

SHORT PAPER

Active immunization status against measles, mumps, rubella, hepatitis B in internationally adopted children, surveyed at the university hospital of Palermo, Sicily

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Abstract

Introduction. The internationally adopted child is a fragile subject who often shows an incomplete health documentation, which hinders the complete assessment of health status.

Materials and Methods. Between January 2010 and June 2016, at the University Hospital “AOUP P. Giaccone” of Palermo, we reviewed the health documentations of 111 children recently arrived in Italy following the conclusion of the international adoption procedure. 62.2% of the children were male, of various nationalities and with an average age of 7 years (± 3.4). This study aims to detect, in the observed sample, the reliability of the vaccinal documentation and the real acquired immunization. We intend to estimate the presence of IgG against Measles, Mumps, Rubella and Hepatitis B viruses.

Results. Percentages of subjects with a complete correspondence between documentation attesting the successful vaccination and the effective immunization were: 78% for measles, 66% for mumps, 84% for rubella, 71% for hepatitis B. Percentages of subjects without vaccinal documentation but with positive evidence of IgG were: 50% for measles, 38% for mumps, 71% for rubella, 50% for hepatitis B.

Conclusion. The partial correspondence found between vaccinations performed and real immune status can be attributed to several reasons: poor reliability of the received health documentation, the complex economic situation of the health services in the countries of origin, the incorrect vaccines storage or the administration beyond the expiration date, the poor immunological response due to concomitant diseases or severe malnutrition, the probable non-administration of the expected booster dose. Particular attention needs to be paid to this population, which may represent a risk group susceptible to vaccine-preventable diseases.

Introduction

Internationally adopted children are vulnerable as they often come from countries with high migration expansion, with inadequate and unequal local healthcare systems.

They often show numerous diseases such as iron deficiency anemia, infectious diseases, rickets, growth disorders and affections related to behavioral and evolutionary issues. An important health problem concerns their immunization status against preventable

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diseases with the most common primary prevention interventions, such as vaccinations (1, 2).

Viviano et Al. showed that many of these children are poorly immunized against diseases such as measles, mumps, rubella and hepatitis B (3). In fact, even if many of them leave their Country of birth with an apparently complete vaccination documentation, doubts can arise regarding the accuracy of the vaccination records and the effectiveness of the vaccines administered, also considering the malnutrition status leading to a possible immunodeficiency. Other issues identified are the inappropriate vaccine management (i.e. cold chain interruption) or administration (i.e. beyond the expiration date), or again the probable non-administration of the expected booster doses recommended by our National Plan of Vaccinations (PNPV 2017-2019), which plans the measles-mumps-rubella vaccine administration between the 13th and the 15th month and a booster dose at the sixth year of life and, for hepatitis B, plans three doses at the 3rd, 5th and 11th-13th month of life (4). The Italian PNPV, often different from those used in the children countries of origin, includes - among its objectives - the reduction of inequalities and the improvement of the health status by promoting vaccination interventions in groups of marginalized or particularly vulnerable populations. These reasons led our research team to examine the immunization status of internationally adopted children and to compare it with their vaccination certificates, focusing on the presence of IgG antibodies against measles, mumps, rubella (MMR) and hepatitis B (HBV).

Materials and methods

The study was conducted between January 2010 and June 2016, at the University Hospital "AOUP P. Giaccone" of Palermo

Table 1 - Sample characteristics (N=111).

Qualitative variables	N (%)
Sex	
Male	69 (62.2)
Female	42 (37.8)
Geographical origin	
Est Europe	90 (81.1)
Africa	12 (10.8)
South America	5 (4.5)
Southeast Asia	3 (2.7)
Portugal	1 (0.9)
Continuous variables	Mean (SD)
Age (months)	84.2 (\pm 41.2)

