



Factors associated to the vaccination covering in adolescents*

Fatores associados à cobertura vacinal em adolescentes

Factores asociados a la cobertura por vacunas en adolescentes

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ABSTRACT

Objective: To analyze the factors associated to the condition of to be vaccinated among adolescents in an area of the Strategy Health of the Family, in the city of Teresina, state of Piauí. **Methods:** Is a study of quantitative nature and sectional type. The sample was constituted by 261 adolescents and the analysis was carried out through the descriptive statistic. **Results:** The vaccination covering against German measles, measles and mumps was 5.4 %; the vaccination against diphtheria and tetanus was 22.9 %; the vaccination against hepatitis-B was 27.2 % and of 35.2 % against the yellow fever. **Conclusion:** The low vaccination covering found in this study had the following causes: lost of vaccination opportunities (65.5 %); deficiency of knowledge on vaccines, the age group - more than 15 years (Reason of Predominance (RP) = 2.85; Rate of Confidence (IC) 95 % = 1.63-4.99); and the masculine gender (RP = 2.04; IC95 % = 1.15-3.62).

Keywords: Hepatitis B; Epidemiology; Immunization; Vaccination

RESUMO

Objetivo: Analisar os fatores associados à condição de estar vacinado entre adolescentes de uma área da Estratégia Saúde da Família de Teresina - PI. **Métodos:** Estudo de natureza quantitativa e do tipo seccional. A amostra foi constituída por 261 adolescentes e a análise foi realizada por meio da estatística descritiva. **Resultados:** A cobertura vacinal contra rubéola, sarampo e caxumba foi de 5,4%; para a vacina contra difteria e tétano, foi de 22,9%; para a vacina contra hepatite-B: foi 27,2% e 35,2% para a vacina contra febre amarela. **Conclusão:** A baixa cobertura vacinal encontrada neste estudo está relacionada: às oportunidades perdidas de vacinação (65,5%); à deficiência de conhecimento sobre as vacinas, a faixa etária maior de 15 anos (Razão da Prevalência (RP) = 2,85; Índice de Confiança (IC) 95% = 1,63–4,99); o sexo masculino (RP = 2,04; IC95% = 1,15–3,62).

Descritores: Hepatite B; Epidemiologia; Imunização; Vacinação

RESUMEN

Objetivo: Analizar los factores asociados a la condición de estar vacunado entre adolescentes, en un área de la Estrategia Salud de la Familia, en la ciudad de Teresina, en el estado de Piauí. **Métodos:** Estudio de naturaleza cuantitativa y de tipo seccional. La muestra fue constituida por 261 adolescentes y el análisis fue realizado por medio de la estadística descriptiva. **Resultados:** La cobertura por vacuna contra rubéola, sarampión e caxumba fue de 5,4%; para la vacuna contra la difteria y tétano, fue de 22,9%; para la vacuna contra hepatitis-B, fue 27,2% y de 35,2% para la vacuna contra la fiebre amarilla. **Conclusión:** La baja cobertura por vacunación encontrada en este estudio está relacionada a: 1) las oportunidades perdidas de vacunación (65,5%); a la deficiencia de conocimiento sobre las vacunas, al intervalo de edad mayor de 15 años [Razón de la Prevalencia (RP) = 2,85; Índice de Confianza (IC) 95% = 1,63–4,99]; al sexo masculino (RP = 2,04; IC95% = 1,15–3,62).

Descriptores: Hepatitis B; Epidemiología; Inmunización; Vacunación

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INTRODUCTION

Teenagers have been considered a high-risk group for hepatitis B incidence, for they are susceptible to negative pressure from peers, a feeling of invulnerability and immortality, leading to difficulties associating risky behaviors and future consequences. Therefore, studies have been demonstrating an increase of positive results for HBV during teenage years, which extend into adulthood⁽¹⁻²⁾.

Infections by Hepatitis B Virus (HBV) are a worldwide problem in public health. More than 2 billion people have already been infected by HVB all over the world, with about 350 million of which becoming chronicle diseased people. Each year, more than 4 million new and serious cases come up, about 25% of which (1 million people) annually die due to active chronicle hepatitis, cirrhosis, or cancer⁽³⁾.

