

## A Study on the National Vaccination of Infants Under 3 Age

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**Abstract:** The subjects for the National Immunization Program for Children are all children less than the age of 12, those who are born after 1st January 2002. In T Administrative district, 360 guardians from 25 kindergartens with children under-3 (born from 1st Jan. 2012 to 31st Dec.) were conveniently sampled and they were all given survey studies certified by a institutional review board and research ethics, a bioethics committee designated by the Ministry of Health and Welfare and the collected data was analyzed with SPSS Ver. 22.0 Program. The general perception of national immunization program according to characteristics were higher in male guardians and statistically showed a significant difference ( $p = 0.004$ ). The perceptions were higher in those aged >50's than the 20's which showed a significant difference ( $p = 0.002$ ). The general demands for national immunization program of the guardians according to their characteristics were higher in guardians more than the age of 50, than those in their 30's. This showed a statistically significant difference ( $p < 0.001$ ). In relational person to the children, perceptions of grandmothers were higher than fathers which showed a statistically significant difference ( $p < 0.001$ ). As occupations of the guardians, demands of those working in the fishing industry were the highest than office workers which showed a statistically significant difference ( $p < 0.001$ ). The satisfaction rate of national immunization healthcare organization were higher in male guardians which showed a statistically significant difference ( $p = 0.014$ ). In relation person to the children, the satisfaction rate of grandmothers were high which showed a statistically significant difference ( $p < 0.001$ ). The research data was taken from a healthcare center in C-province, collecting information of 20,589 under-3 children who were immunized and registered in the data.

**Key words:** National immunization, subject, support vaccine, infectious diseases, organization, Korea

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### INTRODUCTION

The subjects for the National Immunization Program for Children are all children less than the age of 12, those who are born after 1st January, 2002 (Song, 2013; Min, 2010, 2012; Choe, 2006).

The supported contents are full support for immunization fee for the supported vaccine and subject vaccines for 2015 free immunization are 14 types, all of which are immunizations recommended by the government (Lee *et al.*, 2012; Wi, 2013; Jeong, 2013). The basic immunization processes that should be done before the age of 3 through National Immunization Program should be regarded importantly needed by the guardians of children under (Choe, 2006; Lee, 2011; Wi, 2013).

By immunizing the children they are protected from infectious diseases and they can grow as a healthy child (Lee *et al.*, 2012; Song, 2013).

Through acts on prevention and appropriate management for infectious diseases, the immunization practice and methods will be settled and the people and the healthcare provider will follow these standards.

### MATERIALS AND METHODS

The research data was taken from a healthcare center in C-province, collecting information of 20,589 under-3 children who were immunized and registered in the data.

In administrative district, 360 guardians from 25 kindergartens with children under-3 (born from 1st Jan. 2012 to 31st Dec.) were conveniently sampled and they were all given survey papers certified by a Institutional Review Board and Research Ethics, a bioethics committee designated by the Ministry of Health and Welfare and the collected data was analyzed with SPSS Ver. 22.0 Program.

**RESULTS AND DISCUSSION**

Gender birth months status of infants under 3 years in the C provinces. In the C-province's birth month variations of children under the age of 3, January was the highest and December was the lowest. In gender variations, male were higher than females by 2.6% as seen in Table 1.

**Gender status of infants under 3 years in the C provinces:** The highest male birth rate was in J-city and the lowest, N town. The highest female birth rate was in J-city and the lowest, N town as in Table 2. Non-vaccination status of infants under 3 years by

vaccine in the C provinces. The non-immunized children among the under 3 children in C-province were 8.8% and the non immunization status according to vaccines displayed, BCG and hepatitis B in M district, DtaP, IPV, DtaP-IPV, MMR. Pox in J-city, Hib and PVC in E city. Japanese encephalitis was the highest and in all vaccines, G-district was the lowest.

The non-immunization status of children under 3 in C-province was the highest in E-city and H-city was the lowest. It was ranked as the 13th place among 17 administrative districts and perfect immunization rate was 82.7% which was 3.6% lower than the national average as in Table 3.