on 111 children recently arrived in Italy following the conclusion of the international adoption procedure and addressed to our Institution by the Authorities authorized for international adoptions, by the Court for Minors of Palermo or by the Associations of families and adoptive parents. The sample characteristics are described in Table 1. All children underwent a complete clinical examination as well as the assessments expected by the "New indications for the health care of the migrant child" drawn up by the National Working Group for the migrant child of the Italian Society of Pediatrics (GLNBM-SIP) (5). The mean age was 84.2 months (\pm 41.2 SD, 95% CI 76.9 - 92.4). Ninety children came from Eastern European countries (Poland, Russia and Ukraine), 12 from nations of the African continent, 5 from South America, 3 from Southeast Asia and 1 from Portugal. Of these 111 children, 74 (62% male) showed health documentations proving the vaccination against MMR. This assessment was also performed for vaccination against HBV for which there was evidence in 79 subjects (62.2% male). By carrying out the antibody research against the above-mentioned viruses, both the percentage of agreement between the documentation data records and the presence of antibodies, and the percentage of

immunized subjects without a vaccination certificate was calculated. These evaluations were carried out using the “enzyme-linked immuno-absorbent assay” (ELISA) technique. In order to evaluate the differences in antibody positivity against MMR and HBV in children with and without vaccination reported in their pre-adoptive “vaccine cards”, statistical analyses were performed using the Fisher exact test (f-exact). The statistical significance level for the analyses was 0.05. The data were analyzed using the STATA statistical software, version 14.

Results

For subjects with reported vaccine documentation and IgG evidence, correspondence was: 78% for measles, 66% for mumps, 84% for rubella (Table 2), 71% for hepatitis B (Table 3); for those whose documentation did not document the vaccine administration, but in which there was IgG evidence, correspondence was: 50% for measles, 38%

for mumps, 71% for rubella (Table 2), 50% for hepatitis B (Table 3). No statistically significant differences came out between the two groups.

Although a lower percentage of antibody positivity to MMR and HBV has been found in children without a vaccine certificate compared to children with vaccination, the differences did not reach statistical significance (Table 2 and 3).

Discussion

Our study shows that the correspondence between vaccination reported in the health documentation and real immunization is still dramatically low, especially regarding mumps, in relation to the vaccination coverage rates in Italy, currently around 86% for MMR and 93% for hepatitis B (6). The creation of an international computerized immunization registry could facilitate the conservation and consultation of this health information.

Table 2 - Evaluation of antibody positivity for measles–mumps–rubella (MMR) in the 74 children with reported vaccinations or without reported vaccinations in their pre-adoptive immunization record.

Antibody against	Antibody positive/no. of children with reported vaccinations in their pre-adoption records [N (%)]	Antibody positive/no. of children without reported vaccinations in their pre-adoption records [N (%)]	f-exact, P-value
Measles	53/68 (77.94)	3/6 (50)	0.150
Mumps	43/66 (65.15)	3/8 (37.50)	0.146
Rubella	56/67 (83.58)	5/7 (71.43)	0.599

Table 3 - Evaluation of antibody positivity for HBV in the 79 children with reported vaccination or without reported vaccination in their pre-adoptive immunization record**.

Antibody against	Antibody positive/no. of children with reported vaccination in their pre-adoption records [N (%)]	Antibody positive/no. of children without reported vaccination in their pre-adoption records [N (%)]	f-exact, P-value
HBV*	42/59 (71.19)	10/20 (50.00)	0.105

*Anti HBs > 10 mU/mL.

**59/59 children with reported vaccination in their pre-adoptive immunization record are negative to HBsAg, 20/20 children without reported vaccination in their pre-adoptive immunization record are negative to HBsAg.

