Cogitare Enfermagem

ORIGINAL ARTICLE

VACCINATION COMPLETION AND DELAY IN CHILDREN BEFORE AND AFTER AN EDUCATIONAL INTERVENTION WITH THEIR FAMILIES

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ABSTRACT

Objective: To assess vaccination completion and delay in children at a child education center before and after an educational intervention with their families.

Method: A before-and-after study carried out at a child education center in São Paulo from February to April 2017. The intervention consisted of sending reminders and leaflets to the families about the importance of vaccination. The vaccination status was verified through the Child Health Handbook. Fisher's exact and chi-square tests were used.

Results: 151 children and their families participated in the before-phase of the study, and 145 in its after-phase. The prevalence of vaccination completion rose from 81.5% to 93.1% after the intervention (p=0.003). Vaccination delay was more frequent among children under two years of age and those who were male.

Conclusion: The intervention contributed to the increase of vaccination completion through health education of the children's families.

DESCRIPTORS: Immunization; Nurseries; Child Health; Health Education; Public Health Nursing.

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COMPLETUDE E ATRASO VACINAL DAS CRIANÇAS ANTES E APÓS INTERVENÇÃO EDUCATIVA COM AS FAMÍLIAS

RESUMO
Objetivo: avaliar a completude e o atraso vacinal das crianças de um centro de educação infantil antes e após uma intervenção educativa com as famílias.
Método: estudo do tipo antes e depois, realizado em um centro de educação infantil em São Paulo de fevereiro a abril de 2017. A intervenção consistiu no envio de lembretes e folhetos às famílias sobre a importância da vacinação. A situação vacinal foi verificada através da Caderneta de Saúde da Criança. Foram utilizados os testes qui-quadrado e exato de Fisher.
Resultados: participaram do estudo 151 crianças e suas famílias antes e 145 depois. A prevalência da completude vacinal passou de 81,5% para 93,1% após a intervenção (p=0,003). O atraso vacinal foi mais frequente entre crianças menores de dois anos e aquelas do sexo masculino.
Conclusão: a intervenção contribuiu para o aumento da completude vacinal por meio da educação em saúde das famílias das crianças.

DESCRITORES: Imunização; Creches; Saúde da Criança; Educação em Saúde; Enfermagem em Saúde Pública.

PLENO CUMPLIMIENTO Y ATRASO VACUNATORIOS EN NIÑOS ANTES Y DESPUÉS DE UNA INTERVENCIÓN EDUCATIVA CON LAS FAMILIAS

RESUMEN:
Objetivo: evaluar el pleno cumplimiento y el atraso vacunatorios en niños de un centro de educación infantil antes y después de una intervención educativa con las familias.
Método: estudio del tipo antes y después realizado en un centro de educación infantil de San Pablo entre febrero y abril de 2017. La intervención consistió en enviar recordatorios y folletos a las familias sobre la importancia de la vacunación. La situación de vacunas se verificó a través de la Libreta de vacunas infantiles. Se emplearon las pruebas de chi-cuadrado y Exacta de Fisher.
Resultados: del estudio participaron 151 niños y sus familias antes de la intervención, y 145 después de ella. La prevalencia del pleno cumplimiento vacunatorio aumentó del 81,5% al 93,1% después de la intervención (p=0,003). El atraso en las vacunas fue más frecuente entre los niños de menos de dos años de edad y entre los del sexo masculino.
Conclusión: la intervención contribuyó a mejorar el índice de pleno cumplimiento vacunatorio al ofrecer educación en salud a las familias de los niños.

DESCRIPTORES: Vacunación; Guarderías; Salud infantil; Educación en Salud; Enfermería de Salud Pública.

INTRODUCTION

Vaccination is a public health intervention that has an excellent cost-effectiveness ratio for reducing child morbidity and mortality, as it exceeds therapeutic and health rehabilitation actions, an undisputed proof of its benefits being the prevention of two to three million deaths per year around the world[1]. However, 1.5 million deaths could be prevented with increased vaccination coverage[2].

In 2015, almost six million children under the age of five died from preventable diseases, such as pneumonia and diarrhea[2]. Immunization could prevent 59% of the deaths due to pneumonia and 29% of those due to diarrhea[3].

There is evidence that children with complete vaccination have a 27% greater protection against the risk of dying compared to those with delayed vaccines[4]. In Brazil, the actions developed by the National Immunization Program (*Programa Nacional de Imunização*, PNI) have contributed to the reduction of child morbidity and mortality in the last 40 years[5]. In 1977, the PNI was started with four mandatory vaccines during the child's first year of life (BCG, OPV, DTP, and measles)[6] and currently has more than 19 vaccines that target children, adolescents, adults, pregnant women, and the indigenous population. Despite the increase in vaccination coverage, the coverage recommended by the Ministry of Health has not yet been achieved, with heterogeneity among the different Brazilian states and municipalities[7], which contributes to the resurgence of diseases that were already under control.

