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Early childhood education professionals' knowledge about prevention, detection and treatment of acute respiratory infections in children

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ABSTRACT. The present study aimed to identify and compare knowledge and practices of early childhood education professionals from three public nursery schools (A, B and C) in the city of Florianópolis/SC relative to prevention, early detection and handling of acute respiratory infections (ARIs) in children aged between zero and six years old. A total of 120 educators answered a questionnaire. The instrument was composed of 15 close- and open-ended questions, five of which were scored. In statistical analyses, the Anova One-Way test revealed no significant differences for knowledge between professionals from the three institutions, with nursery school B having the highest mean score (6.12 ± 0.8), showing fair knowledge about child care. Overall results point to existing gaps concerning the need for guidance on these aspects of a child's health.

Keywords: child wellbeing; nursery schools; respiratory infections.

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Introduction

According to data of the World Health Organization, approximately 13 million children below five die every year around the world from diseases affecting the respiratory system (World Health Organization [WHO], 2013). Considered as a global public health issue, this type of death could be avoided by means of greater knowledge about early symptoms, better basic health conditions, and adoption of proper treatment measures (Bakonyi, Oliveira, Martins & Braga, 2004; Prato, Silveira, Neves & Buboltz, 2014; Wang et al., 2016).

In Brazil, acute and chronic respiratory diseases are first among major hospitalization causes in the Brazilian Unified Health System (*Sistema Único de Saúde*, [SUS]) and contribute to child morbidity and mortality rates (Prato et al., 2014). In 2010, more than 600,000 children below 14 years old were hospitalized for this reason, accounting for 46% of all SUS hospital admissions (Silva et al., 2013). In the south region, it reaches 17% of all public system hospitalizations (Chiesa, Westphal & Akerman, 2008; Silva et al., 2013). Worldwide, acute respiratory infections (ARIs) raise health service demands and correspond to 30 to 60% of outpatient care, which makes them a major cause of hospitalization in childhood (Organización Panamericana de la Salud, 2005; Pulgarín, Osorio, Restrepo, & Segura, 2011).

ARIs are characterized by respiratory system infections that affect the nose, throat, ears, larynx, bronchi and lungs (Monteiro, Enders & Medeiros, 2003). This group of diseases include sinusitis, pharyngotonsillitis, otitis, bronchitis and pneumonia, which most of the times have viral etiology (Alves & Veríssimo, 2006; Alvim & Lasmar, 2009; Cunha, 2002). Brazil is considered one of the 15 countries with the highest number of annual cases of clinical pneumonia in children below five years old (Cardoso, 2010).

Clinical manifestations of ARIs have a wide spectrum ranging from mild cold symptoms to lower respiratory tract infections, leading to hospitalizations (Hakim et al., 2016; Koskenvuo et al., 2008). The prevalence of infections by the respiratory syncytial virus (RSV) are largely superior to that of other viruses, mainly in children below five (Kurskaya et al., 2018; Magalhaes et al., 2017; Monteiro, Dezanet & França, 2016; Tsuchiya et al., 2005).

Researches point to nursery school attendance as a major risk factor for morbidity from ARIs in early childhood kids (Gurgel et al., 2016; Veríssimo, 2005a). Such fact is due to this group's higher exposure to infectious agents transmitted by confinement and agglomerations, which facilitates the dissemination of infectious agents among children, especially for both the immaturity of their immunological system at this stage of life and poor hygiene (Ibfelt et al., 2015; Veríssimo, Alves & Martins, 2005). In addition, ARIs can affect a child's quality of life, growth and development (Piva, Vieira, Oliveira & Fiewski, 2012).

