ORIGINAL ARTICLE

Characterization of Young Child Health Surveillance in Portugal During the COVID-19 Pandemic

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Port J Pediatr 2023;54(1):15-20
DOI: https://doi.org/10.25754/pjp.2023.26876

Abstract

Introduction: The COVID-19 pandemic has deeply influenced the primary healthcare system in Portugal. Knowing that the first two years of life are a period of major development, it is necessary to comply with all the standard moments of screening, surveillance, and immunization during this period. This study aimed to characterize health surveillance in the first two years and evaluate the fulfillment of guideline 008/2020 released on 26th March 2020 by Direção Geral da Saúde during the COVID-19 pandemic.

Methods: This cross-sectional study was conducted based on the application of an anonymous questionnaire to caretakers of children under 24 months of age through social media. The data refers to the period of March 2020 to March 2021.

Results: This study included 452 children. The coverage of the newborn metabolic screening was 99.6%. Regarding vaccination, 81.9% of the children fulfilled the national program on time and 15.9% with delay. Around one third of the children experienced delay and/or cancelation of the routine consultations. In the group of children aged between 12-18 months (n = 150), 69.3% complied with the minimum of six consultations during the first year of life, while in the group aged between 18-24 months (n = 116), 72.4% complied with the minimum of one consultation during this period.

Conclusion: It is necessary to create strategies to improve compliance with the 008/2020 guideline, especially regarding immunization and consultations at the defined ages to optimize children's health surveillance even during pandemics.

Keywords: Ambulatory Care; Child; Child Health; COVID-19; Pandemics; Portugal; Public Health Surveillance; Surveys and Questionnaires

Keypoints

What is known:

- The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic had an impact on health services all around the world, as well as in Portugal.
- Child health surveillance is essential to prevent disease and promote health, in part by ensuring a good immunization coverage.

What is added:

- The newborn metabolic screening was performed almost in all children, maintaining a high coverage rate as usual.
- Immunization coverage was high; however, there was a delay in its administration in about one sixth of the children.
- There was a significant association between delay in well-child visits and delay in immunization at the recommended ages.

Introduction

In Portugal, the primary healthcare system is the cornerstone of children's health surveillance. The national program for children and youth health surveillance recommends continuous actions for health promotion and disease prevention in children and adolescents through anticipatory measures, promotion of immunization, screening child growth and development, and early assessment and intervention if problems are detected.[1] The first two years of life represent profound changes in growth and psychomotor development, in addition to being a demanding stage for parents who need answers regarding their babies necessities in a safe environment.[1] The national program for children and youth health surveillance defines 10 well-child visits for this age group, namely appointments at 0, 1, 2, 4, 6, 9, 12, 15, 18, and 24 months.[1] The first appointment should ideally be performed until two weeks of life. Vaccines are usually administered during these visits.

At the beginning of the pandemic, the Centers for

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Received: 31/03/2022 | Accepted: 08/10/2022 | Published online: 15/11/2022 | Published: 01/01/2023

Diseases Control and Prevention and the American Academy of Pediatrics specified that routine well-child care and immunization, particularly for children aged 24 months or younger, should be prioritized.[2,3] The Portuguese Direção Geral da Saúde (DGS) guidelines also prioritize newborn metabolic screening, immunization and routine child visits in the first two years of life with a minimum of six appointments in the first year and a minimum of one appointment between 18 and 24 months.[4]

The coronavirus disease 2019 (COVID-19) pandemic significantly affected the Portuguese healthcare system, resulting in 11.4 million fewer face-to-face consultations in the primary healthcare system in 2020, compared to 2019.[5] Almost all the scheduled medical appointments that were not performed were due to cancellation by healthcare institutions.[6] The number of face-to-face medical appointments in the primary healthcare system dropped abruptly at the beginning of 2020. However, since April 2020 there was an increase albeit with another decrease in the winter of 2020, followed by a recovery at the beginning of 2021, although these were still lower than the years before pandemics.[7]

This study aimed to characterize health surveillance in children up to 24 months in Portugal during the COVID-19 pandemic and assess compliance with the new guidelines from DGS released in March 2020 regarding children's health care.