Vaccination coverage in children can be influenced by several factors related to the socioeconomic aspects of the family, such as low maternal schooling, access to and link of the families with the health services, as well as the knowledge and attitude of the parents or guardians regarding immunization in the child's first years of life[8,9].

In Brazil, the Health at School Program (*Programa Saúde na Escola*, PSE), instituted in 2007 as an inter-sectoral policy for Health and Education, considers surveillance of the vaccination calendar to be an essential activity for children's health[10]. The PSE provides for the follow-up of the vaccination status by nurses in school spaces, strengthening families and educators in child care with a view to preventing diseases and promoting comprehensive health. In this sense, a number of studies reveal that strategies such as reminders, phone calls, letters, text messages, and their combinations can improve vaccination coverage in low and middle income countries[11,12].

Considering the evidence on effective and economical strategies to carry out health education interventions with the children's families, aiming at promoting vaccination during the first years of life, this study aims to evaluate vaccination completion and delay in children at a child education center before and after an educational intervention with their families.

METHOD

This is a study of the before-and-after type, with a quantitative approach. Before-and-after studies or uncontrolled clinical trials describe the course of the outcome of interest in a single group of individuals before and after exposure to an intervention[13].

The study was carried out in a child education center (*Centro de Educação Infantil*, CEI), located in a region of high social vulnerability in the city of São Paulo-SP, Brazil. The CEI is linked to the city hall in partnership with a philanthropic institution and serves 180 children from zero to four years of age.

The sampling was for convenience and included all the children regularly enrolled

in the CEI. Children were excluded who did not have their Child Health Handbooks sent by their parents, which would make it impossible to verify the vaccination status (study outcome).

The intervention consisted of sending a reminder to the families through the child's agenda about the child's vaccination status and the care which promotes their vaccination. If completion of the vaccination status was verified, the family was congratulated for the care provided to the child and informed about the next vaccines to be taken. If a delay in the vaccination status was verified, the family was so informed and guided to seek a health service to continue protecting their child's health.

In addition to the reminder, the research team prepared an educational leaflet based on the Ministry of Health's vaccination handbooks and documents[14]. The leaflet addressed the concept of vaccine, the importance of immunizing the organism against diseases, the vaccination schedule for children under five, and the diseases prevented by each vaccine. In addition, tit contained information related to adverse events such as fever, pain, redness, and swelling, as well as serious adverse events like anaphylactic shock, seizures, fainting, shortness of breath, and loss of consciousness, in which the family should immediately seek a health service.

Data collection was carried out in two moments: in the week before the educational intervention and 30 days after the intervention, corresponding to the period from February to April 2017. The collection procedure included the registration of the child's sociodemographic characteristics, the verification of the vaccination status by the researchers through the records in the Child Health Handbook, the implementation of the educational intervention by sending a reminder and an educational leaflet to the families, and a new verification of the vaccination status after 30 days. To this end, the authors developed a data collection tool containing the variables of sociodemographic characterization of the child (gender and age), vaccination status (updated or delayed), delayed vaccines (if any), and time of the study (pre- or post-intervention).

Data was tabulated in an Excel spreadsheet, and analyzed using the Epi Info 7 software. The variables were presented in their absolute and relative frequencies. The Chi-square and the Fischer's Exact tests were used, with a 5% significance level and a 95% confidence interval.

The development of the study complied with the national and international standards of ethics in research involving human beings. The research project was approved by the Research Ethics Committee of the Federal University of São Paulo (Opinion No. 1,849, 484) and authorized by the headship of the CEI. Those responsible for the enrolled children were informed about the objectives of the study, and agreed to and signed the Free and Informed Consent Form (FICF).

RESULTS

The study included 151 children and their families before the intervention and 145 after the intervention (Figure 1).

