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Evaluation of Knowledge on the Extended Program Immunization (EPI) and Study of Completude of Vaccines in Health District of Guediawaye in Senegal in 2018 (Descriptive Study)

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Abstract: ***According to WHO-UNICEF report in 2019, despite the performance of the extended immunization program, the target of 90% coverage in 2018 has not been reached for any of the antigens in Senegal. The objective of the study was to evaluate the knowledge of the parents on the extended vaccination program and also the completeness of vaccinations of the children in Guediawaye health district. Method: This was a descriptive and analytical cross-sectional study that lasted 6 months in 2018 at the various health stations in the Guediawaye Health District. All children attending vaccination services at the various health stations in the Guediawaye health district were included in the study. The questionnaire used focused on the following areas: age, position in siblings, inter-reproductive space, socio-economic level, parents' knowledge and perception of the extended immunization program. The evaluation of the completeness of the vaccines was carried out using data from the vaccination records. The data analysis was done with the package survey of the software R which allows to take into account the clusters. Results: A total of 487 children were enrolled in the study. The median age was 26.6 months and just over half of the children were 24 months and older. The mother was the main respondent (n=93.2%), followed by aunts (3.1%) and grandmothers (2.1%). According to immunization diary data, 96 children (20%) had delayed immunization. These delays were mainly associated with statistically significant differences: the number of persons aged 15 to 49 in the household, the low level of education of fathers, the tenant status of parents and the lack of awareness of administrative frequencies. Conclusion: Awareness-raising campaigns, the reinforcement of women's education, the involvement of all members of the household as well as the improvement of socio-economic status will help to combat these delays.***

Keywords: extended programimmunization, vaccine delay, vaccine completeness

1. Introduction

In Senegal, as in other countries of Sub-Saharan Africa, vaccine-preventable diseases are among the primary causes of morbidity and mortality in children under 5 years of age [6]. Compliance with vaccination recommendations is essential to help reduce child mortality [1].

Since 2001, the expanded vaccination program in Senegal has been dynamic, efficient and currently covers 12 diseases. In 2004 Senegal introduced the Hepatitis B vaccine into the program and in 2005 that against Hib infections as a pentavalent vaccine. DTP3 coverage increased from 52% in 2001 to 93% in 2017, that of the measles vaccine from 48% in 2001 to 90% in 2018 [7]. Overall in 2017 the 90% coverage target was achieved for all antigens except IPV, YFC and hepatitis B at birth [3] [7]. Senegal was declared free of indigenous Polio Virus in 2004 [4] [3]. Since 2004 no case of death due to measles has been notified whereas the country had registered more than 1000 cases in 2001 (4). All health districts in 2009 reached the target of less than one case of maternal and neonatal tetanus per 1000 live births. The validation of the elimination of neonatal Tetanus by the country was effective in 2011. All districts had to organize preventive or response campaigns against yellow fever between 2002 and 2007. The incidence of bacterial Hib meningitis in children under the age of 1 rose from 21.5 cases per 100,000 to 1.4 from 2003 to 2007 following the introduction of the vaccine in 2005 (4) . Between 2013 and 2015 the country introduced vaccines against Pneumococcus, rubella, rotavirus diarrhea as well as a second dose of measles and the inactivated polio vaccine in its program [4].

According to the WHO-UNICEF report in 2019, despite the extended immunization program performance, the coverage target of 90% in 2018 has not been achieved for any of the antigens in Senegal [7].

Overall immunization coverage, which was 83% in 2018, however, hides disparities in the regions and districts of the country [3].

The survey aimed to assess the knowledge, attitudes and practices of the community regarding the use of the services of the Expanded Program on Immunization.

2. Material and Method

2.1 Type of study

It was a descriptive and analytical cross-sectional study that

lasted 6 months in 2018.

2.2 Study framework

The study was carried out at the various health stations of the Guediawaye health district in Senegal.

2.3 Study population and inclusion criteria

All children attending the vaccination services of the various health posts of the Guediawaye health district were included in the study within six months of the study. Children of non-consenting parents were excluded from the study.

2.4 Data Collection

The data were collected using a questionnaire which focused mainly on the individual characteristics of the children (age, position in siblings, inter-reproductive space), socio-economic level, parents' knowledge and perception of the Expanded Program on Immunization.

2.5 Statistical Analysis

The data was analyzed with the Survey package of the R software which allows to take into account the clusters. This analysis of the data consisted of two parts: a descriptive part and an analytical part. A bivariate and multivariate analysis that took into account the confounding factors was used in the analytical part. In total, three models were developed. The dependent variable was the completeness of immunization status in children. In the first model we had as explanatory variables the individual knowledge and characteristics of the child, the second knowledge and perception, individual characteristics of the child and in the third knowledge, attitudes, individual characteristics of the child and the Economic Position Index.

