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Original Article

Parental knowledge and attitudes about Meningococcal infections and vaccination

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Abstract

Aim: *Neisseria meningitidis* is the cause of sepsis and meningitis with high mortality and morbidity. Vaccination is the most effective way to prevent infectious diseases. There are 4 different meningococcal vaccines that can be applied in our country and these vaccines are not yet available in routine vaccination program. It was aimed to determine the knowledge level of parents with children under 5 years of age about invasive meningococcal disease and their attitudes towards the administration of meningococcal vaccines, which are not included in the routine immunization program, to their children.

Materials and Methods: A questionnaire consisting of 17 questions was applied to parents of children under the age of 5, who applying to pediatric outpatient clinics for any reason. Nine of the questionnaire questions were about sociodemographic characteristics, routine control and vaccination. The remaining 7 questions were about meningococcal infection, transmission routes and vaccines.

Results: A survey was conducted with a total of 224 parents, 142 (63.3%) female and 82 (36.7%) male. Two hundred-two of the parents (90.1%) stated that they had all routine vaccinations on time for their children. Eighteen parents (8%), could not have all vaccines on time due to pandemic and health problems. Sixty-two (27.6%) parents reported that they knew about meningococcal disease. Only 56 (25%) of the parents stated that they knew at least one meningococcal vaccine. After brief information about meningococcal infection and vaccines, 114 parents (50.8%) stated that they wanted their children to be vaccinated.

Conclusion: When parents are informed about the meningococcal disease and its severity and then recommended vaccination, the vaccination rate will increase significantly. It is important for healthcare professionals to be more aware of this issue and to inform families.

Keywords: Meningitidis; meningococcal vaccine; parents; sepsis

INTRODUCTION

Neisseria meningitidis (N. meningitidis) causes meningitis and sepsis, with high mortality and morbidity in children and adults. After the addition of *Streptococcus pneumonia* and *Hemophilus influenza* vaccines to the routine vaccination program in Turkey (2008), *N. meningitidis* is seen as the most common cause of sepsis and meningitis. It is also one of the most feared disease factors because it causes epidemics (1). A study conducted in Turkey in 2014 found that it was the most common cause of childhood bacterial meningitis, with a rate of 51.6% (2).

Invasive meningococcal disease is rare, but it is an important condition to study due to its serious complications. Although the mortality rate varies between 10–15%, especially with the use of penicillin and 3rd generation cephalosporins, it causes serious morbidity, such as neurological complications, vision and hearing loss, and extremity amputations with a frequency of 20–40% (3,4).

Neisseria meningitidis is transmitted via nasopharyngeal routes at a rate of 3–25%. In our country, carriage was found to be 6.3% for those between the ages of 10–24. Adolescents and young adults have the highest carrier rate (5,6)

The only reservoir for the bacteria is humans, and contamination occurs through droplets or contact with the secretions of an infected person (7). The disease is most common for children under two years of age in developing countries and over 10 years of age in developed countries. It can spread very quickly, especially in crowded environments, such as nurseries and troops (7,8). Low socioeconomic status, exposure to smoking, viral upper respiratory tract infections, travel to epidemic areas, functional or anatomical asplenia, and complement C5-C9 deficiency are also considered risk factors for invasive meningococcal disease (9).

Vaccination is the most effective way to prevent infectious diseases. The rate of vaccination following the 2018

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expansion of the immunization program in Turkey was between 92–98%. By 2019, it was between 96–99% (10).

Neisseria meningitidis is divided into 13 serogroups according to the polysaccharide capsule it carries. Serotypes responsible for invasive diseases are A, B, C, Y, X, and W. Conjugated and polysaccharide vaccines containing these serotypes have been produced to prevent meningococcal diseases (6,11).

Polysaccharide vaccines are not administered for children under two years of age because they do not stimulate a sufficient immune response and are especially preferred for adults above 55 years of age. Conjugated vaccines are used in the pediatric age group (12,13).

The conjugated meningococcal vaccine, which was first licensed in Turkey in 2012, contains four serotypes (A, C, Y, W) (14). The serogroup B vaccine was licensed and began to be used in 2018. Four different meningococcal vaccines have been available in Turkey since 2018, and none of them have been added into the routine immunization program (15).

The aim of our study is to determine how much knowledge parents with children under five years of age have about invasive meningococcal disease and to determine their attitudes towards having their children receive the meningococcal vaccine, which is not included in the routine immunization program.