Table 1: Birth months status of infants under 3 years in the c provinces (N = 20, 589)

Regions	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
A	14	20	46	30	31	31	23	43	31	39	31	29	368
B	71	64	69	55	77	74	57	56	66	76	66	66	797
C	36	27	27	24	24	31	36	18	29	31	29	25	337
D	80	79	90	74	55	75	70	80	90	73	77	66	909
E	172	178	182	161	151	139	158	160	179	150	161	140	1,931
F	74	56	75	59	65	60	73	56	50	46	69	59	742
G	37	37	45	34	35	35	36	35	25	24	25	31	399
H	178	158	154	140	151	132	163	156	152	153	145	134	1,816
I	30	26	24	16	25	23	25	29	23	30	21	21	293
J	428	366	392	350	337	358	344	339	353	368	344	292	4,271
K	54	47	57	37	41	51	40	43	46	47	33	28	524
L	269	245	294	232	236	223	242	231	246	237	215	201	2,871
M	371	338	378	305	366	314	348	338	356	336	334	271	4,055
N	13	20	20	17	24	11	13	15	17	16	13	16	195
O	32	43	37	36	23	26	36	31	40	37	24	32	397
P	61	57	50	66	59	54	50	51	51	57	54	47	657
Total	1,947	1,761	1,940	1,636	1,700	1,637	1,714	1,681	1,754	1,720	1,641	1,458	20,589
Percent	9.5	8.6	9.4	7.8	8.2	8.0	8.3	8.2	8.5	8.4	8.0	7.1	100

Table 2: Gender status of infants under 3 years in the C provinces, unit: N (%)

Gender (%)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Total
Male	207 (1.0)	407 (2.0)	185 (0.9)	461 (2.2)	1,007 (4.9)	397 (1.9)	209 (1.0)	928 (4.5)	149 (0.7)	2,189 (10.6)	277 (1.4)	1,467 (7.1)	2,038 (10.0)	92 (0.4)	201 (1.0)	340 (1.7)	10,554 (51.3)
Female	188 (0.9)	390 (1.9)	152 (0.8)	448 (2.2)	924 (4.5)	345 (1.7)	190 (0.9)	888 (4.3)	144 (0.7)	2,082 (10.1)	247 (1.2)	1,404 (6.8)	2,017 (9.8)	103 (0.5)	196 (0.9)	317 (1.5)	10,035 (48.7)
Total	395 (1.9)	797 (3.9)	337 (1.6)	909 (4.4)	1,931 (9.4)	742 (3.6)	399 (1.9)	1,816 (8.8)	293 (1.4)	4,271 (20.7)	524 (2.6)	2,871 (14.0)	4,055 (19.7)	195 (1.0)	397 (1.9)	657 (3.2)	20,589 (100.0)

Table 3: Non-vaccination status of infants under 3 years by vaccine in the c provinces, unit: N (%)