The main cause, in most cases, is the lack of vaccinal documentation reliability, as already highlighted in scientific literature (5, 7, 8). By evaluating the results in Table 2 and correlating them with previous studies (1-5, 7, 8), the vaccination is unreliable both when the subjects are serologically negative and therefore not immunized after vaccination, and when they have been vaccinated and the documentation is however incomplete. From the beginning of the 2000s to today, the “GAVI” Alliance (Global Alliance for Vaccines and Immunization), a partnership involving public and private subjects with the aim of improving access to vaccination practices for the population in high migration rate countries, has helped to immunize about 500 million children against deadly infectious diseases, playing a role of proven effectiveness in most of the origin countries (9). There is a risk, but it is difficult to define, that the mismatch between reported vaccination and real immunization is due to other factors, such as the complex economic situations of health services in the countries of origin, the difficulty in maintaining an optimal chain of cold during the drug storage phase, the organizational and logistics issues for the capillary achievement of the entire population and the failure to comply with the mandatory requirements regarding those vaccinations deemed essential by the World Health Organization (10). The issue is more evident for anti-HBV vaccination. As reported in Table 3, the subjects that in their health documentations do not have evidence of HBV vaccination are positive for AntiHBs even though they are all HBsAg negative. HBsAg is the surface antigen of hepatitis B and is a marker present in acute and chronic active hepatitis, as well as in healthy carriers; therefore, the subjects at the time of serological analysis were in the window period before seroconversion or none of them came into contact with the virus, thus attributing the HBs antibodies presence to an actual vaccination never reported in the personal

health record. The latter seems to be the most probable hypothesis. The results of the statistical analysis show no statistically significant differences between the two groups. In children, whose health documentation does not report the successful vaccination, there was a lower percentage of antibody positivity for MMR and HBV compared to children with reported vaccination (Table 2 and 3). Furthermore, accurate serological investigations conducted on a large number of abroad adopted children have demonstrated the presence of protective antibody level in most cases towards diphtheria and tetanus; however, about 20% did not have a protective antibody level against hepatitis B, measles, rubella, mumps (8). Therefore, for international adoptions, children should be evaluated for serological IgG antibodies against MMR and HBV in order to schedule a personalized vaccination plan, evaluating treatment from the first dose (11). Particular attention needs to be paid to this population, which may represent a risk group susceptible for vaccine-preventable diseases.

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Riassunto

Vaccini contro il morbillo, la parotite, la rosolia e l'epatite B e stato di immunizzazione nei bambini adottati a livello internazionale monitorati presso il Policlinico di Palermo, Sicilia

Introduzione. Il minore migrante destinato all'adozione è un soggetto fragile che spesso presenta una documentazione vaccinale e sanitaria incompleta, rendendo difficoltosa la valutazione dello stato di salute del soggetto.

Si è cercato, quindi, di rilevare l'attendibilità della documentazione vaccinale e la reale immunizzazione, stimando la presenza o assenza di IgG dopo ricerca sierologica per le vaccinazioni antimorbillo, antiparotite, antirosolia e antiepatite B.

Materiali e metodi. Tra il 1° Gennaio 2010 e il 30 Giugno 2016, presso l'A.O.U.P. "P. Giaccone" di Palermo, sono stati seguiti 111 bambini (62% maschi) di varie nazionalità, età media 7 anni \pm 3,4. Per ciascun bambino sono state acquisite le informazioni riguardanti lo stato vaccinale ed è stata eseguita indagine sierologica (ricerca IgG) per valutare la reale immunizzazione nei confronti di morbillo, parotite, rosolia e epatite B.

Risultati. Tra i soggetti con attestazione di vaccinazione e reale immunizzazione, la corrispondenza è stata la seguente: 78% morbillo, 66% parotite, 84% rosolia, 71% epatite B; tra i soggetti la cui documentazione attestava la mancata somministrazione del vaccino, ma per i quali si è riscontrata positività alle IgG è stata invece: 50% morbillo, 38% parotite, 71% rosolia, 50% epatite B, da ricondurre a immunizzazione naturale o ad erronea compilazione della documentazione sanitaria.

Conclusioni. Si registra una discrepanza notevole di corrispondenza tra vaccinazioni eseguite e reale immunizzazione, da attribuire a scarsa attendibilità delle documentazioni, difficoltà logistiche in cui operano i servizi sanitari dei Paesi di provenienza, non corretta conservazione o somministrazione di vaccini scaduti, inefficace calendarizzazione delle vaccinazioni, scarsa risposta dell'ospite a causa di malattie defedanti o grave denutrizione. È necessario, pertanto, dedicare specifica attenzione a tale popolazione, che può rappresentare una sacca di suscettibilità per le malattie prevenibili con le vaccinazioni.

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