The most effective way to prevent hepatitis B is vaccination, which has provided great advances to such disease control. Hence, since 1998, the National Immunization Program (PNI – acronym in Portuguese) recommends the universal vaccination of children against hepatitis B, and more than one hundred countries have already included this vaccine in their immunization programs. In Brazil, it has been offered for free to high risk groups since the beginning of the 1990's, and more recently, as of 2001, extended to individuals with up to 19 years old in every region of the country⁽⁴⁾.

Within the current health regulations, vaccination is preferably executed by the Family Health Strategy – ESF (acronym in Portuguese), which relies on a multi-professional team, working with pre-defined territories and population, prioritizing health actions based on a local diagnosis, taking care of families, and providing care throughout the life cycle⁽⁵⁾.

In questions related to teenagers' health, ESF has been seen as a favoring environment to incorporate the integral health proposal for teenagers and youngsters, which aims to: follow up on growth and development, provide nutritional guidance, immunization, educational activities, identify and treat prevalent diseases and aggravations⁽⁶⁻⁷⁾.

Expectations consider that within the ESF teenagers will be welcomed and assisted from a differentiated perspective, in a more contextualized way, understanding that experiences people go through daily protecting their health are partially related to knowing health technologies. Not having constant access to health services means initiatives and changes have to be incorporated to attitudes regarding health⁽⁸⁾.

Taking into consideration the fact vaccines are a collective-comprising instrument, vaccination, in its individual dimension, is understood as and results in protection not only of the vaccinated individual's health against certain diseases, but also of the collectivity, where

such individual is living. Thus, vaccination, even when constantly performed in the health units routine, gains a collective dimension, once it is for individuals inserted in certain social contexts, in a scientific epidemiologic reality⁽⁹⁾.

Upon the facts exposed above, the present study aimed to analyze factors associated to the condition of being vaccinated, among teenagers living in an area covered by the Family Health Strategy, in Teresina/PI.

METHODS

This is a quantitative, sectional study that was developed through domicile inquiries in Teresina (Piauí). The study population was comprised of teenagers living in the area covered by the Family Health Strategy, totaling 44 157 teenagers, ranging from 10 to 19 years of age⁽¹⁰⁾.

According to the study purpose, the World Health Organization (WHO) definition of adolescence – which considers it as being an essential stage between childhood and adulthood, marked with a complex process of biopsychosocial growth and development, comprising the age bracket between 10 and 19 years old⁽⁵⁾ – was used.

With regard to the sample size, studies on vaccine coverage for hepatitis B in the researched literature were taken into consideration, providing rates ranging from 30% to 40%. Based on a 35% prevalence, a tolerable sample error of 7%, and a reliability of 95%, considering a simple and random sample, the expected result was 178 teenagers. However, because this was not a simple and random sample, but determined by group and aiming to correct the imprecision related to the sample design, a design effect (deff) of 1.5 was decided upon. Except for special situations, a 1.4 or 1.5 deff should be enough to keep the desired precision⁽¹¹⁻¹²⁾. Hence, the sample size resulted in 267 teenagers, based on the formulation used for the infinite population calculation, namely: $n = Z^2 \cdot (p \cdot q) / e^2$

Where; n = population size, Z= reliability level, p = assumed prevalence, q = 1-p, and e = tolerable error. Therefore, the result was as follows:

$$n = 1,962 \times 0.35 \times 0.65 / 0.07 = 178 \times 1.5 = 267$$

The employed technique is known as group sampling 30 per 7 and was developed to estimate the vaccine coverage with 10% precision, and 95% reliability. It is based on a population inquiry technique used in the United States of America, in 1965, and further on, in Africa. Ever since, the WHO methodology has been applied with little variations in several parts of the world. However, there is no agreement regarding the obtained

estimations precision⁽¹³⁻¹⁴⁾.

In the present study, each one of the 72 areas covered by a regional health institution in the city was considered a group. Each one had an average of 307 teenagers. The first step was to randomly draw 30 groups. The second, to select seven teenagers from each group, after parents, or the teenager him/herself (in case they were independent) agreed to participate and signed the Informed Consent Term. In order to reach the sample number previously calculated, 9 other groups were added to the original 30 to satisfy the deff, and in the last group (39th group), only one teenager should be investigated so as to reach the sample number of 267.

