

# Respiratory syncytial virus immunization in Sakarya, Turkey

## Abstract

**Background:** Respiratory Syncytial Virus (RSV) is an important respiratory agent causing acute respiratory tract infections in every age group, especially below two-year old infants. Congenital heart disease and prematurity are the leading risk factors. RSV immunization aims to prevent RSV among risk groups and is found to be efficient and safe. The aim of this descriptive study was to determine the frequency of admission to the hospital with the diagnosis of respiratory tract infections in children after RSV immunization and the opinions of the mothers about immunization, between October 2015 and March 2016.

**Methods:** After ethical approval, the institution was informed about the methodology of the study. This study was conducted with mothers of babies younger than 24 months and who were immunized between October 2015 and March 2016. The data were collected through a questionnaire that was prepared by the researchers themselves. The data collected were analyzed in the computer environment by calculating percentages and averages.

**Results:** All children were under their mothers' attendance ( $n=58$ ;  $29.0\pm 5.4$  years; 50% primary/secondary school graduate, 79.3% not working, 70.7% nuclear family; 72.4% of middle-income level. Hospitalization duration at Newborn Intensive Care Unit was between 2 and 180 days (median 72 days). Ages of children were between 3 and 24 months, 40 of them were diagnosed with a chronic health situation; 23 of them had congenital heart anomaly/disease. Thirty-four children were on continuous medication. Hospitalization due to respiratory system infection in five months time before March was 9 days among 39 children who had respiratory system infection during the same period of time. According to most of the mothers ( $n=31$ ) immunization was protective against infections, and six mothers declared that the immunization was not safe.

**Conclusion:** The results showed that well planned prospective and local RSV studies are needed to make conclusions on routine RSV immunization need.

**Keywords:** respiratory syncytial virus, immunization, prematurity, newborn, bronchopulmonary dysplasia

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**Abbreviations:** RSV, respiratory syncytial virus; RTI, respiratory tract infections; CLD, chronic lung disease; CHD, congenital heart disease; BPD, bronchopulmonary dysplasia

## Background

Respiratory tract infections are among the top four causes of morbidity and mortality in adults and children in Worldwide.<sup>1,2</sup> Due to variety and difficulty of detecting viruses that cause respiratory infections, etiological diagnostics of viral infections has been limited with epidemiological purposes mostly. Widespread use of antiviral drugs in respiratory tract infections (RTI) made it necessary to detect the agent.<sup>1</sup> Particularly recurrent RTI in children and nosocomial infections pose a public health risk. Bacteria, viruses and parasites causes RTI, approximately 20-60% of these infections are viral.<sup>2</sup> The most important cause of lower respiratory tract infection in infancy and children younger than 2 years is respiratory syncytial virus (RSV) and highly contagious.<sup>2,3</sup> For severe RSV disease; risk groups are children who have chronic lung disease (CLD), bronchopulmonary dysplasia (BPD), hemodynamically impaired congenital heart disease (CHD), neuromuscular and immune deficiency diseases, and prematurity.<sup>4,5</sup>

Seasonal features are important in RSV infection. Northern hemisphere epidemics associated with RSV occurs between October and June.<sup>6,7</sup> RSV infections are the most important leading causes of severe respiratory diseases that require hospitalization. Infections are common in winter in temperate climates and, in the rainy season in tropical climates. Akçalı et al.<sup>1</sup> carried their study in March because RSV was reported mostly between January-March.<sup>7</sup>

RSV cannot be cured but can be prevented.<sup>8</sup> Due to the lack of a specific treatment against RSV, palliative treatment methods are often used. In patients with severe RTI, ancillary breathing methods can be used as a treatment option.<sup>9</sup> Prophylaxis is used for the control of severe infections. For this purpose polyclonal RSV intravenous immunoglobulin (RSV-IVIG) and monoclonal antibodies (palivizumab) are used. Prophylactic antibody treatment is recommended only for high-risk patients due to the high cost.<sup>10,11</sup>

To protect against RSV infection education of the children and families about hand washing and the environmental cleaning, isolating infants and children with infection and, RSV prophylaxis (palivizumab) for children under risk are recommended.<sup>6,8</sup> The aim of this study was to determine the frequency of admission to hospital with

the diagnosis of respiratory tract infections after RSV immunization and the opinions of the mothers about immunization.

## Materials and methods

This descriptive study was carried out at a State Hospital in Sakarya between October 2015 and March 2016. The population of the study consisted of 58 mothers after being informed by the researchers who agreed to participate, have babies younger than 24 months, meet the inclusion criteria (under 29 gestational weeks and, babies with cardiac problems that impair hemodynamic) and were immunized with Palivizumab (Synagis). Palivizumab (Synagis), a human monoclonal antibody against the RSV fusion protein, has been demonstrated to substantially reduce hospitalization for severe RSV in large clinical trials involving preterm infants.<sup>12</sup> Mothers who did not accept to join the study (n=5) and whose children were still staying in the intensive care unit during data collection (n=1) were excluded from the study.

The mothers who met the inclusion criteria were informed about the objective of our study. They were informed that the data about their children would be kept private and they had the right to leave the study at any time. All the mothers who agreed to participate in this study also gave written permission after reading the informed consent form. The study was approved by the Ethical Board of Sakarya University and study started after receiving approval from related local authorities. The data were collected by face-to-face interviews with the mothers. The mothers were interviewed by using a questionnaire which was prepared by the researchers.

