$, $p < 0.0001$; trust, $R = -0.10$, $p < 0.0001$). The type of health care facility (private/public) was not associated with differences in perceptions.

Participants were asked whether there were scientific, philosophical, or religious arguments not to recommend vaccinations (Table 1). The mean age of those who declared that such scientific arguments existed was significantly higher; the inverse was true for religious arguments. In parallel, students disagreed more often than professional midwives that there were scientific arguments against vaccination, but disagreed less in terms of religious arguments.

Participants were asked whether they trusted the authorities regarding vaccines. They were also asked about the sufficiency of scientific data to recommend vaccinations, the safety of vaccine production, the comprehensiveness of reporting vaccine adverse events, the risk of disease from vaccination, and the influence of the vaccine industry on related policies (Table 2). Once again, participants with greater trust (or less mistrust) toward vaccination were significantly younger, and students expressed less vaccine mistrust than professionals (except for the comprehensiveness of adverse effect reporting).

The median negativity score was 21 [25–75th IQT: 18–25, range 9–39]. It was higher among professionals than students (median 22 vs 21, $p = 0.0112$); among professional midwives, it was higher among participants aged over 40 years (median 22 vs 21, $p = 0.0063$). It was strongly, negatively correlated with the perception of vaccine usefulness ($R = 0.64$, $p < 0.0001$), safety ($R = 0.71$, $p < 0.0001$), and trust ($R = 0.71$, $p < 0.0001$). Interestingly, the negativity score was also correlated with the difference between usefulness score and safety score (Fig. 3), suggesting that vaccine mistrust may in part result from the gap between the two perceptions.

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