The third step was to build area maps (sample units). Streets were numbered, and through a simple random draw, the first street teenagers would be selected from was determined. At last, the street side was also drew, and later used as the starting spot. With regard to domiciles, only the first one was drawn. Teenagers from the subsequent domiciles were selected. Aiming to diminish the intra-class correlation, whenever there was more than one teenager in the same domicile, only one participated in the study, upon a draw. When the teenager was not present for the interview, the team returned up to twice to the same domicile. The individuals who refused to participate, totalizing 6, were not replaced by others, resulting in smaller groups (less than 7 teenagers), which were considered losses, totalizing 2.2%.

Socio-economic and demographic data were collected as: vaccine coverage, possession of vaccine card, access to health units in the city, reception at the vaccination room, knowledge about hepatitis B, information sources, and reasons for not taking vaccines.

Data were collected through visits to the researched teenagers' domiciles, using a pre-tested form, between March and April 2008, by the researcher herself and a tem of previously trained nursing undergraduate students.

Forms were reviewed and inconsistencies corrected before data entry occurred. Data were re-categorized so as to transform open questions into closed questions, thus facilitating the analysis process. Further on, they were typed, utilizing the Epi-Info software version 3.4.1. After data entry, the data bank was cleansed and checked.

Teenagers age bracket was sub-divided so as to adapt it to the Sociedade Brasileira de Pediatria (Brazilian Pediatric Society)⁽¹⁵⁾ classification: 10 - 14 years old is considered precocious adolescence, 15 - 16 years old, intermediate adolescence, and 17 - 19 years old, late adolescence. In this study, the two last categories were grouped together (15 - 19 years old).

The vaccine coverage was calculated for all vaccines, along with the respective lost opportunities for vaccination. The calculation only considered proved

information, upon the vaccine card presentation. For the present study purposes, lost opportunities for vaccination (LOV) were defined as situations where the teenager was not vaccinated regardless of going to a healthcare institution during his/her adolescence. Therefore, the LOV calculation occurred through the formulation: $LOV = \frac{\text{number of teenagers who went to a healthcare institution and were not vaccinated}}{\text{number of teenagers who went to a healthcare institution and should have been vaccinated}}$.

With regard to income assessment, a family income *per capita* was calculated, representing the sum of all family members' incomes, divided by the number of family members. Family was defined as a group of people who sympathetically share incomes and consumption⁽¹⁶⁾. The family income *per capita* was divided into five categories, according to a classification used by the IBGE (Brazilian Institute of Geography and Statistics)⁽¹⁷⁾, about the current minimum wage: up to 1/4; more than 1/4 and up to 1/2; more than 1/2 and up to one; more than one and up to two; more than two and up to five.

In an attempt to find the factors related to the condition of being vaccinated, the bivariate analysis was used, with a prevalence ratio (PR) calculation, and a RI of 95%. The discussion considered knowledge generated about the theme, with focus on teenagers' care, according to the authors whose theories supported the present study.

The research project was approved by the Comitê de Ética em Pesquisa da Universidade Federal do Piauí (Committee for Research Ethics of Universidade Federal do Piauí). The participants signed the Informed Consent Term, and had their confidentiality and privacy preserved, according to the principles stated in Resolution n° 196/96, from the Conselho Nacional de Saúde (National Health Council)⁽¹⁸⁾.

RESULTS

The studied teenagers' socio-demographic characterization indicates that with regard to age bracket, 40.6% of the participants were between 10 and 14 years old, and 59.4% were among 15 and 19 years old, the age average was 15 years old; 55.2% were males; 90% were students, and 50.2% had from 6 to 9 years of education; 67% studied in public schools; 85.1% lived with their parents, and 89.3% owned their houses.

As to family income, 51.6% of the teenagers informed having a per capita income of up to R\$ 103.75. Among those who worked, diversified occupations were mentioned, such as: tutors (5), mechanic (3), housekeeper (2), among others. With regard to the families' means of transportation, 56.2% informed they used a bicycle, 28.1% used a car, and 15.7%, a motorbike.