ARI control depends on preventive measures, such as immunizations, especially DPT (vaccine that immunizes against diphtheria, whooping cough and tetanus), measles and BCG (immunizes against tuberculosis); monitoring and improvement of environmental conditions in which children live; prenatal care; longer breastfeeding time; proper nutrition and protection against colds; search for medical services and general care at home and in schools (Benguigui, 2003; Alves & Veríssimo, 2006). Thus, education professionals have an important role in preventing and handling ARIs, since they spend up to eight hours every day with children. Along this line, the expectation is that they have theoretical and practical knowledge about how to deal with this disease group in order to ensure – besides education – health and wellbeing among children who attend nursery schools.

In this context, the objective of the present study was to identify knowledge and practices of early childhood education professionals from three public nursery schools in the city of Florianópolis, Santa Catarina state, relative to prevention, detection and handling of ARIs in children aged up to six years old, as well as to compare the behavior of professionals from the institutions, considering schooling level as well. The results are expected to subsidize institutions with a knowledge that can contribute to positive reformulations in the routine and qualification of employees involved in early childhood education.

Material and methods

This is a cross-sectional, exploratory and descriptive study of mixed composition (qualitative/quantitative) conducted from September to October 2013. It was approved by Santa Catarina State University Ethics Committee (CAAE No 16569113.0.0000.0118) and authorized by the early childhood education coordination of Florianópolis' municipal education network, SC.

The population was delimited by early childhood education professionals from the central area of Florianópolis. Three public nursery schools located downtown were selected for having in their staff employees from Florianópolis' metropolitan area, in addition to children coming from most neighborhoods, which represents a good regional sample for analysis.

The study also included the following education professionals: classroom, physical education and special education teachers, education assistants, special education assistants, and classroom assistants who met these criteria: worked directly with children and returned both the free and informed consent form (FICF) and the questionnaire duly completed and signed. The sample excluded professionals who did not properly answer some of the questionnaire items.

The first part of the questionnaire consists of characterizing the individuals investigated (sex, age, years of experience in early childhood education, training, role/position, and qualification courses). Next, the document presents multiple choice and essay questions covering: known respiratory diseases in early childhood; typical ARI signs and symptoms; handling of respiratory infections in nursery schools; actions that can reduce risks of ARIs; what actions are the responsibility of parents/guardians, education professionals and education institutions; main causes of ARIs; sources of search for knowledge about ARIs and where this information is researched. At the end, there is a space intended for feedback and suggestions.

Each educator answered the multiple choice and essay questions about prevention, early detection and handling of ARIs that affect children, with the possibility of checking more than one option for each question. The instrument applied was designed by the researchers based on Martins and Veríssimo (2006); Veríssimo (2005a; 2005b).

Questions numbers 02, 04, 07, 09 and 10 were scored, with a maximum value of 10.0 points; each question was worth 2.0 points (value divided by number of propositions, and one wrong answer would cancel out a correct one. The professionals' answers were classified as: poor knowledge (score between 0.0 and 4.0), fair knowledge (between 4.1 and 6.0 points), good knowledge (between 6.1 and 8.0 points) and great knowledge (between 8.1 and 10.0 points), adopting percentiles based on Martins and Veríssimo (2006); Veríssimo (2005a; 2005b).

The professionals were informed about the investigation by means of conversations with the researcher and, in case of agreement with data collection procedures and objectives, signed the FICF confirming their participation in the research.

Data collection was performed in public nursery schools selected after prescheduling with the directors or supervisors of the units. In the presence of the researcher in charge, the participants answered the questionnaire during the children's break (between 11:00 and 13:30h), when the educators were in the classrooms. In some cases, the professionals completed the questionnaires in the educational supervision classroom or in the staffroom. The educators were instructed to answer the questionnaire right after receiving it and were not allowed to have it for longer than 30 minutes, so that they were not able to do any research or have conversations that could influence their answers.

Sampling calculation for finite populations determined the need for 118 research individuals, adopting a 50% prevalence of knowledge relative to prevention, early detection and handling of ARIs for early childhood education professionals, error margin inferior to 5%, and design effect of 1.0 point (Kumar, 1996).

