

group are noteworthy, which is probably due to the predominance of people in the older age group (mean age was 58,9 years). Such a low level of vaccine antibodies in the group may be due to several reasons. First, with the later introduction of hepatitis B vaccination into the national immunization schedule; secondly, with a decrease in the level of protective antibodies over time; thirdly, with the characteristics of the immune system of this age group.

Using molecular diagnostic methods, HBV DNA was detected in 2,5% of patients. The method used, based on nested PCR with electrophoretic detection, makes it possible to detect HBV DNA in peripheral blood plasma at a low viral load (analytical sensitivity 5 IU/ml). The identified cases refer to the HBsAg-negative form of chronic viral hepatitis B.

Conclusions

Due to the prevalence of the HBsAg-negative form of chronic hepatitis B, it is necessary to use highly sensitive molecular biological methods to detect the HBsAg-negative form of chronic viral hepatitis B. In the direction of research of patients in dental clinics, an increase in the analyzed group is required, as well as a further analysis of the nucleotide sequences of the identified isolates.

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ADDRESSING THE PARENTAL HESITANCY ON MMR VACCINATIONS

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Introduction

Vaccines will invariably be a hot topic in preventive medicine, being one of the successful methods and key strategies against infectious disease. The shreds of evidence demonstrating successful immunization movements for smallpox and polio are overwhelming, mainly contributing to the decline in mortality and morbidity of these diseases. Conversely, when people heard less about complications of vaccine-preventable disease, they began to question the need for vaccines. Thus, vaccine hesitancy, vaccine refusal, and anti-vaccine movements started to trend among people.

«Vaccine hesitancy — refers to delay in acceptance or refusal of vaccination despite the availability of vaccine. Vaccine hesitancy is complex and context-specific, varying across time, place and vaccines, which is influenced by factors such as complacency, convenience, and confidence». — As quoted By the SAGE working group of WHO. These vaccine-hesitant people are middle ground people, who do not refuse vaccines out rightly; they are either under-immunized, refuse certain vaccines, no of doses, or delay vaccines due to other reasons¹. When it comes to routine immunization of children, a child's vaccine status depends on parents. Their nature and attitudes directly affect the child's vaccine status. This growing trend of hesitant parents can lead to the resurgence of vaccine-preventable diseases in chil-

dren. Measles, Mumps, and Rubella are such vaccine-preventable diseases. In the 1960s, the First introduced vaccines were as monovalent. In addition, weren't compulsory. Later on, via the trivalent MMR vaccine. Most of the children are vaccinated in WHO European region for MMR 1st and 2nd doses. Nevertheless, in most countries, there is a gap in the progress to achieve 95 % vaccine coverage. Due to increasing vaccine hesitancy on MMR, children are exposed to outbreaks; this will not only put one child at risk but the community, for not able to establish herd immunity for children who are young or medically exempted from vaccines. Such growing trend of hesitant parents can lead to the resurgence of vaccine-preventable diseases, thus this article is to review this among the European population.

Objective

To study and identify the main reasons for parental hesitancy for MMR Vaccine from early period till now, among the European population.

Materials and Methods

Review and summarize qualitative electronic medical scientific literature articles present. Through statistics on annual surveillance epidemiological data on European Union.

Results and discussion

The trivalent MMR vaccine, developed by Mauric Hilleman, and came into use in Europe around the 1980s. Public were hesitant to use trivalent vaccines owing to uncertainties, and the expert and the public views varied regarding the trivalent vaccine in:

1. Added up side effects, as it was trivalent.
2. Safety regarding live attenuated strains of viruses in vaccines
3. Possibility to contract the disease in the waning period of immunity.
4. The course of protection from rubella until pregnancy was also uncertain and doubtful.
5. The need for mumps strain vaccine for girls and very rare mortality in mumps, questioned the need for the MMR vaccine as trivalent especially with mumps virus strain.

Moreover, certain religious communities argued over the vaccine ingredients, especially the gelatin component was assumed to be taken from pigs. These hesitations and questions were the foremost reason for halted vaccine coverage. Nevertheless, concurrently, the results of successful MMR vaccine coverage among the USA convinced the public. Sweden, one of the first, introduced it in 1982, the UK in 1988 [1]. Thus in the 1980s follow-up for the second dose was also recommended with improved vaccine coverage from 1990s to 2000s.

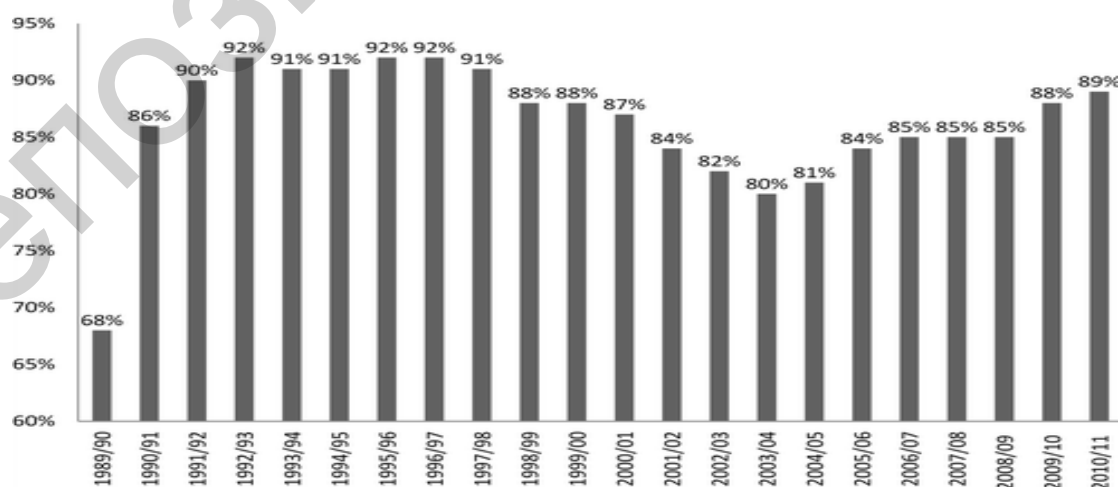


Figure 1 — MMR vaccine coverage in England at 2 years of age, 1988–1989 to 2010–2011

