

Study on parental perception and approach regarding community acquired pneumonia in preschool children from Romania

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ABSTRACT

Introduction. Community acquired pneumonia is a common disease that accounts for 16% of all deaths in children aged 5 years or younger. The purpose of the study was to identify potential modifiable factors in relation with parental perception of pneumonia management in children. Outlining such factors would allow development of approaches in order to reduce pneumonia-associated morbidity.

Methods. A cross-sectional study was conducted between 25th and 27th August 2016. It consisted in distributing a Google Form to parents of children aged between 4 months and 5 years via online social platforms. The questionnaire was structured in 5 sections with 26 questions. Data collection and statistical analysis were done using Microsoft Office Excel Worksheet.

Results. 1083 parental answers were received and analyzed.

Regarding vaccinal status we received following data: 973 (89.8%) children were vaccinated according to Romanian Ministry of Health Schedule and 90 children are incompletely vaccinated or unvaccinated.

378 children were never breastfed or exclusively breastfed for less than 4 months. 32% (352) were complementary fed before the age of 4 months and 19% (201) after 6 months.

46.91% (508) of children had experienced in the past Acute Respiratory Tract Infections and 42.41% (215) of them were admitted. The most frequent two symptoms that would cause parents to generate an unscheduled ED visit were fever [in 47.83% (518)] and cough [in 19.58% (212)]. 38.87% (421) of respondents gave their child medication without physician's advice and 61.3% (358) used analgesics and antipyretics.

Pneumonia has been recognized as a serious illness, potentially life threatening, by 69.07% (748) of parents.

Discussion. There is evidence of correlation between morbidity and mortality in childhood pneumonia and parental educational and socio-economic status. Aim of our study was to explore other factors that impact parental perception, in this era of significant changes in social behavior and communication.

Conclusion. The decrease in the vaccine coverage rate in Romania (89% in this group selected by patients with access to Social Media) led to a decrease below the threshold for maintaining herd immunity.

Romanian parents responding to this questionnaire achieved a good score in symptom recognition and severity assessment of pneumonia. A large number of respondents surveyed in a short time is an indicator of parental desire to be informed and involved in decision-making. This recent change in parental behavior in our country could generate alternatives to existing educational strategies.

Developing medical information platforms for Social Media, translated in local language, could impact parental perception and child pneumonia morbidity in our country.

Keywords: pneumonia, child, education, social media

INTRODUCTION

Community-acquired pneumonia is generated by pathogens acquired from a non-health care environment and is the most common lethal infection in children aged 5 years or younger. It was responsible for 16% of deaths in 2015 (1,2,5). In spite of

dramatic fall of deaths in preschool children due to pneumonia between 2000 and 2015 (they were halved worldwide), numbers remain extremely high: 922,000 deaths per year, 2,500 deaths per day and 100 deaths per hour (5). Deaths occur mainly in underdeveloped or developing countries, 6 out of 10 deaths occurring in only 10 countries – Nigeria,

Angola, Chad, Ethiopia, Democratic Republic of Congo, China, India, Pakistan, Afghanistan, Indonesia (5,6).

In this age group, community-acquired pneumonia shows the highest hospital admission rate and generates increased medical costs (3,4).

Only 3/5 of children with pneumonia receive appropriate care. The incidence rate can be reduced by effective and simple methods such as adequate hygiene and water supply, indoor air quality, exclusive breastfeeding for the first 6 months of life and routine vaccination (including measles) (5).

Measures should be implemented in order to reduce morbidity and mortality of pneumonia. WHO experts have identified these strategies: anti-pneumococcal vaccination, affordable diagnostic and treatment devices [cheap pulse oximetry], cost-effective drug therapy. Amoxicillin as dispensable tablets has a cost of below 50 cents and is considered to be the most cost-effective current therapeutic intervention (5).

OBJECTIVES OF THE STUDY

The main objective of this study is to evaluate the level of knowledge regarding respiratory infections and pneumonia in parents of pre-school children. Secondary objectives were to identify reasons for choosing potentially harmful behaviors for children's health in terms of vaccination and feeding.

METHODS

A cross-sectional study was conducted between 25th and 27th August 2016 using a Google Form questionnaire (Appendix 1). We targeted parents of young children aged between 4 months and 5 years. This form was allocated to social platforms attended by parents. The questionnaire was structured in 5 sections with 26 questions. 1146 people filled-out the form but only 1083 answers were included. 61 were excluded because clerical errors and 2 were ineligible because they were living abroad and had other vaccination schemes (Appendix 2 – the design of the study).

