Immunization Coverage Evaluation for the Period of years 2012-2016 in Korce-Albania

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Doi:10.19044/esj.2020.v16n6p55 URL:http://dx.doi.org/10.19044/esj.2020.v16n6p55

Abstract:

Objective: The objective of this study was to evaluate vaccination coverage retrospectively from birth to 14 year-old children for the period of years 2012-2016, considering also some factors that influence vaccine uptake. **Methods:** Immunization coverage is the proportion of the number of children vaccinated and those scheduled for vaccination. In this study, this value was calculated referring to the national immunization schedule against diphtheria, tetanus, pertussis, Hepatitis B, mumps, rubella and measles for the district of Korça. **Results:** Vaccine coverage levels referring to this district for MMR vaccine resulted to be 97.4% and for Hepatitis B vaccine resulted to be always above 98%. As for the third dose of the DTP-HepB-Hib vaccine, the average value was found to be 96%. **Conclusion:** The 2015-2016 period showed an increase in vaccine coverage values for the DTP vaccine. Also, during this period there was a noticeable drop in the coverage levels for the third booster dose of the penta-valent vaccine (DTP-Hep.B-Hib). Vaccine coverage values analyzed for the year 2016 showed a non-optimal continuity regarding to the fourth booster dose of TT/ Td vaccine.

Keywords: Schedule, Strategy, Booster Dose, Vaccine Uptake

Introduction

Vaccination against infectious agents is one of the most widespread and consolidated approaches to the primary prevention of diseases in the population of the world. Vaccines are generally safe, and serious adverse reactions are uncommon (WHO, 2013). Routine immunization programmes provides protection from a number of infectious diseases that previously caused millions of deaths each year (WHO, 2019), (Plotkin, 2014).

In the present time, vaccines against diseases such as HIV, malaria, cancer, are under different stages of clinical trials (Delany, Rappuoli & De Gregorio, 2014).

In Albania, the national immunization programme has undergone several stages, during which new antigens have been added; the origin of antigens, the forms of combination or their administration have changed too. Immunization coverage rate is an index of the vaccination programme performance and provides an overview of immunity in the population (Wallace, Ryman & Dietz, 2014). This indicator does not give information about the level of protection (Andre et al, 2008). The goal of this public health intervention is to reduce the incidence of vaccine-preventable diseases by administration of potent vaccines administered at the appropriate ages (Grrenwood, 2014; Katz, Wild, Elmore & Lucan, 2013).

A series of specifically modified antigens with diverse potences, that can stimulate different levels of active immunity in an individual have been produced using various technologies (Pojani, Nelaj & Ylli, 2017). In the recent years a trend toward the use of combined vaccines is noticed with the purpose to increase the practicality of application achieving high coverage for more than one antigen at the same time and minimizing logistical problems (Lahariya, 2015).

National coverage for routine child immunization with DTP vaccine exceeds the level 95% in 2015 and 2016 as a result of using the combined DTP-HepB-Hib vaccine (Pojani, Nelaj, 2016). Immunization coverage of the value 98% was estimated for Diphtheria-tetanus-pertussis (Pojani, 2017).

In this study, the vaccine coverage has been analyzed precisely for the region of Korca as it represents a city that lies in the southeast of Albania with a large territorial area, about 1800 km^2 and also with a strategic geographic position bordered by two important countries in the Balkans.

Subjects and Methods

This study intended to demonstrate how a very important indicator such as the vaccination coverage can affect and describe the immunization situation in a particular district like Korca in the period from 2012 up to 2016. Immunization coverage is usually assessed on the basis of the percentage of children who have received a certain number of recommended vaccine dose

(WHO, 2018). The vaccination coverage is expressed as a proportion of the number of children vaccinated and the number of children scheduled for vaccination (WHO, 2009) referring to vaccines within the routine immunization schedule (e.g. diphtheria, tetanus, pertussis, Hepatitis B, DTP-Hep.B-Hib, MMR). The data needed to evaluate and analyze the levels of vaccination coverage for this city were provided by the Regional Public Health Directorate, Epidemiology Sector in Korca.