As we can see in the figure 1, vaccine coverage reached above 90 % in the 1990s to 2000s. Then follow a declining pattern in 2000s, which was mainly due to MMR vaccine controversy, the most damaging medical hoax of the 20th century. In the 1998, a research article in the medical journal *The Lancet* by Andrew Wakefield, claimed a possible link between MMR and a rare form of autism and Colitis.

Wakefield used the press launch to claim that MMR was dangerous and parents should immediately seek separate measles, mumps, and rubella vaccines until further safety testing had been completed. Parents were hesitant, confidence in the MMR vaccine substantially weakened and criticism and concerns started soaring [2]. Over the following years, uptake of MMR dropped. Multiple studies showed that there was no evidence for a link between MMR and autism, and in 2004 ethical violations and poor research practices were exposed in Wakefield's work. The article was withdrawn from the *Lancet* in 2010. The government took measures to communicate and enlighten the public through the internet, media and general practitioners. Correspondingly by funding autism-related research to gain public confidence. Concurrently improvement were seen in early 21st century. However, WHO standard of 95 % vaccine coverage not met until 2021 (Table 2).

Table 2 — Incidence of measles rubella and mumps in The Europe in the period of 2013–2020

	2013	2014	2015	2016	2017	2018	2019	2020
Measles	10271	3665	4001	4642	18363	17822	13200	12205
Rubella	38847	6110	2161	1264	696	558	380	420
Mumps	20936	1632	13567	14793	13694	11312	11200	10800

Table 3 — The vaccine status of patients with reported cases

	Unvaccinated	Not fully vaccinated	Fully vaccinated
2015	84.80 %	10.10 %	3.60 %
2016	87 %	7 %	4 %
2017	87 %	8 %	3 %
2018	82 %	11 %	7 %
2019	71 %	18 %	10 %

As we can see in the table 2, the data indicates a declining trend in measles cases compared to 2017 and 2018 data, but still much higher than the number of cases observed in 2015–2016, while an improving trend seen in rubella and mumps cases through the years. Although the vaccine status from table 3 suggesting an improved results in each year, more than 70 % unvaccinated people got infected.

Also, In 2019 – For the 12 435 cases with known age, the distribution of case numbers by age group was 11 %, 17 %, 11 %, 6 %, 7 %, 17 % and 32 % in the age groups. s <1, 1–4, 5–9, 10–14, 15–19, 20–29 and 30+ years of age, respectively, adding up to a total of 56 % of cases above the age of 14 years. In 2018, among the 17 800 cases with known age, the distribution of case numbers by age group was 14 %, 21 %, 13 %, 8 %, 8 %, 15 % and 21 % in the <1, 1–4, 5–9, 10–14, 15–19, 20–29 and 30+ years age groups, respectively. In addition, in 2017 of 14 600 cases, 5 590 (38 %) were aged ≥20 years and 5 350 (37 %) were children.

Parents are expected to consider the best interest of their child in medical decision-making, focusing on their child's medical, emotional, and social needs, rather than their own social or emotional interests. If we summarize the reasons for recent upsurging trend for vaccine hesitancy. Parental hesitancy towards MMR Vaccinations can be classified into the following:

1. Parent's knowledge: A recent study found that 8 % of parents believed it was better to get the disease naturally rather than receive an immunization for protec-

tion. Also personal experience with a limited form of the disease may have led parents to believe that disease-related risks are low and to underestimate the risk of complications from infection.

2. Mistrust toward government, vaccine institutions, or pharmaceutical companies: ongoing and frequent changes to the childhood vaccine schedule on a national scale, and by physicians within local practices can raise doubts among parents about the importance of strictly adhering to the recommended vaccine schedule

3. Social religious-cultural beliefs and socioeconomic status: Religious objections to vaccines are generally based on (1) the ethical predicaments associated with using human fetal tissue cells to create vaccines, and (2) beliefs that the body is sacred, should not receive certain chemicals, blood, or tissues from animals, and should be healed by a god, or by natural means

Lower-income was the only socio-demographic characteristic independently associated with vaccination opposition. Socioeconomic factors such as the number of siblings and the father's education level were the most important predictive factors for having missing or no vaccinations

4. Mass media, social media influence: the inaccurate/false information being easier to access than accurate information when researching risks and anti-vaccination groups being more active than pro-vaccination also fueled vaccine hesitancy

Conclusion

Parental vaccine hesitancy is a growing public health problem. As described above, challenges to maintaining coverage include overcoming factors influencing hesitancy on MMR vaccines. Public health advocates and health care professionals can make the strategies such as enforcing school mandates for immunization, minimizing policies that promote non-medical exemptions, and maintaining financial support for vaccination. Novel strategies are needed to address parental vaccination attitudes. Possibly, reassurance by the medical staff and publicity by the health system, delivering a sensible explanation of the vaccine's importance, would increase parents' preference to vaccinate and boost the rate of vaccinated population.

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