The purpose of this study was thoroughly explained and completing the form represented parental agreement for participation. The form complies with Good Clinical Practice Guidelines: no personal data fields were included (names, national identification number or other personal data) in order to keep strict confidentiality throughout the study and data analysis.

In order to avoid influence and to eliminate bias, the respondents' level of knowledge was assessed with an open-ended question. All the answers were embedded in a score assessment of parents knowledge (Table 1).

TABLE 1. Assessment of knowledge score regarding symptoms of pneumonia

Clinical manifestation	Points
– Fever/Chills	1p
– Cough	1p
– Changes in breathing/chest pain (excluding pain described as „pain in the middle of the chest“)	1p
– Nonspecific symptoms: ill appearance, loss of appetite, restlessness, vomiting	1p

RESULTS

Demographic data were analyzed. Number of people living in the child's dwelling: in 94.74% of cases (1026) the child lives together with both parents, 4.34% (47) with one of his parents and ~1% (10) with his grandparents or other caretakers. The status of the parents' / guardians' employment was analyzed: 44.88% (486) mothers are on parental leave and 34.16% (370) are currently active. Regarding the status of the fathers, 94.74% (1026) are active and 1.48% (16) are on child-raising leave. In terms of educational level 71.74% (777) of mothers and 54.48% (590) of fathers had achieved more than compulsory basic education.

Daycare of children was analyzed - see Fig. 1. Of these children 2,79% (11) are in small groups (less than 5 children), while 37,56% (148) are in a large group (over 20 children). Respondents were questioned about extra-curricular activities undertaken by children; 75,07% (813) do not attend extra-curricular activities and 24,93% (270) do.

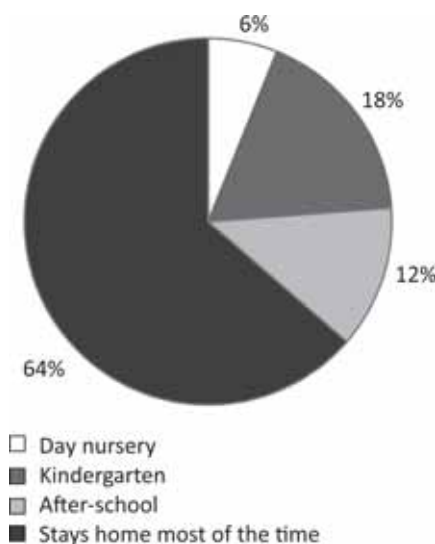


FIGURE 1. Child in the community

The vaccine status of the children was analyzed: 973 were vaccinated according to the Romanian Ministry of Health schedule, 20 children (1,85%) also had also optional vaccines and 90 of the children (8,31%) were vaccinated partially or not at all. Parents of partially or unvaccinated children have indicated the following reasons for this choice - see Table 2.

TABLE 2. Reasons for choosing not to vaccinate or to vaccinate only partially.

Reasons	Number of respondents
I do not know/do not answer	22
Distrust of their efficiency/safety	21
Fear of side effects	21
Because of the child's medical history	11
I experienced post-vaccine adverse reactions in my children	8
Information issues	4
Missing vaccine on the market	3

Natural feeding time (exclusive breastfeeding without food, water/tea/formula) was analyzed: 705 children were breastfed for 4-6 months, 378 children less 4 months or never. The reasons for choosing a unhealthy diet were evaluated through an open question to avoid influencing respondents' response, as illustrated in Table 3.

TABLE 3. The reasons for choosing a unhealthy diet

Reasons	Number of respondents
I do not know / I do not answer	270
Lack of quantitative / qualitative milk	47
Maternal medical conditions / multiple pregnancy	34
Child refused breastfeeding / Did not take enough milk	15
I was not informed / supported to breastfeed	11

TABLE 4. Red flags: when to see a doctor?