The data analysis was performed using SPSS version 21.0. Immunization coverage was calculated by the formula below.

$$Immunization\ coverage\ (\%) = \frac{The\ number\ of\ vaccinated\ children}{Number\ of\ children\ scheduled\ for\ vaccination}\ x\ 100$$

Results

Children of one year old age undergo a MMR vaccine followed by a booster dose which is given at the age of 5. Vaccination coverage for the first dose of MMR vaccine for the year 2016 is calculated to be 96.4% and 99% relative to the booster dose. For the first booster dose of DTP vaccine, year 2015 showed a high coverage value (98.7%) in comparison to other years considered in the study. As for the DT and Td vaccine a high coverage value (98.6 and 99.3% respectively) was calculated in 2013. Table 1 presents the analysis of the vaccine coverage value for each year.

Vaccine type / Year	**Hep.B-0**	**DTP-Hep.B-Hib (1)**	**DTP-Hep.B-Hib (2)**	**DTP-Hep.B-Hib (3)**	**DTP**	**DT**	**Td**	**MMR**	**MMR 1-Booster**
2012	99.6	99.3	98.7	98.2	98.4	98.6	98.8	99.1	99.3
2013	98.9	98.2	98.3	97.0	98.4	98.6	99.3	98.1	95.7
2014	99.1	98.1	98.7	95.6	96.3	96.9	96.7	95.7	95.9
2015	99.7	99.7	98.5	99.4	98.7	96.9	95.6	96.5	97.0
2016	99.7	97.6	99.4	90.0	97.5	97.4	97,7	96.4	99.0
Average value (%)	99.4	98.5	98.7	96.0	97.8	97.7	97.6	97.2	97.4
95% CI:	99.0-99.7	97.8-99.3	98.3-99.0	92.8-99.2	96.9-98.7	96.9-98.4	96.3-98.9	95.9-98.4	95.9-98.8

Table 1: Immunization coverage (%) for the period 2012-2016 in Korça region

Table 2 presents vaccine coverage values for vaccines applied during the first 24 months of child's life.

Vaccine type / Year	Hep.B-0	DTP-Hep.B-Hib (1) 2nd month	DTP-Hep.B-Hib (2) 4th month	DTP-Hep.B-Hib (3) 6th month	MMR	DTP
2012	99.6	99.3	98.7	98.2	99.1	98.4
2013	98.9	98.2	98.3	97.0	98.1	98.4
2014	99.1	98.1	98.7	95.6	95.7	96.3
2015	99.7	99.7	98.5	99.4	96.5	98.7
2016	99.7	97.6	99.4	90.0	96.4	97.5
Average value (%)	99.4	98.5	98.7	96.0	97.2	97.8
95% CI:	99.0-99.7	97.8-99.3	98.3-99.0	92.8-99.2	95.9-98.4	97.0- 98.7

Table 2: The coverage for the vaccines applied within the first 24 months of life for the Korça Region

Based on the evidences and calculations, the average value of vaccine coverage for Hepatitis B vaccine in the period 2012-2016, resulted to be 99.4% (95% CI 99.0-99.7%). As for the DTP-Hep.B-Hib vaccine the coverage values were calculated 98%.

Vaccine coverage value for DTP-Hep.B-Hib3 vaccine (since 2009 the Hepatitis B component was included in the combined penta-valent DTP-Hep.B-Hib vaccine), during 2016 was found to be below 95% (95% CI: 92.8-99.2). As for the trivalent vaccine MMR, 2012 and 2013 cohorts represented high levels of vaccine coverage with a value of 97.2% (95% CI: 95.9- 98.4%).

Immunization coverage: HepB-0 (the first dose immediately administered at birth)

Referring to the first dose of Hepatitis B vaccine, administered to all neonates at birth or immediately afterwards, as presented in Chart 1, the annual average values of vaccine coverage for the period 2012-2016 resulted to be above 98%, especially for 2015 and 2016 cohorts where the value calculated was 99.7%.