Methods

We conducted a cross-sectional study and collected the required data through an anonymous original online questionnaire posted on social media. The aims of the study were explained in informed consent. The participants were informed of the possibility of study withdrawal at any time, and only completed questionnaires could be submitted. The questionnaire was available in April 2021. The data collected refers to the period from March 2020 to March 2021. The sole inclusion criterion was being 24 months or less. On the other hand, age above 24 months was the exclusion criterion. In 2019 and 2020, 171 005 children were born, meaning that we needed at least 384 participants to have a significant sample of the Portuguese population with an age of up to 2 years.[8]

We collected demographic and health surveillance data, namely attendance of scheduled well-child visits, immunization, and newborn metabolic screening. In case of delays and/or cancellations, parents were questioned about the main reason behind these. In the end, we asked parents to evaluate their level of satisfaction with their child's health surveillance on a numerical scale from 0 (not satisfied at all) to 5 (extremely satisfied). All questions required a mandatory answer.

We analyzed the data using frequencies and percentages for categorical variables. Median values and standard deviation were reported for quantitative variables. We applied Pearson chi-squared test ($\chi 2$) to evaluate significant associations, using SPSS 28® (IBM Corporation Released 2021, IBM SPSS Statistics for Windows, Version 28.0. Armonk, NY, IBM Corp.). The significance level for all the results was defined as $p < 0.05$.

Results

We received 467 responses to our questionnaire, of which 15 were excluded for being related to children older than 24 months. Therefore, 452 responses were analyzed. The sociodemographic characteristics of the children are tabulated in Table 1.

Table 1. Sociodemographic characteristics of the children included in the study

	Number (%) of children
Age	
0-6 months	112 (24.8%)
7-12 months	133 (29.4%)
13-18 months	119 (26.3%)
19-24 months	88 (19.5%)
Sex	
Feminine	216 (47.8%)
Masculine	236 (52.2%)
Family doctor in primary healthcare center	
Yes	408 (90.3%)
No	35 (7.7%)
Don't know	9 (2.0%)
Follow-up	
Family doctor in primary healthcare center	210 (46.5%)
Private doctor for personal reasons	188 (41.6%)
Private doctor for reasons related to pandemics	33 (7.3%)
Other (public and private follow-up or another)	21 (4.6%)
Region of residence	
North	135 (29.9%)
Center	74 (16.4%)
Lisbon and Tagus valley region	167 (36.9%)
South (Algarve and Alentejo)	66 (14.6%)
Madeira and Azores	10 (2.2%)

Age was well distributed, and the mean age of children was 12.07 ± 6.48 months. Most of the children had a family doctor in a primary healthcare center (90.3%, n = 408). Regarding child health surveillance, 7.3% (n = 33) of children had private follow-ups due to pandemic-related reasons and 55% (n = 250) only had a follow-up with a family doctor in the primary healthcare center. The children included in this study lived in different regions of Portugal. Between March 2020 and March 2021, 94% (n = 425) of children had access to appointments and vaccines, 4.4% (n = 20) had access only to vaccines, 0.7% (n = 3) had access only to appointments, and 0.9% (n = 4) did not have access to any of these resources.

During this period, 55.3% (n = 250) of the children in our study needed to perform the newborn metabolic screening, which was actually performed on 99.6% (n = 249) of those children. Only one child (who was 10 months old at the moment of the questionnaire) did not undergo this screening. Of the 249 children who performed the screening, 90 cases were in the hospital and 159 cases were in the primary healthcare center. Of those children who performed it at the primary healthcare center (n = 159), 158 (99.4%) did it between the third and sixth day of life, as recommended, and only one child performed it with delay due to scheduling difficulties at the healthcare center.