Red flag	Number of respondents	Percentage
Fever	518	47.83%
Cough	212	19.58%
Trouble breathing	182	16.81%
I do not know / At any symptom	60	5.54%
Runny nose	52	4.80%
Wheezing / Grownl	34	3.14%
Ill appearance	20	1.85%
Vomiting	3	0.28%
Sore throat	1	0.09%
Ear pain	1	0.09%

Frequency of Acute Respiratory Tract Infections (ARTI) was analyzed, 46.91% (508) having ARTI and 53.09% (575) did not had ARTI. Of the children who had ARTI 42.41% (215) required admission. Parents were asked by a open-ended question what is the red flag symptom that influences them to visit the doctor. If the parents indicated several reasons, the first reason written by respondent was chosen, according to Table 4.

Parents were asked if they consider pneumonia a serious illness that can sometimes cause death. 69,07% (748) consider pneumonia a serious illness and 30,93% (335) do not consider pneumonia a potentially fatal illness. Regarding the ability of respondents to recognize the symptoms of pneumonia, they are presented in Fig. 2.

We also questioned how parents choose to administer children's medicines (shown in Fig. 3). Of the 584 respondents who took medication without asking for a doctor's advice or only the pharmacist's advice, 358 gave analgesics and antipyretics, 79 drugs not found on the National Medicines Agency's website, 48 received antitussive medications and mucolytics, 24 antibiotics and 75 other types of medicines.

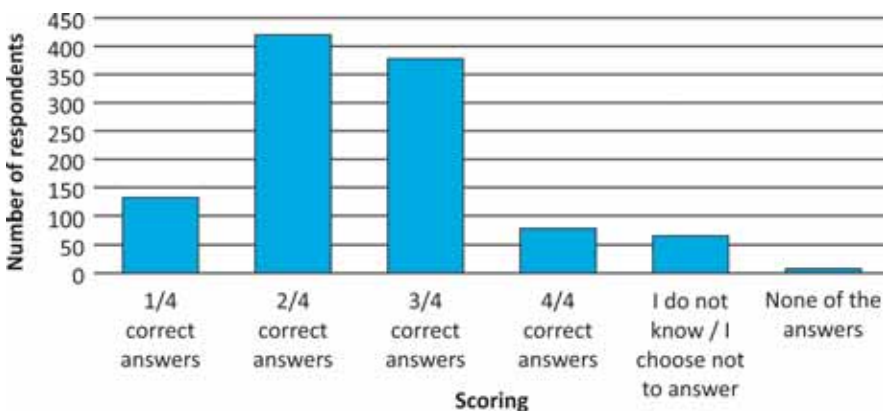


FIGURE 2. The ability to recognize the symptoms of pneumonia

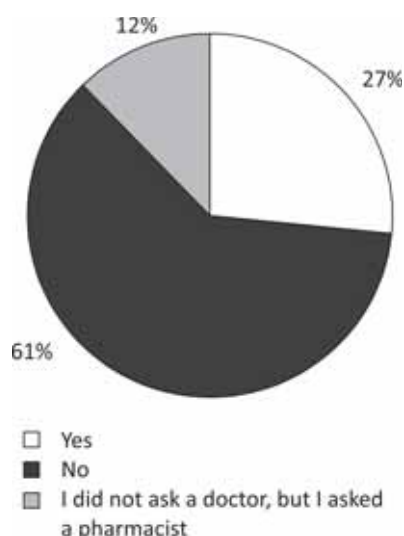


FIGURE 3. Did you ever been given medication to your child without asking for a doctor's advice?

Using the multivariate analysis, we documented a statistically significant relationship between the drug delivery pattern and the father's education level ($R^2 = 0.016$, $F = 0.0003$, correlation coefficient of -0.062 and $p < 0.001$).

DISCUSSION

We have chosen this age group because of increased pneumonia frequency and morbidity. Understanding parental current knowledge and perception can generate meaningful approaches in order to decrease the burden of respiratory diseases.

Current data support the significant influence of socio-economical and educational status of parents on pneumonia morbidity and mortality (7). Broadening perspective on parental perception can influence positive outcomes of various approaches.

Asthma and recurrent upper airway diseases increases the risk for pneumonia. Beside medical risk factors there are social and cultural risk factors. Parental or caretaker's literacy can influence pneumonia outcome in young children (8,9).

In order to explore modifiable factors we evaluated reasons for incompliance with immunization recommendations and feeding habits of parents from Romania. Understanding these real life aspects can improve physician-patient communication barriers with a direct and positive impact on pneumonia burden. Such an approach could influence also cost-efficacy aspects and indirect medical costs (medical leave for parents) (10).