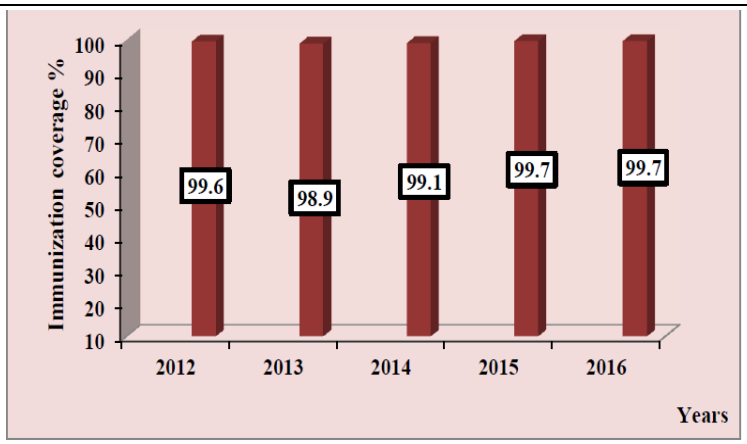

Chart 1: Immunization coverage for the (HepB-0) dose immediately administered to neonates at birth; period 2012-2016 in Korça Region.

Immunization coverage in childhood (5-6 year old children)

Considering the trivalent vaccine MMR, specially the first booster dose applied to children at 5, for the same period (2012-2016), the average values of vaccine coverage resulted to be 97.4% (95% CI: 95.8- 98.8%), according to the Table 3 below.

Vaccine type / Year	MMR 1°	DT
2012	99.3	98.6
2013	95.7	98.6
2014	95.9	96.9
2015	97.0	96.9
2016	99.0	97.4
Average value (%)	97.4	97.7
95% CI:	95.8- 98.8	96.9- 98.4

Table 3: Vaccine coverage for some vaccines applied to 5-6 year old children in Korça District

Immunization coverage for vaccines applied in adolescence (14-18 years old)

Immunization coverage levels for the reinforcing dose of combined tetanus/diphtheria vaccine appeared to be higher than the values considered as optimal, in fact an average value of 97.6% (95% CI: 96.3- 98.9%) was observed. On the other hand, regarding the fourth booster dose of TT/Td vaccine, the immunization coverage levels for 2014 and 2016 never reached the recommended value (95%) and in fact it reached an average of 91.7% (95% CI: 87.8- 95.5%).

Discussion

Immunization schedule in Albania has been improved gradually by adding new vaccines or new vaccine components such as rubella component (generating the MR vaccine) introduced in 2000 and mumps component in 2005, generating the MMR vaccine in current use by the national immunization calendar.

Referring to the vaccination programme, all children should get four doses of DTP vaccine, one dose at each of the following ages: the first booster (DTP) at the age of 2, the second booster (DT) at the age of 6 years, followed by a third and a fourth booster dose (Td) which are applied at the age of 14 and 18.

Based on the evidences, Hepatitis B vaccine attains sustainable levels even in national extend. As for the coverage values of vaccines applied during the first 24 months of child's life, Chart 2 clearly shows high levels of immunization coverage reflected by this district for the DTP-Hep.B-Hib vaccine.

Immunization coverage: HepB-0

Hepatitis B is a life-threatening liver infection caused by the hepatitis B virus (HBV). It is a major global health problem (Chang, Chen, 2015). The vaccine against hepatitis B is 95% effective in preventing infection and the development of chronic disease and liver cancer due to Hepatitis B (Bhat, Ghali, Deschenes & Wong 2014). It is extremely necessary that all neonates should get the first dose of Hepatitis B vaccine shortly after birth, because reduces the risk of getting the disease from mother or family members who may not know they are infected (WHO, 2008). The average values of vaccine coverage for the period 2012-2016 referring to this vaccine resulted to be always above 98%.

Immunization coverage in childhood (5-6 year old children)

Immunization coverage levels for vaccines applied to children at the age of 5- 6 are high and stable. This growing trend is perhaps related to the hypothesis that parents with under two year old children have different opinions compared to the six-year-old children parents.