For quantitative analysis, data were tabulated by means of Microsoft Excel® software (2010), and statistical analysis was performed on Statistical Package for the Social Sciences (SPSS), version 20.0. Data were treated by descriptive statistics (mean and standard deviation), adopting a 95% confidence interval (95% CI). Data normality was verified through the Kolmogorov-Smirnov and Shapiro Wilk tests. According to questionnaire results, the final mean considering schooling was compared by the ANOVA one-way test, followed by Tuckey's *post hoc*. The level of significance adopted for the tests was $p \leqslant 0.05$. Qualitative data were presented in frequency and percentage tables.

Results

The sample was composed of 120 early childhood education professionals, 53 of which were employees from nursery school A, 10 from nursery school B, and 57 from nursery school C, all females (100%) aged on average 38.6 ± 9.6 years old, with average time working in early childhood education of 11 ± 7.2 years. Schooling level, training course, current job and questionnaire score are displayed in Table 1.

Table 1. Participants' characteristics as to schooling, training course, role and questionnaire score.

Respondent's Characteristic	Nursery school A (n=53)	Nursery school B (n=10)	Nursery school C (n=57)	Total (n=120)
Age (years):				
Mean+Standard Deviation	40.7 (±9.6)	37.0 (±10.3)	36.9 (±9.2)	38.6 (±9.6)
Experience in Early Childhood Education (years):				
Mean ± Standard Deviation	10.7 (±6.6)	12.9(±9.6)	10.9(±7.5)	11.5(±7.2)
Schooling:				
High School (Primary Teaching)	2 (3.8%)	1(10.0%)	3(5.3%)	6(5.0%)
Incomplete Undergraduate Course	0 (0.0%)	0(0.0%)	8(14.0%)	8.0(6.7%)
Complete Undergraduate Course	20 (37.7%)	2(20.0%)	14(24.6%)	36(30.0%)
Specialization	31 (58.5%)	6(60.0%)	32(56.1%)	69(57.5%)
Master's	0 (0.0%)	1(10.0%)	0(0.0%)	1(8.0%)
Training Course:				
Primary Teaching	2(3.8%)	1(10.0%)	8(14.0%)	11(9.17%)
Pedagogy	48(90.6%)	8(80.0%)	44(77.2%)	100(83.3%)
Physical Education	1(1.9%)	1(10.0%)	4(7.0%)	6(5.0%)
Languages	2(3.8%)	0(0.0%)	1(1.8%)	3(2.5%)
Role/Position:				
Teacher	18(34.0%)	5(50.0%)	18(31.6%)	41(34.2%)
Physical Education Teacher	1(1.9%)	1(10.0%)	4(7.0%)	6(5.0%)
Classroom Assistant	26(49.1%)	4(40.0%)	29(50.9%)	59(49.2%)
Teaching Assistant	4(7.5%)	0(0.0%)	5(8.8%)	9(7.5%)
Special Education Assistant	2(3.8%)	0(0.0%)	1(1.8%)	3(2.5%)
Special Education Assistant Teacher	2(3.8%)	0(0.0%)	0(0.0%)	2(1.7%)
Questionnaire Score:				
Poor knowledge	8(15.1%)	1(10.0%)	5(8.8%)	14(11.7)
Fair knowledge	43(81.1%)	8(80.0%)	44(77.2%)	95(79.2%)
Good knowledge	2(3.8%)	1(10.0%)	8(14.0%)	11(9.2%)
Great knowledge	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)
Score mean+standard deviation	5.97 ±0.7	6.12 ±0.82	6.06 ±0.90	6.05 ±0.83

Source: Table designed by the researchers from data found.

As for questionnaire score, the Anova One-Way test revealed no significant difference ($p \leqslant 0.05$) between nursery schools. However, nursery school B professionals had the highest average questionnaire score (6.12 ± 0.8), followed by nursery school C (6.06 ± 0.9) and lastly by nursery school A (5.97 ± 0.7), since most professionals from the three institutions showed fair knowledge about the subject approached.