According to the national vaccination program, 15.9% (n = 72) of children experienced a delay in immunization during that one year but recovered, 1.1% (n = 5) had a present delay, and 1.1% (n = 5) did not know their vaccinal status. Overall, 17% (n = 77) of children did not fulfill immunization at the recommended ages during that year (44 children with an age of up to 12 months and 33 children aged between 13 and 24 months). The main reason for the delays was issues related to the healthcare center, as we can see in Fig. 1.

Regarding well-child visits, 28.8% (n = 130) of the cases experienced delay and 23% (n = 104) experienced the cancellation of at least one of those appointments. Overall, 36.3% (n = 164) of all children experienced a delay and/or cancellation of at least one of their appointments during the key ages, with some children experiencing both of them. The majority of parents attributed the cause of this to issues related to the healthcare center, as is shown in Figs. 2 and 3.

Considering DGS guidelines, we can see that 19.4% (n = 6) of children aged 12 months and 33.3% (n = 69) of children aged between 13 and 24 months did not fulfill the minimum criterion of six appointments in the first year as recommended. In the group of 18–24-month-old children (n = 116), 27.6% (n = 32) did not fulfill the minimum criteria of one appointment during this period of life as recommended in the DGS guidelines and 43.8% (n = 14) of those children also had a delay in immunization (*versus* 13.1% of those children with the same age who complied with the DGS guidelines). There was a positive association between non-compliance with the DGS guidelines (at least one appointment between 18 and 24 months) and immunization delay ($X^2(1) = 12.880$, $p < 0.001$). There was also a significant association between the delay and cancellation of well-child visits ($X^2(1) = 97.959$, $p < 0.001$), as well as, between a delay in well-child visits and a delay in immunization at the recommended ages ($X^2(1) = 58.970$, $p < 0.001$). There was no significant association between immunization or medical appointment delays and the region of the primary healthcare system ($X^2(2) \geq 8.483$, $p = 0.075$, $X^2(2) \geq 5.767$, $p = 0.217$).

Concerning the grade of satisfaction with their children's health surveillance, 71.2% (n = 322) of parents manifested great satisfaction (values 4 and 5), the mean value (0 to 5) of which was obtained at 3.99 ± 1.17.

Discussion

To the best of our knowledge, this was the only study conducted during a full year of the pandemic in Portugal that portrayed many aspects of healthcare surveillance of young children. The sample was representative of the Portuguese population with an age of under 2 years. During this one-year COVID-19 pandemic, the results of our study showed that newborn metabolic screening in Portugal maintained high adherence rates as seen in pre-pandemic years, being also supported

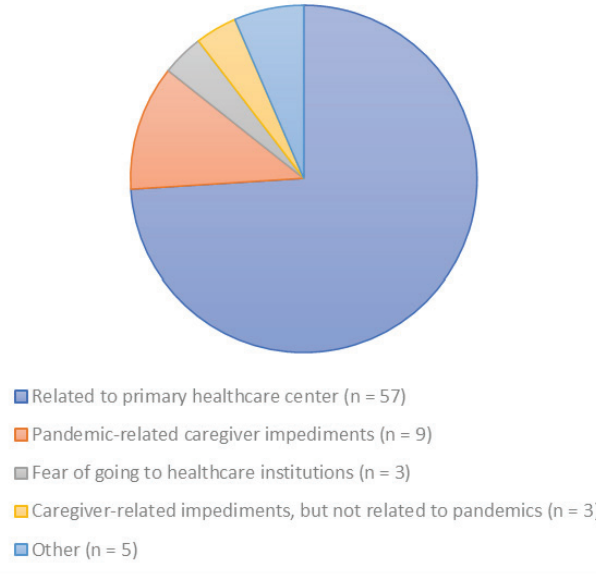

Figure 1. Reasons of delay in vaccination (n = 77).