Imunization coverage for vaccines applied in adolescence (14 – 18 year old)

In Korça district, for the year 2014, 2900 adults of the age 18 to 19 were planned to receive the booster dose of tetanus/diphtheria (TT/Td4) vaccine; but in fact, only 87.8% of them were vaccinated. A slight increase of vaccine coverage level was observed in 2016 (Table 4), with an average value of 94.0%.

Vaccine type / Year	Td-3	TT / Td-4
2012	98.8	--------
2013	99.3	--------
2014	96.7	87.8
2015	95.6	93.2
2016	97.7	94.0
Average value (%)	97.6	91.7
95% CI:	96.3- 98.9	87.8- 95.5

Table 4: Vaccine coverage for vaccines applied in adolescence in Korça district

For this age, a greater attention is needed to improve the access to vaccination services. The immunization coverage values observed in 2016, showed a non-optimal continuity of these levels, especially when referring to the third dose of pentavalent vaccine which was calculated to have a 90.0% value. (Chart 2).

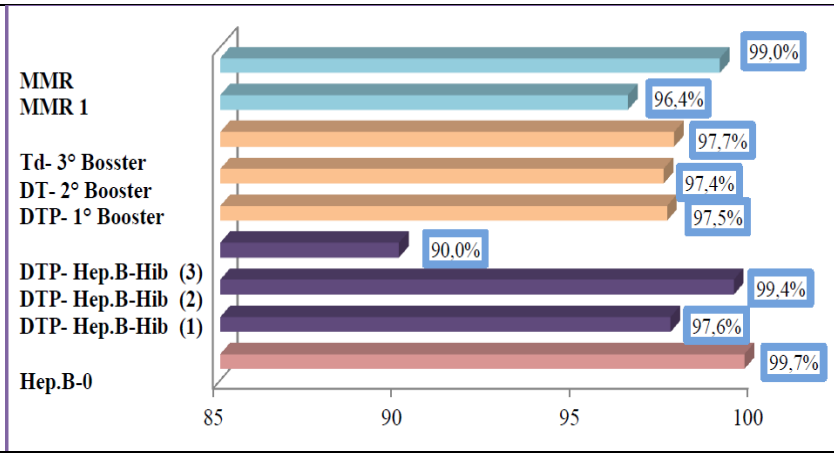

Chart 2: The coverage for the vaccines considered in the study for the year 2016 in Korça district

Conclusion

During the three years period, 2012 to 2014, stable coverage values were estimated except those offered by measles vaccine, for which a decrease was reported in 2013, and for DTP-1 vaccine especially in 2014. Immunization coverage values for DTP vaccine for the period of years 2015-2016 showed a visible increase for the first dose of Hepatitis B vaccine. As for the third dose of DTP-HepB-Hib vaccine, in the same period we noticed that the values of immunization coverage were decreasing.

Considering the data analyzed for the year 2016, we noticed a non-optimal continuity regarding to the fourth booster dose of TT/ Td vaccine and to the third dose of pentavalent vaccine, too (90.0%).

A threat to the immunization program that needs to be considered in the future (Pojani, Ylli, 2016), remains the tendency towards an unreasonable concern about vaccinations and the global refusal, which is being noticed, in implementing them (Damnjanović et al, 2018), (Grzybowski et al 2017). According to the most recent WHO and UNICEF immunization data, nearly 1 in 10 infants worldwide did not receive any vaccinations in 2016 (WHO, 2017).

In order to continue maintening high levels of vaccination coverage, the following steps are highly recommended: closely tracking and monitoring the vaccination calendar for all children in Albania, strengthenin the surveillance and working to eleminate the receptive pockets presented by still unvaccinated children due to parents' negligence or refusal.

Regarding the analysis of Korca regional immunization program in 2015 and 2016, was observed and increase of about 25% of the number of vaccination rejection without a clinical reason. We recommend special attention be given to vaccination of children living in urban aereas and it is also important to supervise the preservation of protection levels for all age groups and geographical areas in Albania.

The vaccination programme should ensure the equality of the coverage among the population. It should be noted that an effective vaccination programme must be accompanied by an effective surveillance of diseases to be controlled.

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