Some of parental expectations regarding child health are not realistic. A local study documented that 67,82% of parents presenting in ED with a fe-

brile child expected a medical prescription for an antibiotic before a final diagnosis of disease (11). This misconception of Romanian parents should be addressed via efficient communication channels in order to present current data that support a high frequency of viral pneumonia in this age group (12).

Because we delivered the Social Media questionnaire during summer it is possible to have missed some of the negative parental beliefs, because in a continental climate the incidence of pediatric pneumonia has a seasonal distribution (13). Another weakness of our study was the global approach of respiratory infectious diseases without a clear separation between upper (UAD) and lower airway diseases (LAD). Current knowledge is presenting in separate analysis UAD and LAD and also familial context of disease (14).

Pneumococcal immunization started in August 2017, will impact burden of pediatric pneumonia in Romania, as in many other developed or developing countries (15). This outcome will decrease parental self-medication frequency and probably also the amount of antibiotic prescriptions for pediatric pneumonia. In present study we replicated literature findings that supported a strong correlation of low self-medication incidence with high paternal education level (16). It is significant for this study the relative high frequency (second place after fever-reducing drugs) of unsafe or unrecommended drugs in the self-medication instances.

Very high response rate in such a short time proves that Social Media could be a major research tool for parental perceptions and behaviors. Many parents are currently surfing on-line in order to find potential solutions to their unanswered questions in health-related issues. Inner-city parents from Romania are questioning first Social Media resources, before asking their doctor, 31% asking friends on-line, 32% reading blogs and 74% general forums (17). In a large and representative Social media page, Virtual Children's Hospital („Spitalul Virtual de Copii”) out of 80,000 followers there are more than 75,000 parents that like this page. So we can estimate a proportion of around 5% of parents that oppose science and conventional evidence-based data in Romanian Social Media.

CONCLUSIONS

Romanian parents that use Social Media have a good awareness of pneumonia in children, with a high recognition pattern. The significant number of responders proves the shift of parental behavior to empowerment and implication in a physician-pa-

tient partnership. There is a significant request of Social Media medical content in our country.

Traditional parenting models are changing slightly, father being more involved and more often responsible for a correct approach regarding medication in children.

Because of the structure of our approach – “single point survey” – it is possible to have missed changing patterns of parental behavior. Because computer-literacy is constantly increasing, in the

last decade in our country, there is a stringent need to reproduce these findings in the near future in order to increase accuracy.

Social Media communication has a significant impact factor and could be used to increase disease awareness and healthy behaviors.

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APPENDIX 1

APPENDIX 1. The questionnaire <i>* mandatory questions</i>	
Introduction: Hello! I am a 6th year student at the Medical and Pharmacy University (UMF) “Carol Davila” Bucharest and currently conducting a study on respiratory infections in pre-school children (ages between 4 months to 5 years) that will be used to complete my Graduation thesis. The data you will fill in this form will be used for the strict purpose of being interpreted statistically. I guarantee the full confidentiality of the data you fill in. Your completion of this form represents your agreement to participate in this study. Thank you!	
Section 1/6	
How many children do you have?*	
<ul style="list-style-type: none"> • 1 • 2 • 3 • 4 • Other (Specify) 	
Is your child / one of the children aged between 4 months and 5 years old??*	
<ul style="list-style-type: none"> • Yes • No 	
Section 2/6	The world of your children – let’s know each other! For the following questions please respond to the thought of your preschool children (4 months – 5 years)
The preschooler (4 month – 5 years) currently lives with:*	
<ul style="list-style-type: none"> • Both parents • One of the parents • Grandma • Other (Specify) 	
Number of people living with the child in the same house:*	
<ul style="list-style-type: none"> • 1-2 persons • 3-5 persons • More than 5 people 	
What affirmations best suit your baby (regular means more than 3 days per week)*	
<ul style="list-style-type: none"> • Regularly goes to nursery • Regularly goes to kindergarten • Remains regularly on after-school • None of the above, for the most part of the time he stays home 	
For children who spend most of their time at the nursery / kindergarten / after-school. How many children are in the group / class with your child??	
<ul style="list-style-type: none"> • Less than 5 children • 5-10 children • 11-20 children • More than 20 children 	
Does your child practice various extracurricular activities such as drawing, sports, dancing, etc?*	
<ul style="list-style-type: none"> • Yes • No 	
If so, how many colleagues are in the class / group / collective with it?	
<ul style="list-style-type: none"> • Less than 5 children • 5-10 children • 11-20 children • More than 20 children 	