Comparing the final score mean according to the respondents' schooling, the Anova One-Way test showed significant differences ($F(1.120) = 3.37$, $p = 0.012$); however, due to the small number of cases in some groups, Tuckey's *post hoc* was not able to identify in which group the difference was. Analyzing descriptive data, it is evidenced that those participants who attended graduate courses, specifically specialization and master's, had a higher final score mean, which consequently shows greater knowledge relative to the theme. It is worth noting as well that 10.5% of the variation in the final score mean derives from schooling.

Table 2 presents diseases that the educators consider as ARIs, with the most frequently mentioned by them being bronchitis (95%), asthma (92.5%) and pneumonia (83.3%). Mistakenly, they believed that the following diseases were ARIs: tuberculosis (45%), chickenpox (8.3%), conjunctivitis (7.5%), cystic fibrosis (6.7%), measles (5.7%), hepatitis (3.3%) and anemia (3.3%).

Table 2. Diseases most frequently considered by professionals as ARIs.

ARI	Nursery school A (n = 53)	Nursery school B (n = 10)	Nursery school C (n = 57)	Total (n = 120)
Bronchitis*	50(94.3%)	9(90.0%)	55(96.5%)	114(95.0%)
Asthma*	47(88.7%)	8(80.0%)	56(98.2%)	111(92.5%)
Pneumonia	44(83.0%)	8(80.0%)	48(84.2%)	100(83.3%)
Bronchiolitis	42(79.2%)	8(80.0%)	47(82.5%)	97(80.8%)
Otitis	11(20.8%)	4(40.0%)	11(19.3%)	26(21.7%)
Sinusitis	27(50.9%)	8(80.0%)	29(50.9%)	64(53.3%)
Common cold	19(35.8%)	4(40.0%)	10(17.5%)	33(27.5%)
Hay Fever	27(50.9%)	6(60.0%)	33(57.9%)	66(55.0%)
Flu	26(49.1%)	7(70.0%)	24(42.1%)	57(47.5%)
Whooping Cough	18(34.0%)	3(30.0%)	17(29.8%)	38(31.7%)

* Crisis periods were considered. Source: Table designed by the researchers from data found.

The following ARIs were mentioned, in the three nursery schools, as being the most frequent ones: bronchitis first (81.7%), then asthma (40%) followed by bronchiolitis (35.8%).

The signs and symptoms of ARIs checked by the professionals as being the most common ones are displayed in Table 3.

Table 3. Signs and symptoms most frequently referred to by the professionals while identifying ARIs.

Signs and Symptoms	Nursery school A (n = 53)	Nursery school B (n = 10)	Nursery school C (n = 57)	Total (n = 120)
Body aches	20(37.7%)	1(10.0%)	22(38.6%)	43(35.8%)
Cough	44(83.0%)	9(90.0%)	50(87.7%)	103(85.8%)
Runny nose	37(69.8%)	8(80.0%)	31(54.4%)	76(63.3%)
Fever	41(77.4%)	10(100.0%)	49(86.0%)	100(83.3%)
Loss of appetite	31(58.5%)	6(60.0%)	32(56.1%)	69(57.5%)
Shortness of breath	35(66.0%)	7(70.0%)	38(66.7%)	80(66.7%)
Wheezing	41(77.4%)	10(100.0%)	53(93.0%)	104(86.7%)
Difficulty to breath	40(75.5%)	10(100.0%)	51(89.5%)	101(84.2%)
Sore throat	23(43.4%)	4(40.0%)	24(42.1%)	51(42.5%)
Irritation and crying	31(58.5%)	4(40.0%)	34(59.6%)	69(57.5%)
Watery eyes	22(41.5%)	3(30.0%)	26(45.6%)	51(42.5%)
Higher respiratory frequency	17(32.1%)	6(60.0%)	23(40.4%)	46(38.3%)

Source: Table designed by the researchers from data found.