Data presented by Figure 1 show the studied group vaccine coverage compared to the teenagers' basic vaccine calendar. The vaccine coverage found is below recommended levels.

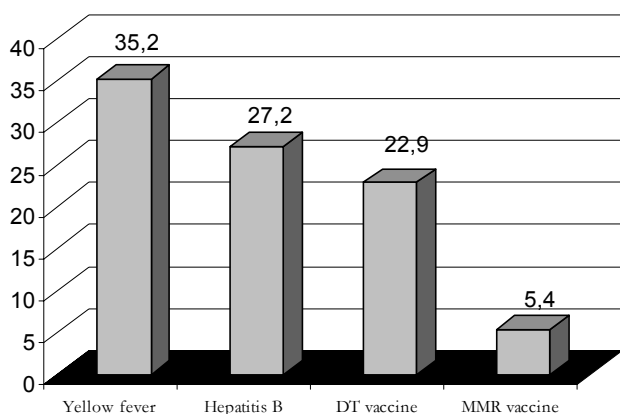


Figure 1 – Studied teenagers' vaccine coverage, according to the vaccine type. Teresina - PI, 2008, (n = 261).

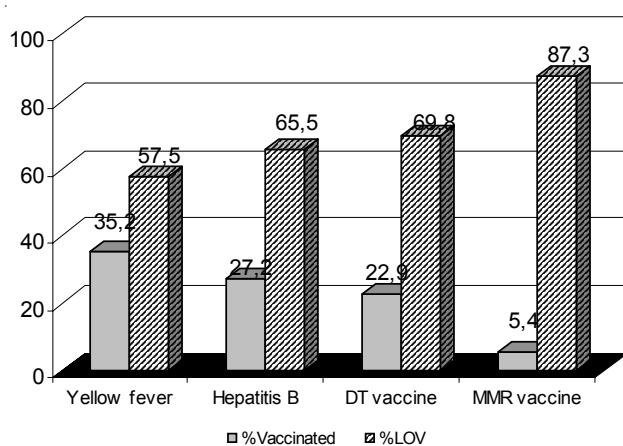


Figure 2 – Studied Teenagers' vaccine coverage and lost opportunities for vaccination, according to the vaccine type. Teresina - PI, 2008, (n = 261).

Data presented by Figure 2 show that the studied teenagers went to healthcare institutions during adolescence and the lost opportunities for vaccination. Out of the interviewed total, 92.7% of teenagers went to healthcare institutions, 87.6% went to public institutions, and 75.2%, less than a year before. The reasons why they searched for healthcare institutions were diversified, 46.3% had routine appointments, here understood as appointments to perform examinations, motivated by individuals responsible for the teenagers, in order to investigate detectable alterations through the urine summary, blood count and parasitological test, to check for anemia or worm presence. Among the teenagers, 24.8% reported having some disease at the time, 17.8% reported having searched for the vaccination

service, and 80.2% of the teenagers classified the healthcare institution as good.

Among the 242 teenagers who went to a healthcare institution, 97 (40.1%) received information about vaccination, and 145 (59.9%) did not. Better access to information was verified in the community, where 57.1% of the interviewed individuals affirmed they were oriented with regard to vaccination, 48.3% of which received information at school, and 43.0, at home. The professional who provided most information was the health community agent (46.1%).

With regard to knowing the teenagers' vaccine calendar, 60.2% informed they did not know anything about it. Among the 261 teenagers, 39.8% had a vaccine card, and 58 (22.2%) reported having the card, but not being able to find it; in this study, the second group was included in the group who did not have a vaccine card. Among the reported reasons why interviewees did not have the card are: loss (44.0%); not being able to locate it, or not being able to remember where it was kept (43.3%), and having forgotten it in another house (9.7%).

As to vaccines, 48.6% mentioned they knew the vaccine against yellow fever, which can be attributed to the informative campaigns about it, publicized in the media, due to the jungle yellow fever epidemic in the Middle-West Region of Brazil, in the beginning of 2008; about one third of the interviewees knew about both the vaccine against hepatitis B and the vaccine against tetanus.