2.6 Ethical and regulatory aspects

The study was financed by the African Centre of Excellence for Maternal and Child Health (CEA-SAMEF) which is a public consortium of scientific cooperation placed under the supervision of the University Cheikh Anta Diop of Dakar. Newsletters have been sent to various administrative and health district authorities. Informed consent was requested from all 18 year olds and over participating in the study (babysitters).

The identity of the individuals who agreed to participate was noted on a specific card and kept secret. Anonymity has been respected. The completed collection sheets and the databases were kept in a secure place.

The approval of the Cheikh Anta Diop University Health Ethics Committee in Senegal was required before the start of field activities (Reference of the approval: 0260/2017/CER/UCAD).

The inclusions were made at the level of the vaccination units under the supervision of the Head Nursing Officer and the investigator.

At the immunization unit level, consent was obtained from the child's parent or guardian individually in an office.

3. Results

3.1 Data collected from children

A total of 487 children were enrolled in the Guediawaye district. The median age was 26.6 months and just over half of the children were 24 months and older (Table I). A male predominance was noted with a sex-ratio of 1.22. The mean inter-reproductive space was 42.09 months with a standard deviation of 29.9.

3.2 Data collected from parents or guardians of children

The mother was the main respondent (n = 93.2%) (Table II) followed by aunts (3.1%) and grandmothers (2.1%). The implication of the male gender was not felt. The parents were almost all married (94.9%) and were mostly in a monogamous regime (4/5). Regarding parental education, 80% of women had a low level of education. Men were more educated with just over 50% of fathers having at least secondary education (Table III). Over half of the women (64.1%) were unemployed and 66.5% of the men were self-employed.

Respondents were most often tenants (56.3%) (Figure 1). The average number of rooms was 3 with a standard deviation of 1.5 and extremes of 1 to 10. The median was 3 pieces.

3.3 Vaccine delay according to parents

According to the parents, 445 (91.4%) children were up to date and 42 (8.6%) were delayed compared to the vaccination status (Table IV).

The causes of the delay were various. They were often attributed to illness, travel, moving, forgetting... (table V).

The state of knowledge and perception about vaccines often depended on the question asked. The majority of parents had a problem with the frequency of administration, knowledge of the age of vaccination and side effects of vaccines (Table VI).

3.4 Analytical results of immunization delay (table VI)

According to the data collected on the vaccination card, 96 children had an out-of-date immunization status.Vaccine delay was more prevalent in children over 12 months of age ($p = 0.004$). Delays were also found with a statically significant difference, in households with fewer individuals aged (1-2) 15-49 ($p= 0.044$), when fathers' education level was low ($p= 0.011$), among renters ($p= 0.037$). Lack of knowledge of the frequency of administration also impacted on delay with a value of $p= 0.027$.

4. Discussion

Out of 487 children enrolled, 42 had incomplete immunization status, i.e. a prevalence of 8.6%. An even

higher rate of incomplete vaccination (60%) had been found in Yaoundé in 2018 by Félicitée N [2].

In Senegal, in Kaolack had regained a prevalence of fully unvaccinated children of 12.1% [9].

Among the children who were late with their vaccinations, 23% of the parents were completely unaware.

A higher rate of ignorance among mothers of children with delayed immunization was noted in the study by Félicicitée N. with a prevalence of 65.9%.

POUTH et al. in 2014 showed in their study that the lack of control by the mother/nurse of the vaccination schedule was the independent predictive factor most significantly associated with vaccine incompleteness. It was cited in his study as the primary cause of non-vaccination by mothers of unimmunized or partially immunized children. Parents did not adequately control at what age the child should start and finish vaccines, or even the total number of vaccines to be taken [8].

Immunization delay was primarily a function of parental education, occupation status, and knowledge of the frequency of vaccine administration.

A study conducted in Cameroon by Pouth in 2012 on immunization coverage and factors associated with completeness had shown that mothers who were afraid of side effects (p=0.04) were not aware of the importance of vaccination (P=0.013, who had missed immunization opportunities (P=0.0055), who took more than one hour to immunize their child (P=0.0005), and who did not master the immunization schedule (P=0.00001) were significantly associated with non-completion of childhood immunization [8].

Ndiaye et al. in 2009, showed in Ndoulo (Senegal) that dropouts or delays were more a function of booklet availability, poorly known vaccine reactions and missed vaccination schedules [5].

5. Conclusion

The study included 487 children with an average age of 27.14 months, with just over half over 24 months of age.

The interviewee was largely the mother. The latter was characterized by a low level of education and most of them were unemployed, hence their availability compared to fathers. After inspection of the booklets, 96 vaccine statuses that were not up to date had been noted.

Delay was often blamed in the mother's case on illness, ignorance, travel and relocation.

This delay was also associated with a statically significant difference in the child's age, household size, parental education, occupation status, and knowledge of frequency of administration. Hence the need to focus on communication, to improve the educational level of the parents for a good care of the children.