The ARI-related signs and symptoms checked most frequently were cough (41.7%), diarrhea (5.8%) and rhinorrhea (1.7%). The most serious signs and symptoms referred to by the educators were fever (55.8%), difficulty to breath (50.0%) and shortness of breath (37.5%).

As for actions to be taken by professionals when a child presents ARI signs and symptoms in nursery schools, the most frequently mentioned ones were: calling his or her family/guardians for them to pick him or her up (96.7%), informing the nursery school's direction board so that they do something about it (59.2%)

and comforting the child while waiting for parents/guardians (45.0%). Because the professionals checked more than one alternative, actions such as giving a shower in case of fever (24.2%), calling emergency services (10.8%), giving the child some type of medication (8.0%) and taking the child to hospital (1.7%) were procedures referred to as well.

The actions considered by the professionals as able to reduce the risks of a child acquiring ARIs in nursery school are: handwashing (90.0%); use of paper towels (83.3%); presence of pillows and mattresses in airy places (81.7%); provision of a nutrient-rich menu (79.2%); use of individual bed sheets, blankets (70.0%) and clean clothes (60.8%); use of individual pacifiers (60.0%); washing toys with water and soap (57.5%); sun bathing (55.0%); use of individual combs and toothbrushes (53.3%); keeping playgrounds clean and free of objects that accumulate water (51.7%).

The actions mistakenly mentioned by the educators as able to reduce the risk of acquiring ARIs were: presence of another ill children in the nursery school (13.3%), use of sunscreen (8.3%), keeping the nails long and dirty (1.7%), use of face towels collectively (0.8%), use of anti-slip rugs (7.5%), keeping a short distance between mattresses while the children are sleeping (31.7%).

In school routine, attitudes such as washing hands (80.8%), using paper towel (55.8%), preparing a nutrient-rich menu (59.2%) and encouraging a higher ingestion of liquids (34.2%) were the most frequently mentioned as present in the day-to-day of the nursery schools researched.

The answer to the question relative to who would be responsible for certain actions concerning prevention and handling of ARIs in children is presented in Table 4.

Table 4. Responsibility for actions related to prevention and handling of ARIs in children.

	Responsibility		
Action	Parents/Guardians	Educators/Nursery school	Both
Ensuring an up-to-date vaccination record	74(61.7%)	1(0.8%)	45(37.5%)
Giving prescribed medication	21(17.5%)	12(10.0%)	87(72.5)
Keeping places clean and airy	57(47.5%)	11(9.2%)	52(43.3%)
Taking the child to regular medical appointments	78(65%)	0(0.0%)	42(35.0%)
Dressing the child with clean clothes	28(23.3%)	8(6.7%)	84(70.0%)
Teaching how to wash the hands	10(8.3%)	8(6.7%)	102(85.0%)
Ensuring a nutrient-rich diet	11(9.2%)	6(5.0%)	103(85.8%)
Teaching how to clean the nostrils	11(9.2%)	20(16.7%)	89(74.2%)
Promoting a healthy adaptation process	48(40%)	26(21.7%)	46(38.3%)

Source: Table designed by the researchers from data found.

Figure 1 displays the attitudes most frequently checked by the professionals as contributors to the onset of ARIs in preschool children. The options mistakenly considered as risk factors for acquisition of respiratory infections were: number of chairs and desks per classroom (42.5%), excessive cleaning of school environment (29.2%), well ventilated classrooms (20.8%) and presence of trash cans in the classrooms (11.7%).

When questioned about the habit of reading content related to child health, 26.7% claimed to engage in this type of reading, 59.2% said they did so sometimes, and 14.2% stated that they rarely read about it. The internet (60.8%) was mentioned as the main source of search for this type of information, followed by newspapers (60.0%) and books (50.8%).

About questionnaire content, 15.8% thought the questions were very easy, 35% found them reasonably easy, 20.8% said they were hard and 28.3% expressed they were very hard. When questioned about the importance of providing training and qualification courses on child health, 63.3% answered that they were very important, 35.8% said that they were somewhat important, and 0.8% deemed them as little important. Need for provision of qualification courses in the child health field by Florianópolis' Municipal Government was the most frequent suggestion given by means of the questionnaire.