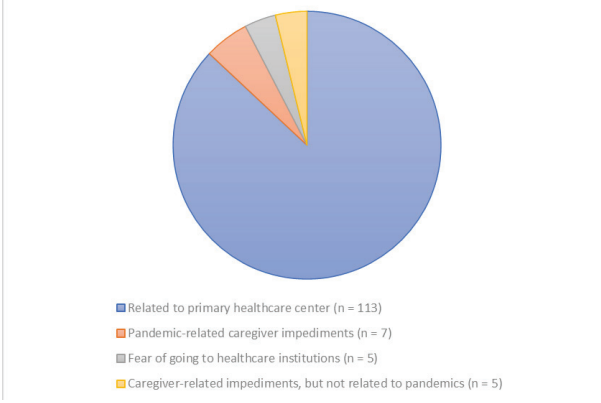

Figure 2. Reasons for deferred appointments (n = 130).

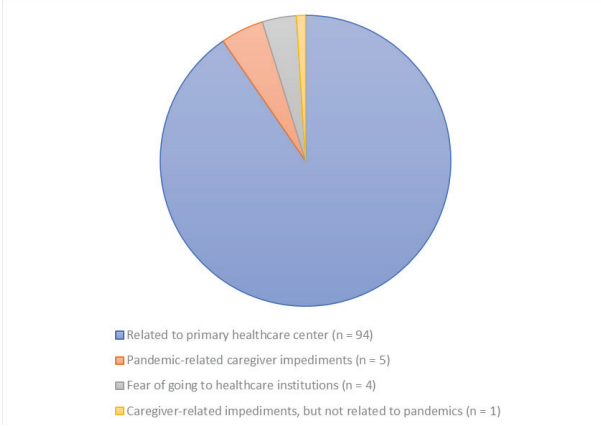

Figure 3. Reasons for cancelled appointments (n = 104).

by another Portuguese study.[9,10] We noticed a decrease in the rate of children who performed the metabolic screening in the primary healthcare center (63.9% *vs* 75% in pre-pandemic years), which can be justified by the realization of this test in hospitals to those whose mothers were infected by COVID-19.[9]

However, the other aspects of children's health care may be compromised, such as immunization which is one of the most cost-effective public health interventions and cannot be delayed.[11] Other countries, both low- and high-income ones, reported disruptions or suspension of routine immunization services.[11-13] The findings of our study also showed a delay in immunization in 17% (n = 77) of children. The Portuguese immunization report showed a higher rate of susceptibility for measles and group C meningococcus in children aged 13 months in 2020 (16% *versus* a rate of 14% of delay in the pre-pandemic year of 2019).[14,15] Considering the need for vaccine coverage of at least 95% to achieve group immunity, this gap should alarm us because of the increased risk of vaccine-preventable disease outbreaks.[15]

To emphasize the impact of this subject, the findings of a large study from eight United States healthcare systems showed that despite the expanded opening of primary care centers from September 2020 and the increase in the percentage of vaccination coverage after the important disruption at the beginning of pandemics, these measures were not sufficient to reach pre-pandemic values and make up for the missed immunization.[12] Therefore, the effects of the COVID-19 pandemic may not be held back in our past history and could be carried forward to the future.

Routine child visits may also have been compromised during this year of the COVID-19 pandemic and may be a cause for the observed delay in immunization, as the results of our study showed. Another study in Portugal showed a higher percentage of children (54.2%) with postponed or canceled appointments by the healthcare center from March to May of 2020, which was probably due to the reason that it elapsed during the first two months of lockdown due to COVID-19 pandemic.[10] There is no available data regarding routine child visits from pre-pandemic years and that was a limitation of our study in terms of data comparison. Nonetheless, this emphasizes the importance of studies, like ours, to capture the overall picture in normal functioning periods as well as in adverse ones.