MATERIALS and METHODS

A questionnaire was conducted along with face-to-face interviews with the parents of children under five years of age who were admitted for any reason to the pediatric outpatient clinics of our hospital between December 2019 to June 2020. The population of children 0-5 years old, living in our city 102014. There is no incidence study on meningococcal vaccination in our country. In some studies conducted in Europe, the mean vaccination rate was found to be 13% (16). With a confidence level (CI) of 95%, and the arbitral relative precision of 6% points on each side, a sample of 174 parents of children 0–5 years old was needed for the purpose of this study (17). Two hundred and fifty questionnaires were planned, but 26 parents refused to do the survey because they did not have time and did not want to participate in the survey. Two hundred and twenty-four patients were invited to participate. Therefore, the required condition for a minimal sample size was fulfilled. The survey was not offered to foreign parents due to communication barriers. Parents who were healthcare professionals were also excluded from the study because they already possessed knowledge about meningococcal infection and vaccines. Participants were asked a total of 16 questions: nine were about sociodemographic characteristics, well-child visit, and routine vaccination of their children, and seven were about meningococcal infection and vaccination.

After the parents were informed about the questionnaire and their consent was obtained, the questions were directed by the same doctor using the face-to-face interview method. Approval for the study was obtained from our hospital's non-invasive ethics committee (approval number: 325/2021).

Statistical Analysis

The program "Statistical Package for Social Sciences" version 22 was used for statistical analysis. Number, percentage, mean, and standard deviation were calculated from descriptive statistics. When necessary, comparative analyses were made using the chi-square test. The P <0.05 value was considered significant.

RESULTS

The 224 parents who consented to participate in the questionnaire were asked the 16 questions on the questionnaire form using a face-to-face interview method. Of the participants, 142 (63.3%) were female and 82 (36.7%) were male. The mean age of the parents was 31.9 ± 7.1 years (18-67). The epidemiological data for the participants are shown in Table 1. Of the mothers who participated, 27% were primary school graduates, 35.9% were high school graduates, and 36.5% were university graduates. Of the fathers, 17% were primary school graduates, 45% were high school graduates, and 44% were university graduates.

Table 1. Epidemiologic features of parents

Age (year) (mean±SD)	31.9±7.41
Gender, n(%)	
Female	142 (%63.3)
Male	82 (%36.7)
Number of child, n(%)	
1	63 (%28.1)
2	89 (%39.7)
3	57 (%25.4)
>3	15 (%6.7)
Education status, n(%)	
Primary school	53 (%23.6)
High school	88 (%39.2)
Univercity	83 (%36.6)
Monthly income, n(%)	
<2500 TL	41(%18.3)
2500-5000 TL	84 (%37.5)
>5000 TL	88 (%)

While 173 of the parents (77.2%) stated that they took their children for routine well-child visit, 51 parents (22.8%) stated that they did not. When asked about the vaccines in the routine vaccination program, 202 parents (90.1%) stated that their children had gotten all the routine vaccinations on time, and 18 parents (8%) stated that their children's vaccinations were not complete due to the pandemic and other health problems. Four (1.79%) parents stated that they had never had their children vaccinated.

In response to the question of whether they had information about childhood vaccinations that are not included in the routine vaccination program, 110 parents (49.1%) stated that they did not know about any of them, and 114 (50.9%) parents stated that they knew about at least one vaccine. The educational status of the parents and their knowledge levels about routine and paid vaccinations, meningococcal disease, and meningococcal vaccines are compared in Table 2.

Parents were asked which other vaccines they knew those were not included in the routine vaccination schedule. If they knew of more than one vaccine, the responses were recorded separately. Of the parents who answered, 50% stated that they did not know any special vaccines, 25% stated that they only knew the rotavirus vaccine, and 25% stated that they knew both the rotavirus and meningococcal vaccines.

When asked about their levels of knowledge regarding meningococcal infection, 62 parents (27.6%) stated that they had information about the disease; of these parents, 39/62 (62%) stated that they knew its severity. When parents were asked whether they had information about the mode of transmission of meningococcal infection, 29/62 (46.7%) answered that it was transmitted by droplets and close contact. Of the parents who were asked about their knowledge of meningococcal vaccines, 56 (25%) stated that they knew at least one of four meningococcal vaccines, and 168 (75%) stated that they did not know any of them.

When the 56 parents who said that they knew about the meningococcal vaccines were asked from what source they received the information, 15 (26.7%) stated that their doctor gave information, 12 (21.4%) learned from the internet, 10 (17.8%) from their doctor and the internet, and 19 (32%) from their doctor, the internet, and their immediate surroundings. Forty percent of the parents who said they had received information from their doctors stated that they wanted to have the vaccines.

After information about meningococcal infections and vaccinations was given by the doctor conducting the survey, the parents were asked whether they wanted these vaccinations. Of the 224 parents asked, 114 (50.8%) stated that they wanted to have the vaccines, while 110 (49.2%) said they would not.

When the parents who did not want to have the vaccines were asked for their reasons in an open-ended question, 30 (13.9%) parents did not see them as necessary, 19 (8.4%) could not get them because they were expensive, 18 (8%) were afraid of their side effects, and the remaining 43 (39%) reported multiple reasons, such as cost, side effects, and anticipation of pain.