Many children spend from eight to twelve hours a day at nursery schools, therefore, it is of paramount importance that these places and their professionals are prepared to meet the basic health and education needs of this group, whose ages range from zero to six years old. These environments are daily exposed to thousands of different microorganisms that come from children, employees and parents (Ibfelt et al., 2015).

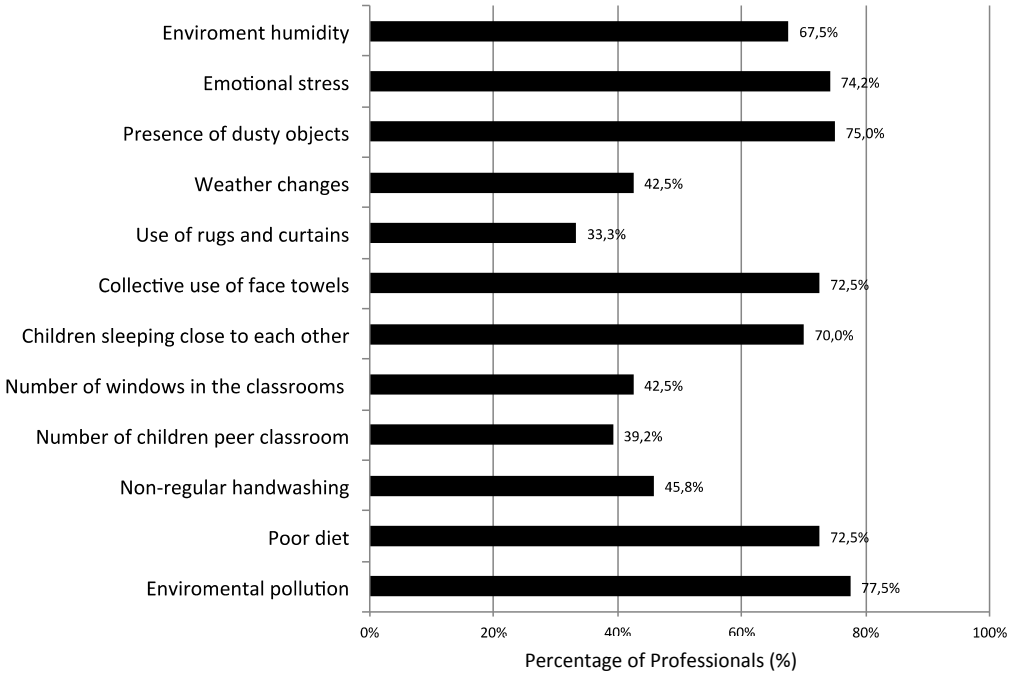

Figure 1. Attitudes that contribute to the onset of ARIs, according to questionnaire answers.
Source: Figure designed by the researchers from data found.

Discussion

In a review about infectious diseases in Brazilian preschool children cared for in nursery schools, Pedraza, Queiroz, and Sales (2014) concluded that high rates of respiratory infections are associated with the time that children spend in this environment and the structural characteristics/agglomeration of the latter. Broadly speaking, the study revealed that children gathered in a situation of daily and prolonged coexistence (10-12 hours) may facilitate the dissemination of diseases, which gives nursery schools a typical epidemiology in infection transmission. In this sense, the focus of the present research is of great relevance.

According to article 29 of the Brazilian National Education Guidelines and Bases Law, early childhood education, the first primary education stage, has as its main goal to develop children comprehensively as to their physical, psychological, intellectual and social aspects, complementing family and community actions (Prefeitura Municipal de Florianópolis, 2010; Veríssimo et al., 2005). Following this line, pedagogical educational guidelines for early childhood education in Florianópolis state that children are subjects of rights and deserve adequate material, cultural, pedagogical and health conditions that complement their families' actions (Prefeitura Municipal de Florianópolis, 2010).