There are, however, some limitations to our study. Data were gathered by the parents' feedback, which might induce bias because of their personal perception and accuracy of memory. An alternative to avoid this bias would be the verification of each individual health and vaccine report card. Besides that, we realized that a questionnaire through social media posed a natural risk of bias, as it selected only parents with access to such media. We also did not ask parents to differentiate between the type of well-child visits - in person or by phone - and that could be an interesting data point since the physical exam and the evaluation of psychomotor development are so important to detect problems, especially in age below 2 years.

In conclusion, the results of our study showed the disruption of routine child visits and routine immunization caused by the COVID-19 pandemic and the need to optimize compliance with the new guidelines from DGS. As we mentioned, by ensuring well-child visits at key ages, we are providing opportunities to achieve better vaccination coverage and thus preventing outbreaks of preventable disease. Based on the findings of our study, the main reason for the delay or cancellation of appointments or immunization was related to the healthcare center. Therefore, in addition to creating guidelines, we need to create a plan to optimize the response of health resources, especially in the primary healthcare setting, to promote better health surveillance

of children and ensure that the COVID-19 pandemic does not compromise the present and future of our children.

Author Contribuitions

LM, TY, SB and PO participated in the study conception or design. LM and TY participated in acquisition of data. LM, TY, SB and PO participated in the analysis or interpretation of data. LM, TY, SB and PO participated in the drafting of the manuscript. LM, TY, SB and PO participated in the critical revision of the manuscript. All authors approved the final manuscript and are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Conflicts of Interest

The authors declare that there were no conflicts of interest in conducting this study.

Funding Sources

There were no external funding sources for the realization of this paper.

Protection of human and animal subjects

The authors declare that the procedures followed were in accordance with the regulations of the relevant clinical research ethics committee and with those of the Code of Ethics of the World Medical Association (Declaration of Helsinki 2013).

Provenance and peer review

Not commissioned; externally peer reviewed

Confidentiality of data

The authors declare that they have followed the protocols of their work center on the publication of patient data.

Acknowledgments

The authors would like to express special thanks of gratitude to Daniel Marcelo for language editing and proofreading this article.

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Caracterização da Vigilância da Saúde Infantil em Portugal Durante a Pandemia de COVID-19

Introdução: A pandemia COVID-19 impactou os serviços de saúde primários em Portugal. Tendo em conta que os primeiros dois anos de vida são um período de intenso desenvolvimento, é importante cumprir os momentos-chave de rastreio, vigilância e imunização neste período. Este estudo teve por objetivo caracterizar a vigilância de saúde das crianças até os 2 anos, bem como avaliar o cumprimento da norma 008/2020, emitida pela Direção Geral da Saúde a 26 de março de 2020, durante a pandemia COVID-19.

Métodos e Materiais: Estudo transversal com aplicação de questionário anónimo divulgado em redes sociais aos cuidadores de crianças com idade até aos 24 meses. Os dados recolhidos referem-se ao período entre março de 2020 e março de 2021.

Resultados: Este estudo contou com 452 crianças.

A cobertura do rastreio neonatal foi de 99,6%. Relativamente à vacinação, 81,9% das crianças cumpriram o esquema atempadamente e 15,9% com atraso. Cerca de um terço das crianças tiveram as sua consultas atrasadas e/ou canceladas. No grupo de crianças com idade entre os 12-18 meses (n = 150), 69,3% cumpriram o mínimo de seis consultas no primeiro ano e no grupo de crianças com idade entre os 18-24 meses (n = 116), 72,4% cumpriram o mínimo de uma consulta neste período.

Conclusão: É necessária a criação de estratégias para melhorar o cumprimento da norma 008/2020, em especial na área da vacinação e das consultas de rotina em idades-chave, a fim de otimizar os cuidados em saúde infantil mesmo durante a pandemia.

Palavras-Chave: Assistência Ambulatória; COVID-19; Inquéritos e Questionários; Lactente; Pandemias; Portugal; Saúde da Criança; Vigilância em Saúde Pública