Table 2. Educational status of parents and knowledge level about disease and vaccination

Education status	Primary school	High school	Univercity
Helath child visit n (%)			
Yes	33 (62.2)	73 (83)	67 (80.7)
No	20 (37.7)	15 (17)	16 (19.3)
Is routine vaccination complete? n (%)			
Yes	49 (92.5)	79 (89.8)	74 (89)
Missing	4 (7.5)	8 (9)	6 (7.3)
No	0	1 (1.2)	3 (3.7)
Does he/she know the vaccinations not in the routine vaccination? n (%)			
Yes	9 (17)	36 (41)	69 (83)
No	44 (83)	52 (59)	14 (17)
Does he/she know about meningococcemia? n (%)			
Yes	3 (6)	9 (10)	33 (40)
No	50 (94)	79 (90)	50 (60)
Does he/she know the seriousness of meningococcemia? n (%)			
Yes	2 (4)	4 (5)	33 (40)
No	51 (96)	84 (95)	50 (60)
Does he/she know the way to get infected? n (%)			
Yes	1 (1.9)	4 (5)	24 (29)
No	52 (98)	84 (95)	59 (71)
Does he/she know about meningococcal vaccines? n (%)			
Yes	2 (3.7)	8 (9)	46 (55.4)
No	51(96.3)	80 (91)	37 (44.6)

DISCUSSION

In Turkey, there are four different childhood vaccines to protect against invasive meningococcal infections. These vaccines are not yet included in the routine vaccination program (18).

These vaccines are important in preventing invasive meningococcal infections, which have high morbidity and mortality. This study aimed to determine the knowledge levels of parents about the diseases and their vaccines and ascertain parental attitudes towards the vaccines. It was observed that a small number of parents (25%) had information on this subject.

Survey studies can determine the success of preventive medicine practices. In particular, the feedback received regarding vaccination and awareness efforts will guide new studies on this subject. In a study evaluating the knowledge level of families regarding childhood vaccinations, 97.7% of the parents stated that childhood vaccinations were necessary, and 93.9% stated that their children's vaccinations were complete (19). In a study conducted by Odusanya et al. (20) in Nigeria, 99.1% of the parents surveyed stated that the vaccines were beneficial and that their children were fully vaccinated. In our study, 90% of the parents stated that they had all the vaccines in the routine vaccination program, while 8.3% of the parents who said that they had incomplete vaccinations stated that the vaccinations could not occur due to health problems and the COVID-19 pandemic. These studies reveal that the level of knowledge of parents regarding the benefits and necessity of routine vaccinations is quite high. The low rate of complete vaccinations in our study compared to previous studies was attributed to COVID-19 restrictions.

In a study conducted in Kenya, the education level of the mother was found to be directly proportional to the children being fully immunized (21). In this study, no relationship was found between the educational status of the participants and whether their children were fully immunized. Interestingly, three of the four parents who stated that they did not have any vaccinations were university graduates.

Healthcare professionals play important roles in informing about and performing routine and non-routine vaccinations. In a study conducted in Spain, 95% of the parents surveyed saw pediatricians as the most important source of information on immunization. It was also emphasized that parents who would normally avoid vaccinations tended to be vaccinated upon the advice of their doctors (22). In a study conducted in Turkey assessing pediatricians' levels of knowledge about meningococcal infections and vaccines, it was reported that 87.6% of the participants have information about these vaccines and 40% recommended the vaccines to all of their patients (7). In our study, 40% of the parents who received information about meningococcal vaccines from their doctors stated that they wanted the vaccines.

Meningococcal infections are most common in developing countries in patients under two years of age, and invasive diseases are seen in infants under one year of age (7). For this reason, it is vital that parents have information about meningococcal diseases and vaccinations and have their children vaccinated. In a study evaluating parental approaches to meningococcal serogroup B vaccines in Italy (23), 71% of the parents surveyed stated that they had no knowledge about meningococcal meningitis, while only 34% reported that they had information about its etiology. In our study, 27% of the participants had information about meningococcal diseases, while 25% stated that they knew about at least one meningococcal vaccine.

After a briefing by the doctor during the survey application, 50.8% of the parents answered that they wanted to have the vaccines. This suggests that information given to parents by healthcare professionals about vaccines and diseases can increase the frequency of vaccine administration.

Because meningococcal vaccinations are not included in the routine vaccination schedule in Turkey, they are administered for a fee. For this reason, it is also a matter of curiosity as to how much having to pay for the vaccine affects the decision to have it. Of the parents whose reasons for not having meningococcal vaccines questioned, only 8.4% stated that they would not have them because it was expensive.

CONCLUSION

Given these results, it is likely that the vaccination rate will increase significantly when information regarding the vaccines and the severity of the meningococcal diseases are provided to parents. For this reason, it is especially important that physicians working in primary healthcare institutions and pediatricians are more conscious of this issue and make efforts to inform parents about the importance of these vaccines.

Competing Interests: The authors declare that they have no competing interest.

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Ethical Approval: The study protocol was reviewed and approved by the scientific ethics committee of non-invasive researches of Inonu University (date: 05.09.2017, number: 19-10).

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