Section 3/6	About the child
<p>Your child is currently vaccinated?*</p> <ul style="list-style-type: none"> • Yes, according to the Ministry of Health schedule • Other (specify) <p>If not, what caused you not to vaccinate?</p> <ul style="list-style-type: none"> • An open answer question <p>About exclusively breast-feeding, what affirmations fit you?*</p> <ul style="list-style-type: none"> • Yes, I've only fed him for breast less than 1 month • Yes, I've only fed him to breast for up to 2 months • Yes, I've only fed him to breast for up to 3 months • Yes, I've only fed him to breast for up to 4 months • Yes, I've only fed him to breast for up to 5 months • Yes, I've only fed him to breast for up to 6 months • Yes, I've only fed him to breast for more than 6 months • No, I never breast fed him <p>If your baby has not been breastfed, what were the main reasons why you made this choice?</p> <ul style="list-style-type: none"> • An open answer question <p>Your child was born prematurely*</p> <ul style="list-style-type: none"> • Yes • No <p>At what age did you start diversifying? *</p> <ul style="list-style-type: none"> • 2-3 months • 4 months • 5 months • 6 months • Over 6 luni 	
Section 4/6	Mother's opinion about diseases
<p>Had ever she or he suffered from acute respiratory tract infections / lung disease?*</p> <ul style="list-style-type: none"> • Yes • No <p>If the answer is yes, was hospitalization necessary?</p> <ul style="list-style-type: none"> • Yes • No <p>In a respiratory infection what you think is the symptom that would cause you to see your doctor immediately?*</p> <ul style="list-style-type: none"> • An open answer question <p>What do you think are the symptoms of pneumonia? (maximum 5)*</p> <ul style="list-style-type: none"> • An open answer question <p>Do you consider pneumonia the serious illness that can cause death frequently?*</p> <ul style="list-style-type: none"> • Yes • No <p>Have you ever given your child medications without consulting a doctor?*</p> <ul style="list-style-type: none"> • Yes • No • I did not go to a doctor, but I asked for the pharmacist's opinion <p>If so, what type of medication?</p> <ul style="list-style-type: none"> • An open answer question 	
Section 5/6	About parents
<p>The last form of education completed by mother?*</p> <ul style="list-style-type: none"> • 1 grade to 4 grade • 5 grade to 8 grade • 9 grade to 10 grade • 11 grade to 12 grade • Faculty • Master/PhD <p>The last form of education completed by father?*</p> <ul style="list-style-type: none"> • 1 grade to 4 grade • 5 grade to 8 grade • 9 grade to 10 grade • 11 grade to 12 grade • Faculty • Master/PhD <p>Currently working mother?*</p> <ul style="list-style-type: none"> • Yes • No • She is in child care leave 	

Currently working father?*

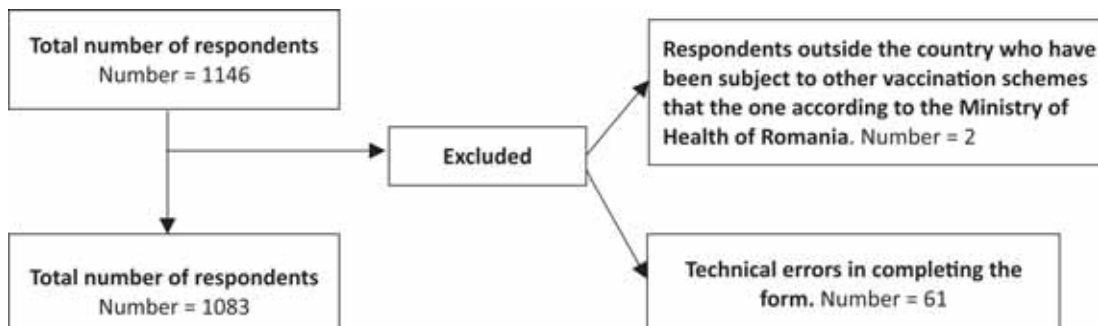
- Yes
- No
- He is in child care leave

Income per family member is (gathered all household income and divided by the number of people living there)*

- under 500 ron
- 500 – 1,500 ron
- Over 1,500 ron

Section 6/6

Thank you!

APPENDIX 2. Study design

Conflict of interest: none declared
Financial support: none declared

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