Resions	BCG	Hepatitis B	DTaP	IPV	DTaP-IPV	Hib	PCV	MMR	Pox	JEL* (live)	JEL* (dedlive)	Total
A	4 (1.5)	16 (2.3)	28 (2.0)	15 (3.2)	10 (1.9)	26 (1.5)	34 (1.3)	5 (1.5)	3 (0.8)	11 (1.6)	36 (1.6)	188
B	18 (6.8)	28 (4.1)	73 (5.2)	24 (5.1)	28 (5.2)	78 (4.6)	182 (6.8)	26 (8.0)	31 (8.3)	43 (6.3)	134 (6.1)	665
C	5 (1.9)	17 (2.5)	32 (2.3)	19 (4.0)	20 (3.7)	33 (2.0)	46 (1.7)	11 (3.4)	12 (3.2)	19 (2.8)	48 (2.2)	262
D	9 (3.4)	34 (5.0)	80 (5.7)	45 (9.5)	46 (8.6)	75 (4.4)	108 (4.0)	21 (6.5)	20 (5.4)	31 (4.5)	77 (3.5)	546
E	39 (14.7)	50 (7.3)	140 (10.1)	34 (7.2)	38 (7.1)	457 (27.1)	520 (19.4)	34 (10.5)	42 (11.3)	72 (10.5)	236 (10.8)	1,662
F	15 (5.6)	43 (6.3)	81 (5.8)	38 (8.0)	25 (4.7)	90 (5.3)	130 (4.8)	21 (6.5)	24 (6.4)	43 (6.3)	122 (5.6)	632
G	2 (0.8)	2 (0.3)	8 (0.6)	1 (0.2)	1 (0.2)	7 (0.4)	34 (1.3)	-	-	4 (0.6)	10 (0.5)	70
H	4 (1.5)	25 (3.7)	106 (7.6)	20 (4.2)	25 (4.7)	101 (6.0)	184 (6.9)	22 (6.8)	36 (9.7)	45 (6.6)	166 (7.6)	734
I	6 (2.3)	17 (2.5)	33 (2.4)	18 (3.8)	20 (3.7)	24 (1.4)	40 (1.5)	10 (3.1)	9 (2.4)	16 (2.3)	36 (1.6)	229
J	38 (14.3)	96 (14.1)	257 (18.4)	74 (15.6)	84 (15.7)	209 (12.4)	385 (14.4)	48 (14.8)	56 (15.0)	119 (17.3)	454 (20.8)	1,820
K	6 (2.3)	16 (2.3)	23 (1.7)	13 (2.7)	12 (2.2)	17 (1.0)	64 (2.4)	7 (2.2)	7 (1.9)	15 (2.2)	40 (1.8)	220
L	30 (11.3)	82 (12.0)	203 (14.6)	54 (11.4)	76 (14.2)	214 (12.7)	362 (13.5)	51 (15.7)	50 (13.4)	102 (14.9)	393 (18.0)	1,617
M	52 (19.5)	143 (20.9)	195 (14.0)	57 (12.0)	78 (14.6)	224 (13.3)	390 (14.5)	30 (9.3)	34 (9.1)	110 (16.0)	275 (12.6)	1,588
N	6 (2.3)	10 (1.5)	13 (0.9)	3 (0.6)	7 (1.3)	22 (1.3)	34 (1.3)	4 (1.2)	7 (1.9)	7 (1.0)	34 (1.6)	147
O	8 (3.0)	23 (3.4)	43 (3.1)	26 (5.5)	23 (4.3)	34 (2.0)	47 (1.8)	10 (3.1)	12 (3.2)	15 (2.2)	34 (1.6)	275
P	24 (9.0)	81 (11.9)	78 (5.6)	34 (7.2)	41 (7.7)	78 (4.6)	121 (4.5)	24 (7.4)	30 (8.0)	34 (5.0)	90 (4.1)	635
Total	266	683	1,393	475	534	1,689	2,682	324	373	686	2,185	11,290

\*JEL: Japan encephalitis

Table 4: Non-vaccination status of infants under 3 years by region in the C provinces, unit: N (%)

Regions	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Total
Total (%)	395 (1.9)	797 (3.9)	337 (1.6)	909 (4.4)	1,931 (9.4)	742 (3.6)	399 (1.9)	1,816 (8.8)	293 (1.4)	4,271 (20.7)	524 (2.6)	2,871 (14.0)	4,055 (19.7)	195 (1.0)	397 (1.9)	657 (3.2)	20,589 (100.0)
Not vaccination (%)	67 (17.0)	119 (14.9)	14 (4.2)	55 (6.1)	435 (22.5)	36 (4.9)	34 (8.5)	67 (3.7)	12 (4.1)	424 (9.9)	73 (13.9)	155 (5.4)	173 (4.3)	34 (17.4)	54 (13.6)	53 (8.1)	1,805 (8.8)

Table 5: General characteristics about national immunization needs of guardian

Characteristics/Classification	N	Mean±SD	F-values	p-values*
<b>Gender</b>				
Male	64	4.48±0.53	7.133	0.008
Female	262	4.27±0.58		
<b>Age</b>				
20's	40	4.54±0.69 <sup>a</sup>	6.667	0.000
30's	220	4.21±0.60 <sup>a</sup>		
40's	57	4.45±0.49 <sup>ab</sup>		
>50	9	4.65±0.53 <sup>b</sup>		
<b>Relation</b>				
Mother	269	4.24±0.57 <sup>a</sup>	16.863	0.000
Father	41	4.50±0.52 <sup>a</sup>		
Grandmother	16	5.00±0.00 <sup>b</sup>		
<b>Education</b>				
Middle school	32	4.47±0.54 <sup>a</sup>	1.399	0.248
High school	95	4.28±0.63 <sup>a</sup>		
More than univ.	199	4.30±0.56 <sup>a</sup>		
<b>Job</b>				
Housewife	134	4.24±0.52 <sup>a</sup>	4.599	0.000
Employee	81	4.23±0.49 <sup>a</sup>		
Self-employment	60	4.38±0.76 <sup>a</sup>		
Male	64	4.48±0.53		
Female	262	4.27±0.58		

\*By the independent t-test or one-way ANOVA test at  $\alpha = 0.05$ ; <sup>a, b</sup>Means followed by different letters are significantly different at  $\alpha = 0.05$

**Non-vaccination status of infants under 3 years by region in the C provinces:** The general perception of national immunization program according to characteristics were higher in male guardians and statistically showed a significant difference ( $p = 0.004$ ). The perceptions were higher in those aged more than the 50's than the 20's which showed a significant difference ( $p = 0.002$ ). In relationship with children, perceptions of grandmothers were higher than fathers which showed a significant difference ( $p < 0.001$ ).