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Tables

Table I: Distribution of children by age group of children

Age group of children	Absolute frequency (n)	Relative frequency (%)
Less than 12 months	133	27,3
Between 12-23 months	96	19,7
24 months and more	258	53,0
Total	487	100,0

Table II: Distribution of children according to the quality of the interviewee

Interviewees	Absolute frequency (n)	Relative frequency (%)
Mother	**454**	**93,2**
Aunt	15	3,1
Grandmother	10	2,1
Sister	4	0,8
Grandfather	1	0,2
Other	3	0,6
Total	487	100,0

Table III: Distribution of parents according to their level of education

	Mothers	Fathers
Not educated	49,50%	25,70%
Primary	30,80%	25,70%
Middle school	11,30%	17,20%
High school	4,10%	12,70%
University	2,10%	9,20%
Koran	2,30%	8,40%

Table IV: Distribution according to knowledge of the child's vaccination delay

Knowledge of the child's Immunization delay according to the mother	Absolute Frequency (n)	Relative Frequency (%)
Yes	32	76,2
No	1	2,4
no answer	9	21,4
Total	42	100,0

Table V: Breakdown by reasons for the child's immunization delay

Reasons for the child's immunization delay	Absolute frequency (n)	Relative frequency (%)
Disease	10	23,8
Travel	7	16,7
Don't know	6	14,3
Moving	5	11,9
Forget	4	9,5
Work	4	9,5
Late appointment	3	7,1
Lost vaccination booklet	1	2,4
Ceremonies in the family	1	2,4
lack of vaccine	1	2,4
Total	42	100,0

Table VI: State of knowledge on vaccination

Table VI

Knowledge about vaccination	Absolute frequency (n)	Relative frequency (%)
Obligation to vaccinate the child		
Yes	480	98,6
Don't know	7	1,4
Reasons for compulsory vaccination		
Protects the child against diseases	468	96,3
Don't know	7	3,7
Favourable to vaccination		
Yes	482	99,0
Don't know	5	1,0
Knowledge of the frequency of vaccine administration		
Yes	49	10,1
No	438	89,9
Knowledge of vaccination age		
Yes	242	49,7
No	245	50,3
Knowledge of side effects		
Yes	459	94,3
No	28	5,7
Side effects of vaccination on the child		
Fever	453	98,7
Pleurs	222	48,4
Pain	12	2,6
Diarrhoea	2	0,4
Others	7	1,5

Age range	Vaccine Delay				Total	P value
	Yes		No			
	N	%	N	%		
Less than 12 months	19	15	108	85	127	
Between 12 and 23 months	25	29,8	59	70,2	84	0,004
24 months and more	52	30,8	117	669,2	169	
Gender of the child	Vaccine Delay				Total	P value
	Yes		No			
	N	%	N	%		
Feminine	45	25,1	134	74,9	179	0,958
Male	51	25,4	150	74,6	201	
Size of household	Vaccine Delay				Total	P value
	Yes		No			
	N	%	N	%		
Child under the age of 5 years						0,756
1 to 2	83	25	249	75	332	
3 and more	13	27,1	35	72,9	48	
Child from 5 to 14 years						0,31
Yes	75	26,6	207	73,4	282	
No	21	21,4	77	78,6	98	
Person aged 15 to 49						0,044
Yes	57	29,7	135	70,3	193	
No	39	20,7	149	79,3	188	
Persons over 49 years of age						0,948
Yes	50	25,1	149	74,9	199	
No	46	25,4	135	74,6	181	
Size of household	Vaccine Delay				Total	P value
	Yes		No			
	N	%	N	%		
Educated mother						0,287
Yes	52	27,7	136	72,3	188	
No	44	22,7	148	77,1	192	
Educated Father						0,011
Yes	36	19,5	149	80,5	185	
No	60	30,8	135	69,2	195	
Renter	Vaccine Delay				Total	P value
	Yes		No			
	N	%	N	%		
						0,037
Yes	66	29,1	161	70,9	227	
No	30	19,6	123	80,4	153	
Knowledge of vaccine frequency	Vaccine Delay				Total	P value
	Yes		No			
	N	%	N	%		
						0,027
Yes	4	10,5	34	89,5	38	
No	92	26,9	250	73,1	250	

Figure

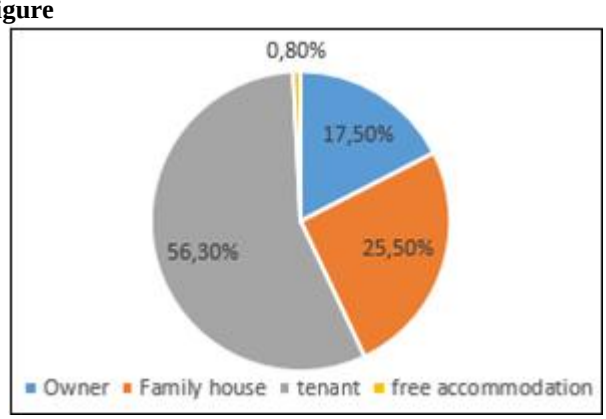

Figure 1: Distribution of parents by occupation status