Teenagers reported having a lack of knowledge about vaccines, only one third reported they knew how the yellow fever vaccine offered protection; and less than 20% reported they had knowledge about the hepatitis B, and 18.7% knew the DT vaccine. Regarding the DT vaccine, they only reported the protection it provides against tetanus. As to the MMR vaccine, only 3.1% knew about the protection it provides against rubella, and 2.7%, against measles.

Among the factors that could be related to the lack of vaccination for teenagers, fear of receiving vaccines was researched, and 63.2% reported they were not afraid of it. Among those who reported being afraid (36.8%), fear of needles can be highlighted (48.9%), as well as pain (41.6%).

With regard to being vaccinated against hepatitis B, a higher prevalence was found among the teenagers between 10 and 14 years old (RP = 2.11; IC95% = 1.41–3.17) who were females (RP = 1.69; IC95% = 1.09–2.61), when compared with the age bracket ranging from 15 to 19 years old, and male teenagers, respectively. The fact interviewees worked or had an income did not increase vaccination adhesion. No significant rates related to teenagers' access to healthcare services and vaccination adhesion were found either.

A higher prevalence of vaccine coverage against

hepatitis B was identified among teenagers who knew the teenagers' vaccination calendar (RP = 1.94; IC95% = 1.30 – 2.90), and who had been informed about vaccines in healthcare institutions (RP = 1.74; IC95% = 1.15 – 2.63), when compared, respectively, to the teenagers who did not know the vaccination calendar, and the ones who had not been informed about vaccines. As to the variables: having access to information about vaccines out of healthcare institutions (mainly at school and at home), and knowing where the facilities are and when vaccination takes place, did not increase the prevalence of having received a vaccine against hepatitis B.

It was also possible to verify that the relationship between being vaccinated against hepatitis B and having children (or not) was not a significant among the teenagers; not being afraid of taking vaccines did not increase the vaccination prevalence (RP = 1.05, IC 95% 0.70 – 1.58).

DISCUSSION

In the present study, more than 50% of the teenagers were part of low income families, according to the *per capita* income classification used by the Brazilian government social programs⁽¹⁹⁾, with a *per capita* income around R\$ 100.00. Families are considered extremely poor when their monthly income does not exceed R\$ 60.00, and poor when it ranges from \$ 60.01 and R\$ 120.00, making them even more vulnerable.

Regarding the studied group vaccine coverage, where the previously mentioned scheme was assessed, it was lower than recommended for all vaccines. Although a national vaccination calendar was adopted, and vaccines are free, their use depends on a personal decision made by the teenager to take the vaccine. Educational actions with the community's own resources, and health practices reorganization in the vaccination facilities, as well as sharing the responsibility for protecting are important steps towards a wider initiative attempting to solve health problems, specially, vaccine coverage^(3,20).

A study with the hepatitis B theme⁽²¹⁾ found 72% vaccine coverage among teenagers, showing that deciding to implement vaccination strategies among this population is feasible. In this study, from 261 teenagers, 103 (39.5%) had received the first dose of the vaccine against hepatitis B; 32.2%, had received 2 doses, and 27.2% (71), had the three necessary doses, that is, among 103 teenagers who started the process, only 68.9% finished it, resulting in 31.1% abandonment. The abandonment rate concerns the percentage of teenagers who did not receive the minimum dosage. This is attributed to several factors, among them, lack of clarifications regarding the type of vaccine administered

and the number of dosages it requires⁽²⁰⁾.

When assessing the low vaccine coverage found, it is worth highlighting the lost opportunities for vaccination (LOV), which are not part of the present study objective, but were included, complementing the obtained results, for they represent significant data.

According to the Health Pan-American Organization⁽²²⁾, a lost opportunity for vaccination occurs when a person who could be immunized with no contraindications goes to a healthcare institution and does not receive the necessary vaccines. It is important to say that 92.7% of the teenagers went to healthcare institutions for diversified reasons, and only 40.1% had access to information about vaccination, demonstrating that healthcare professionals did not request or look at the teenagers' vaccine cards in the occasion, so as to identify possible candidates to vaccination.