In the field educational level, the perceptions of guardians who graduated from middle school were higher than the graduates of high school and universities which showed a significant difference ( $p < 0.001$ ). According to the occupations of the guardians, the perceptions of those working in the fishing industry were higher than those working in the agricultural industry which statistically showed a significant difference ( $p < 0.001$ ) as in Table 4.

**General characteristics about national immunization needs of guardian:** The general demands for national immunization program of the guardians according to their characteristics were higher in guardians more than the age of 50, than those in their 30's. This showed a statistically significant difference ( $p < 0.001$ ). In relational person to the

Table 6: Satisfaction of the national immunization and health institutions, unit: N (%)

Characteristics/Classification	Satisfaction	So So	Dissatisfaction	p-values*
<b>Gender</b>				
Male	43 (67.2)	14 (21.9)	7 (10.9)	0.014
Female	40 (15.3)	94 (35.9)	127 (48.5)	
<b>Age</b>				
20's	29 (72.5)	9 (22.5)	2 (5.0)	0.493
30's	101 (45.9)	82 (37.3)	37 (16.8)	
40's	33 (57.9)	16 (28.1)	8 (14.0)	
>50	8 (88.9)	1 (11.1)	-	
<b>Relation</b>				
Mother	127 (47.2)	98 (36.4)	44 (16.4)	0.000
Father	28 (68.3)	16 (24.4)	3 (7.3)	
Grandmother	16 (100)	-	-	
<b>Education</b>				
Middle school	23 (68.3)	5 (15.6)	4 (12.5)	0.018
High school	51 (53.7)	34 (35.8)	10 (10.5)	
More than Univ.	97 (48.7)	69 (34.7)	33 (16.6)	
<b>Job</b>				
Housewife	65 (48.5)	44 (32.8)	25 (18.7)	0.021
Employee	41 (50.6)	30 (37.0)	10 (12.3)	
Self-employment	31 (51.7)	22 (36.7)	7 (11.7)	
Fishery	15 (68.2)	7 (31.8)	-	
Agriculture	15 (51.7)	11 (37.9)	3 (10.3)	

\*By Chi-square test and Fisher's exact test at  $\alpha = 0.05$

children, perceptions of grandmothers were higher than fathers that showed a statistically significant difference ( $p < 0.001$ ). As occupations of the guardians, demands of those working in the fishing industry were the highest than office workers which showed a statistically significant difference ( $p < 0.001$ ) as in Table 5.

**Satisfaction of the national immunization and health institutions:** The satisfaction rate of National Immunization Healthcare organization were higher in male guardians which showed a statistically significant difference ( $p = 0.014$ ). In relation person to the children, the satisfaction rate of grandmothers was high which showed a statistically significant difference ( $p < 0.001$ ). In educational levels, the satisfaction rate of guardians who graduated from middle school were higher than those who graduated from high school and university which showed a significant difference ( $p = 0.018$ ).

In the occupations of the guardians, the satisfaction rate of the guardians working in the fishing industry was the highest than homemakers or the guardians who research in the agricultural industry which showed the a significant difference ( $p = 0.021$ ). Satisfaction rate on trusted healthcare center by the National Immunization program were higher in grandmothers related to children which showed a significant difference ( $p = 0.002$ ) as in Table 6.

## CONCLUSION

The basic immunization processes that should be done before the age of 3 through National Immunization Program should be regarded importantly needed by the guardians of children under 3. By immunizing the children, they are protected from infectious diseases and they can grow as a healthy child.

The high perceptions and satisfaction rate of the guardians of children under the age of 3 should be reflected and thus, the National Immunization Program should be expanded fully subsidized. The number of institutes that carry on the immunization should be increased and the trusted medical care institutions should be induced to actively participate in the program to deliver correct information on the national immunization program so that the range of immunization can be expanded.

Through immunization, the infectious diseases within the administrative districts can be prevented and this can be used as reference to enhance the National Immunization program and to provide policies for immunization.

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