Analyzing the sample's schooling level, 57.5% has specialization, and 5%, primary teaching. Therefore, the sample's schooling level is high, above that required by Florianópolis' Municipal Government, which complies with the Municipal Education Council norms (chapter III, article 10), which set forth that teachers seeking to work in early childhood education must have higher education degree in pedagogy-teaching, accepting mid-level primary teaching courses as minimum training too (Prefeitura Municipal de Florianópolis, 2009).

Despite the data presented, a small portion of the participants managed to identify all questionnaire answers related to which diseases are considered as ARIs. Many chronic respiratory infections were mentioned as being acute and other diseases, such as chickenpox, hepatitis, anemia, conjunctivitis; in addition, some participants mistakenly consider some signs and symptoms, such as cough and diarrhea, as synonyms with ARIs.

The ARIs checked as most common in nursery schools were asthma, bronchitis, pneumonia and bronchiolitis. Many of the diseases mentioned have a direct relationship with the respiratory syncytial virus (RSV). In a recent study, Gurgel et al. (2016) determined the rates of the RSV and seven other viruses that cause lower respiratory tract infections in children in northeastern Brazil, in addition to their association with several risk factors. They found that the RSV was the most frequent one (40.2%) and that there was a

significant relationship between infections by it and nursery school attendance. The findings corroborate with those of Kurskaya et al. (2018), which showed higher RSV prevalence in hospitalized children in Russia.

Illnesses such as flu and common cold, very frequent in preschool children, were rarely mentioned. Mistakes or ignorance as to what ARIs are evidence a need to disseminate more information about them. Veríssimo et al. (2005), seeking to check knowledge and practices of nursery school employees about respiratory aggravations in childhood, identified flu, cold, asthma, bronchitis, pneumonia and hay fever as the most frequently referred to by educators. When questioned about gravity signs, they pointed out fever, runny nose, cough, fatigue and behavioral changes, elements that were also considered in the present research. It is thus perceived that most interviewed educators knew about the signs and symptoms of ARIs. Several factors contribute to risks of respiratory aggravations in early childhood education institutions, such as low birth weight, young age at nursery school admission, early weaning, living with tobacco smokers, agglomerated environments, confinement and atopy, besides elements specifically related to nursery schools, such as number of children per educator and per classroom (Macedo, Menezes, Albernaz, Post & Knorst, 2007; Monteiro, Silva, Lopes & Araujo, 2007).

Questioned about serious symptoms, most participants checked fever, shortness of breath and difficulty to breath, which matches the serious signs/symptoms of ARIs. Wheezing and coughing were also referred to as serious. Comparing these data with those found by Alves and Veríssimo (2006), who also covered nursery school university professionals' knowledge and practices relative to ARIs in childhood, fever and breathing changes were highlighted as well, additionally to mood changes in children.

According to Alves and Veríssimo (2006, p. 83), "[...] failure to perceive signs indicative of respiratory aggravations is a factor that may result in late search or no search at all for specialized care". This behavior may raise the likelihood of cases worsening, reducing the child's treatment options and recovery. Thus, the internal regulation of Florianópolis' early childhood education units advises their employees to call family members/guardians when a child in the school shows signs and symptoms of any disease. They must also communicate the institution's direction aboard and comfort the child while waiting for their relatives who will take them to a specialized medical service.

Despite this conduct norm, the present research evidenced that some professionals have attitudes that are not in line with those adopted by the municipal education network in case of ARIs. The educators said that they make the calls requesting emergency services themselves and give showers to children with fever resulting from respiratory conditions. This very same context was addressed in a research by Martins and Veríssimo (2006), who observed similar measures taken by participants, as most interviewees stated that they would send the child to the nursing department and call their guardians.

Not all sample professionals agreed that ensuring that the children's vaccination records are up to date and that taking them to regular medical appointments are the exclusive responsibility of parents/guardians, although these actions are clearly not the responsibility of educators or education institutions.