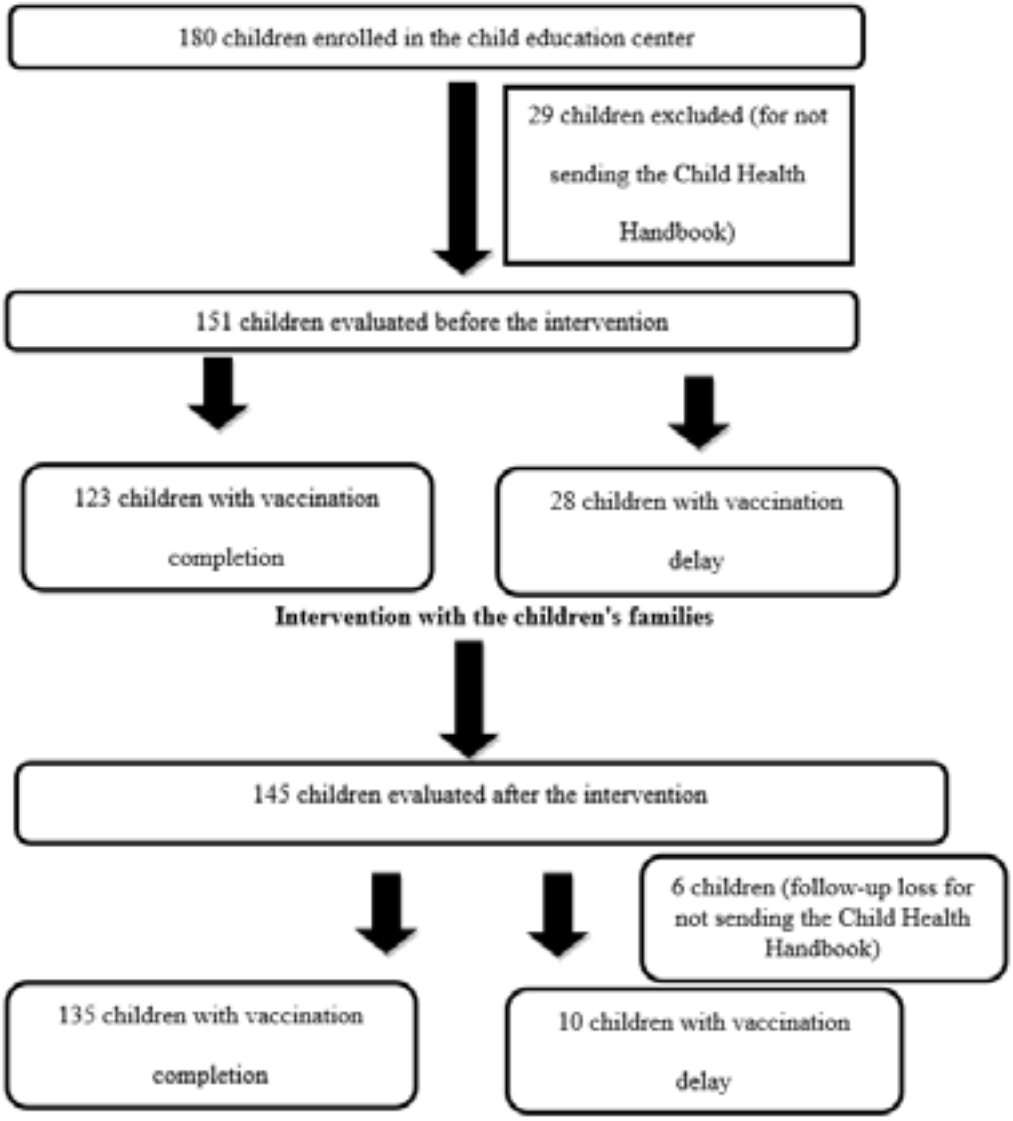

Figure 1 - Flowchart of participation of the children and their families. São Paulo, SP, Brazil, 2017

Of the 151 children who participated in the study, 78 (51.6%) were female, and 93 of them (61.6%) were two years old or older. The prevalence of vaccine completion rose from 81.5% to 93.1% after the intervention (p=0.003). Table 1 shows the distribution of the vaccination status before and after the intervention, according to the characteristics of the children. After the intervention, vaccination delay was more frequent among children under two years old and those of the male gender, but without a significant difference.

Table 1 - Distribution of the children's vaccination status before and after the intervention with their families according to the children's characteristics. São Paulo, SP, Brazil, 2017 (continues)

Variables	VACCINATION STATUS					
	COMPLETION			DELAY		
	Before n=123 (%)	After n=135 (%)	p*	Before n=28 (%)	After n=10 (%)	p+
Age						

< 2 years old	43 (35)	51 (37.8)	0.638	15 (53.6)	06 (60)	0.726
> 2 years old	80 (65)	84 (62.2)		13 (46.4)	04 (40)	
Gender						
Female	65 (52.8)	70 (51.8)	0.873	13 (46.4)	04 (40)	0.726
Male	58 (47.2)	65 (48.2)		15 (53.6)	06 (60)	

*Chi-square test. +Fisher's exact test.

Of the 28 children with vaccination delay before the intervention, seven (46.7%) had three or more delayed vaccines. As for the delayed vaccines, they were identified as follows: against Hepatitis A: nine, against poliomyelitis: nine, pentavalent: six, DTP: five, tetra viral: four, pneumococcal: three, meningococcal C: three, and against influenza: two. Among the children aged two years old or over, it is noted that 12 of them (92.3%) had only one delayed vaccine, as shown in Table 2.