## Results

All children were under their mothers' attendance. The mean age of the mothers (n=58) was 29.±5.4 years, and 50% of them were primary school graduates, 79.3% was not working, 70.7% was living in a nuclear family; 72.4% was of middle-income level Table 1.

**Table 1** Descriptive characteristic of mothers

Characteristics	n	%
<b>Education level</b>		
Primary school	20	34.5
High School	29	50
University	9	15.5
<b>Working status</b>		
Working	12	20.7
Not working	46	79.3
<b>Family Type</b>		
Nuclear family	41	70.7
Extended family	17	29.3
<b>Economical situation</b>		
Good	41	70.7
Middle	17	29.3
Bad	41	70.7

Mean rates of pregnancy was 1.90±0.83 (min:1, max:3), number of living children was 1.71±0.70 (min:1, max:4), and duration between

the last pregnancies was 3.11±1.26 years. Minimum number of doctor visits during the last pregnancy was 2 (max: 15); majority of births took place at a hospital (n=56).

Mean age of children was 12.22±5.37 months, mean week of gestation was 31.10±6.05 and birth weight average was 1683.71±1116.70gr (min: 610gr, max: 4000gr). Birth age of 38 children was shorter than 37 weeks and 38 children's birth weight was below 2000gr. Average stay at Newborn Intensive Care Unit (NICU) was 66.36±39.33 days, Mean RSV Prophylaxis Dose was 4.21±1.28 times Table 2.

**Table 2** Descriptive characteristics of the children

Variables(n=58)	Min	Max	Mean±SD
YAge (Month)aş	3	24	12.22±5.37
Gestation (Week)	23	41	31.10±6.05
Birth weight (gr)	610	4000	1683.71±1116.70
Length of stay (NICU)*	2	180	66.36±39.33
RSV prophylaxis dose	1	5	4.21±1.28

\*Neonatal Intensive Care Unit.

Six of the mothers had a history of premature baby; the most frequently (n=43) mentioned difference between term and premature baby was "growth and development". Hospitalization duration at NICU was between 2 and 180 days (median 72 days). Ages of children were between 3 and 24 months and 40 of them had a diagnosed chronic health situation; 23 of them with congenital heart anomaly/disease Table 3. Thirty four children were on continuous medication. Prevention against infections was the most frequently (n=31) mentioned benefit of the vaccine and six mothers declared that the vaccine was not safe. Hospitalization due to respiratory system infection in five months time before March was 9 days among 39 children who had respiratory system infection during the same period of time.

**Table 3** Indications and number of children\*

Indication	Number of children
Younger than 2 years, under medical care for chronic respiratory disease for 6 months	31
Younger than 2 years, cyanotic or non-cyanotic heart disease	23
Younger than 12 months, Birth age<29 weeks	20
Children younger than 12 months and who have congenital anomaly or neurologic disease that effect respiratory system	10

\*Due to more than one indication the total is greater than the study group (n=58).

## Discussion

Although the incidence and intensity of RSV infections vary at each year, it is one of the main factors that cause infection.<sup>13</sup> It is estimated that 132,000-172,000 children under five years of age require medical care in the US each year.<sup>14</sup> Furthermore, in many countries, RSV is comparable to influenza regarding mortality rates and health and

economic burdens in children.<sup>15</sup> In Turkey, it is estimated that there are 30,000-45,000 hospital admissions per year due to RSV among children under five years.<sup>7</sup> In a study in Turkey, 376 children under two years of age were hospitalized every year in Bursa due to RSV-RTI and this figure is estimated as 18,800 for Turkey (12). Hafizoglu et al.<sup>9</sup> presented 50 children between 2 months and 1 year age who admitted to the emergency with lower RTI. RSV antigen was positive in 23.<sup>9</sup> Frobert et al.<sup>16</sup> found RSV as the most frequently detected virus in intensive care unit.<sup>16</sup> In another study RSV was the most frequently detected agent 61.2 % (41/67) among 160 children.<sup>1</sup> In our study, 39 mothers reported that their children's diagnosis were related to respiratory system.

RSV infection is usually resolves spontaneously in healthy children. However, premature infants require hospitalization and intensive care.<sup>17,18</sup> Karaman et al.<sup>19</sup> reported asthma attacks and wheezing in children who had RSV infection history.<sup>19</sup> There is evidence that palivizumab prophylaxis is effective in reducing the frequency of hospitalizations due to RSV infection, i.e. in reducing the incidence of serious lower respiratory tract RSV disease in children with chronic lung disease, congenital heart disease or those born preterm.<sup>20</sup> Blanken et al reported a relative reduction of 61% in the total number of wheezing days during the first year of life among 429 premature children with palivizumab.<sup>21</sup> Furthermore, limited studies reported that RSV immunization reduce the rate of hospitalizations due to RSV infection.<sup>22-25</sup> In our study, hospitalization with a diagnosis of respiratory infection among immunized children was 23% (9 out of 39 patients) which implies a desired immunity.

The mothers' knowledge and "feeling" were mostly (31/39) related to protective effects of RSV vaccine. In the current medical literature there aren't any papers on mothers' knowledge on RSV vaccine. In this respect, our study is the first study on this subject in our country and the results seem to support the necessity of further investigations.

### Study limitations

We were not able to track the families' education on RSV immunization and their knowledge about protection from infections.

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### Conflict of interest

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