When it comes to preventive health actions analyzed in this investigation, the participants were questioned about risk factors for the onset of ARIs, and the most frequently mentioned by them agree with the literature. In their research, Botelho, Correia, Silva, Macedo and Silva (2003) indicate that environmental factors such as pollution of the air breathed and climate variations are determinant to increases in cases and gravity of ARIs in children below five. Corroborating with these data, a recent study by Frauches et al. (2017) argues that most medical consultations due to respiratory diseases in the state of Espírito Santo/Brazil may be related to air quality in the city. Alves and Veríssimo (2006), in their turn, while investigating knowledge and practices related to ARIs in childhood, which included nursery school university employees, found that the most commonly mentioned causes for the onset of diseases were those relative to the environment, in addition to the child's individual susceptibility and lifestyle (pollution, weather, cigarettes, dust, emotional stress, and others). These results corroborate with data found in the present study, according to which environmental pollution, poor diet, non-regular handwashing, number of children per classroom, children sleeping close to each other, collective use of face towels, rugs and curtains, weather changes, dusty objects, emotional stress, and environment humidity were all checked. In contrast, some irrelevant actions were considered as risk factors as well, including number of trash cans and number of desks and chairs in the classrooms, showing another gap in the interviewed educators' understanding of ARIs.

When discussing preventive actions, it is important to focus on the hygiene of toys used in the classroom, which, for being collectively used, can disseminate and help transmit microorganisms that cause

ARIs. In their research, Ibfelt, Engelund, Schultz, and Andersen (2015) analyzed whether cleaning and disinfecting toys could reduce the presence of diseases and the load of pathogenic microorganisms in nursery environment in Norway, concluding that the DNA and RNA of respiratory viruses are disseminated around these places and that cleaning and disinfecting toys every 15 days reduced the microbial load.

With respect to personal interests, a portion of the professionals said that they rarely sought for information about child health, while most claimed to seek this type of information 'sometimes or always', especially online, which shows some interest and concern beyond the pedagogical sphere in relation to child care.

In light of the foregoing, it is evident that assessing early childhood education professionals' knowledge and practices is of extreme importance for the health and wellbeing of children attending these institutions, since incidence of ARIs in nursery schools is high, and so is the rate of mortality/morbidity from this type of condition. Thus, identifying what these professionals understand and know about respiratory diseases in childhood provides a perspective on the quality of services targeting this age group and signals a need for training and educating caregivers/teachers.

Training educators on child healthcare requires a pedagogical project that includes contents relative to health promotion and knowledge about the health-disease process (Maciel et al., 2010). The results presented in this research show the relevance of learning about common diseases acquired in nursery schools affecting the respiratory system of children, things that contribute to the onset of ARIs in children within these environments, and actions that can be taken towards preventing or reducing risks of transmission of microorganisms responsible for ARIs, in addition to making it clear what responsibilities professionals and institutions have in health promotion and disease prevention when it comes to children attending these places.

Changes in professional training as well as encouragement for ongoing qualification courses concerning child health are fundamental to provide children with a safer and more adequate environment that meets their basic needs.

The care provided by early childhood education teachers while dealing with children who have ARIs must be closely linked to disease prevention and health promotion actions (Piva et al., 2012). Health education can improve early childhood education professionals' skills for them to promote health and healthy habits and prevent aggravations by early detecting gravity signs in children with ARIs and other diseases.

Conclusion

The present study identified that the educators interviewed had fair knowledge about prevention, early detection and handling of ARIs in children attending public nursery schools.

Some non-respiratory signs, symptoms and diseases were considered as ARIs. Moreover, some precautions and attitudes mentioned are unrelated to the handling of these diseases, while preventive measures were forgotten or mistakenly referred to. Even actions condemned by internal regulations of the participating units were mentioned as being routine in these institutions. Therefore, the study results reveal gaps in early childhood education professionals' understanding of child healthcare.

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