Table 2 - Distribution of the number of delayed vaccines before and after the intervention according to age stratification. São Paulo, SP, Brazil, 2017

Number of delayed vaccines	**UNDER 2 YEARS OLD**		**2+ YEARS OLD**	
	Before n=15 (%)	**After n=6 (%)**	**Before n=13 (%)**	**After n=4 (%)**
One	05 (33.3)	02 (33.3)	12 (92.3)	04 (100)
Two	03 (20)	01 (16.7)	01 (7.7)	-
Three or more	07 (46.7)	03 (50)	-	-

DISCUSSION

The objective of this study was to evaluate vaccination completion and delay in children at a child education center located in a region of high social vulnerability, before and after an educational intervention with their families. Sending a reminder and an educational leaflet to the families allowed for the increase in the children's vaccination completion, corroborating the findings of previous studies that implemented interventions with the aim of sharing knowledge about the importance of vaccination and helping parents to remember to vaccinate their children[11-12,15-16]. The findings suggest that a simple, low-cost intervention can be implemented by nurses that invest in inter-sectoral actions, as recommended by the Health at School Program.

The results of this study reinforce those of national studies that found vaccination coverage levels between 68% and 89%[17-18]. Despite the reduction in the number of children with delayed vaccines, the fact that 100% vaccination coverage is not achieved after the intervention is worrying. The search for strategies that allow addressing the reasons for non-vaccination, other than forgetting or not knowing about the importance of each vaccine, is necessary for the development of future interventions. Furthermore, in

Brazil, not vaccinating a child is considered an illegal practice and a violation of the Child and Adolescent Statute (*Estatuto da Criança e do Adolescente*, ECA), which guarantees all children the right to health and makes vaccination mandatory for every parent or guardian of a baby, child, or adolescent[19].

However, several reasons contribute for parents or guardians of children not vaccinating their children. Among them, we mention the risks associated with adverse reactions, the quantity of vaccines applied at the same time, the application technique, as well as the difficulty in observing the suffering of the child resulting from the invasive and painful procedure, in addition to the lack of family support for the child's guardian to go to the Health Unit and the low acceptance by the child of the vaccine given orally[20]. Other barriers are related to the health services, which have an operating schedule that makes it difficult for those responsible for the child to attend during business hours, in addition to the possibility of lack of vaccines and strikes[20].

Additionally, it is worth highlighting the expansion of the anti-vaccine movement both in European countries and in Brazil, representing a serious public health problem. Measles is an example of an immuno-preventable disease that has remained controlled in Brazil; however, 10,274 cases and 12 deaths were reported in 2018[21]. A study conducted with couples who are selective about the vaccination calendar shows that they do not recognize the act of not vaccinating as an act of negligence or violation of the law, but as caring for their children, since they must choose the best for them regardless of what is established in the rules and laws, using their autonomy in caring for the child[22].

The results showed a lower prevalence of completion in children under two years of age, but no statistically significant association was found. This data may be related to the higher frequency of vaccination in this period of life, since the vaccination calendar recommends approximately 16 vaccination episodes until the age of fifteen months. The evidence reveals that the main reasons for delay in vaccination are related to febrile episodes, flu, or lack of information[23,24]. These data confirm the need to monitor the vaccination status in order to update it in child education schools, as established in Decree No. 6,286, which instituted the Health at School Program[25].

The nursing practice involves monitoring the vaccination status in child education schools. This represents an important strategy for preventing harms through immunization and promoting children's health. A systematic review that evaluated the implementation of vaccination programs in schools showed the role of Nursing in monitoring the vaccination status, as well as in the application of immuno-biologicals and communication with the parents[26].

In this sense, the nurse can contribute by identifying vulnerabilities, and by implementing interventions targeted at children, families, and educators, in order to minimize vaccine delays. In addition, the partnership between health and child education professionals makes it possible to strengthen the relationship with the families in a given territory and, in this way, to strengthen the caregivers of children. The school constitutes a legitimate space for health promotion, and the results found highlight the importance of inter-sectoriality between Health and Education, especially with regard to monitoring the vaccination status of the children.

The study highlighted the role of nurses in promoting children's immunization in the school setting. However, some limitations include its unicentric character, considering that it was carried out in only one child education center, the non-follow-up of the child's vaccination status for a longer period, the loss in the follow-up of some participants, and the limitations of using the Child's Health Handbook as a source of data, not allowing knowing the characteristics of the families such as schooling, occupation, and other variables that can influence vaccination completion.

CONCLUSION

The results of this study reveal that there was a significant difference regarding the prevalence of vaccination completion in children after the intervention, with an increase of 11.6%. Aimed at the families of children at a child education center and implemented by sending reminders and leaflets about the importance of vaccination, the educational intervention contributed to the vaccine completion of children under four years old. However, efforts are still needed to achieve 100% of vaccination coverage for the children. Future research studies need to investigate the reasons for non-vaccination, aiming to develop effective interventions to promote the immunization of this population.

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