Studies have been demonstrating that professional negligence regarding vaccine cards observation, among other negative attitudes, has become one of the main LOV causes, and consequently, contributed to low vaccine coverage⁽⁸⁾.

It was possible to observe that the studied teenagers were lacking knowledge about vaccines recommended in the vaccination calendar, for only 19.9% reported they knew what type of protection the vaccine against hepatitis B offered. Not knowing the teenagers' vaccination calendar increased the vaccine non-acceptance among the interviewees (RP = 1.94; IC 95%: 1.30 – 2.90), and not having access to information decreased the vaccination adhesion, when compared to the informed group (RP = 1.74; IC 95%: 1.15-2.63).

In this study, being a student did not present a significant statistic association with the condition of being vaccinated against hepatitis B, however, it is important to consider the clinical significance. In a study performed at a school⁽¹⁾, among 195 students who took the first dosage, 93.3% successfully completed the vaccine scheme, therefore corroborating with previous studies in developed countries, where school was found to be an environment that facilitates the three dosages to be given to students. The long period of time between the second and third dosages has been pointed out as an obstacle for the vaccine scheme to be concluded.

With regard to the age bracket, the lack of adhesion to the vaccine was higher among teenagers ranging between 15 and 19 years old, when compared to the age bracket of 10 to 14 years old (RP = 2.11; IC 95%: 1.41-3.17). The practice of vaccination in Brazil is focused on prevention and protection against diseases, prioritizing children. Families value such health practice; they participate and respond for their members' health.

The results found in the present study demonstrate that family care is extended to teenagers when they are

younger, for older teenagers are considered to be more independent from family care, and because having a feeling of immortality is peculiar to this age bracket, they do not value primary care provided to protect and promote health.

In this study, being a male decreased vaccine adhesion (RP = 1.69; IC 95%: 1.09-2.61). A similar result was observed in a research performed in the United States of America⁽²³⁾, which assessed risk factors related to not accepting the vaccine, and revealed that female teenagers were more likely to accept the vaccine against hepatitis B. On the other hand, a study that assessed risk factors associated to not accepting the vaccine⁽²⁴⁾ revealed that men were significantly more likely to accept the vaccine against hepatitis B than women (43.2%) ($\chi^2 = 175.16$; $p < 0.01$).

The health model adopted in the researched city determines that vaccines are provided through basic care, especially through the Family Health Strategy, that aims to integrate the complexity of individual, collective, curative, and preventive actions promoting health, facing and solving health problems in a pre-defined territory. The results obtained with this research indicate that Family Health team should invest in an educational process about health, generating awareness among teenagers with regard to the need for vaccination.

The main health-related challenge is the humanization of healthcare practices, enhancing the relationship between technical foundations and values associated to the teenagers' happiness and existential projects. It is important to rethink the vaccination practice as an encounter of subjects, and to share actions and commitments⁽²⁵⁾.

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FINAL CONSIDERATIONS

When thinking about factors related to vaccine coverage against hepatitis B among teenagers, the present study revealed a low coverage, which is related to lost opportunities for vaccination and lack of knowledge about vaccines.

Considering that this study was performed in areas covered by the Family Health Strategy, and that vaccination is a priority within the healthcare system, a more knowledgeable population was expected to be found, mainly with regard to the vaccination calendar and the protection provided by vaccines, for education initiatives in health should contribute to a higher vaccine coverage.

The LOV occurrence was a surprising finding for being one of the causes for low vaccine coverage, indicating that healthcare professionals should be aware, so as to get more involved in the vaccination activity.

Vaccine coverage for teenagers can be improved if vaccines are provided at school, which could play an important role in a wide teenager care program, along with the Family Health Strategy. The vaccination practice is extremely valuable, for it is a health technology that uses the most powerful tool against aggressive agents (the vaccines), breaking several diseases transmission chains. However, it involves rebuilding knowledge and practices with new dimensions for care, considering that teenagers, as critical and thinking beings, have the capacity to assess values and whether to incorporate and modify them or not, according to their own ideas.

It is important to highlight that all teenagers who participated in this study and did not have updated schemes were forwarded to the vaccination facilities at the Family Health Units.

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