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What affects pediatric healthcare providers to encourage receipt of routine childhood vaccinations? Results from the Northern District of Israel, 2016

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ABSTRACT

Background: Pediatric healthcare providers (HCPs) are a major resource which helps parents make decisions about their children's vaccinations. It is important to assess their behavior to encourage the receipt of routine vaccines.
Objectives: (1) To evaluate the knowledge level of and attitudes towards routine childhood vaccinations among pediatric HCPs; (2) To assess their behavior to encourage the receipt of routine vaccinations and associated predictors; (3) To examine their willingness to receive immunization training and to improve their skills to cope with vaccine-hesitant parents.
Study design and settings: This is a cross-sectional study among pediatric physicians and nurses working at primary clinics (curative service) and mother-child health clinics (preventive service) in Jewish localities in the Northern District of Israel.
Methods: A structured, anonymous, self-administered questionnaire was used.
Results: The study included 271 HCPs (response rate = 72.2%). An insufficient knowledge level about vaccines was demonstrated among participants (mean score: 5.2 ± 0.91 and 4.71 ± 1.21 points out of 6 in the preventive and curative services, respectively; p = 0.000). The overall attitude towards vaccinations was positive (mean score: 45.40 ± 5.98 and 42.95 ± 6.84 points out of 56 in the preventive and curative services, respectively; p = 0.002). The two predictors that were associated with the behavior of HCPs to encourage childhood vaccinations were workplace (preventive vs. curative service) and the number of parents encountered by the HCP who opposed or feared vaccines. No association was found between the behavior and the knowledge level and the attitudes. Of the HCPs, 79.3% were interested in immunization training and 66.1% in participating in workshops to improve their communication skills to cope with vaccine-hesitant parents.
Conclusions: There is a need to increase the commitment of HCPs to encourage parents to vaccinate their children with routine vaccines, to improve their knowledge about vaccines, and to provide them with communication tools to deal with vaccine-hesitant parents.

1. Background

Vaccines are considered to be one of the most successful and cost effective health interventions [1]. The success of immunization programs depends on high rates of vaccination coverage. This is accomplished by both direct protection of the vaccinated individual and indirect protection of the community through "herd immunity" [2].

In Israel, despite the high routine vaccination coverage [3], there are still reasons for concern because of lack of trust in routine childhood immunization programs. Reports indicate that in recent years there has been an increase in the number of Israeli parents who deviate from the routine immunization program by delaying acceptance or refusal of vaccines [4,5].

Many studies indicate that healthcare providers (HCPs) play a significant role in influencing parental decisions related to the

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vaccination of their children [6–10]. Therefore, in an era in which there is a rising trend towards vaccine hesitancy, HCPs are a major resource in dealing with parents who fear or oppose vaccines. Their influence can be felt by initiating a dialogue, correcting misconceptions and recommending vaccines.

In Israel, routine childhood vaccinations recommended by the Ministry of Health, with the exception of the seasonal influenza vaccines, are provided by nurses at the mother-child health clinics (MCHCs) who provide preventive medical services for children up to school age, and later by nurses of the school health services. Vaccinations against seasonal influenza and against tetanus following injury and vaccinations for risk groups are provided by nurses or doctors in the setting of curative services, mainly in the primary clinics. Both the doctors and nurses in the preventive and curative services are in contact with the child's parents, recommend and discuss childhood vaccinations and are a source of information for many about vaccines. Accordingly, it is important to assess the involvement of pediatric HCPs in this process and their behavior in dealing with parents who hesitate or refuse to vaccinate their children.

In this study, which focuses on doctors and nurses who care for children in the community at the MCHCs and primary clinics, we evaluated: 1. The level of knowledge and attitudes of pediatric HCPs towards routine vaccinations; 2. Their behavior to encourage parents to vaccinate their children with the recommended routine vaccines and predictors related to this behavior; 3. The willingness of HCPs to participate in immunization training programs, and their interest in improving their communication skills to cope with parents who hesitate to vaccinate their children.

2. Methods

2.1. Study design

A cross-sectional study was conducted among 377 pediatric physicians and nurses who work in 96 primary clinics of the health funds (curative service) and in 132 MCHCs (preventive service) out of about 99 primary clinics and 161 MCHCs in Jewish localities in the Northern District of Israel, respectively. These clinics were chosen due to their availability and convenient access.

2.2. Data collection and variable definitions

Data were collected from an anonymous self-administered questionnaire based mainly on selecting appropriate questions from previous surveys [10–14], and other questions that were developed according to the objectives of the study.

The questionnaire was assessed by several experts who agreed that it was a valid measurement tool (face, content and consensual validity). A pre-test of the questionnaire was performed among 15 HCPs to ensure comprehension. Minimal linguistic adjustments were made accordingly.

The questionnaire included 47 questions in 6 parts:

1. Socio-demographic and professional characteristics (10 items).
2. Knowledge level about childhood vaccinations: a score was calculated based on responses to 6 questions. The response categories were "yes", "no" and "do not know". A correct answer was counted as a single point (score range, 0–6).
3. Attitudes towards childhood vaccinations: a score was calculated based on responses to 14 statements on a 5-point Likert scale (0–4). A higher score expressed a more positive attitude towards childhood vaccinations (score range, 0–56).
4. The HCP's behavior to encourage parents to vaccinate their children with routine vaccines. A score was calculated based on responses to 10 statements regarding the frequency of the HCP's involvement in encouraging parents to vaccinate their children with routine vaccines (5 behavior statements toward all the parents and another 5 statements toward parents who fear or oppose to vaccines), during the year preceding the survey. Response categories were "for everyone" (2 points), "for some of them" (1 points), "for none of them" (0 points) and "irrelevant" (0 points). "Irrelevant" was considered as non-involvement and therefore counted as zero. A higher overall score indicated greater involvement in encouraging parents to vaccinate their children with routine vaccines (score range, 0–20).
5. The routine vaccinations among the pediatric population in the care of the HCP. This section included three questions and three variables which were defined as follows: the percentage of children who received the recommended vaccinations according to their age (response categories: 95%, 75–95%, <75% or unknown); the number of parents encountered by the HCP during the three months preceding the survey, who were opposed to and feared vaccines (response categories: none of the parents, one parent, 2–5 parents, >5 parents, or the subject of vaccinations was not discussed during the visit).
6. Immunization training: this section included four questions regarding immunization training that a worker has had in the past, his/her willingness to receive such training, and interest in participating in workshops to improve communication skills to deal with vaccine-hesitant parents. Response categories were "yes" or "no".

The questionnaire was distributed to HCPs in their workplace by a research team contact from February to June 2016.

2.3. Statistical analysis

Statistical analyses were performed using SPSS software (version 23). A one-way analysis of variables (ANOVA) was conducted to determine whether the mean scores of the HCPs for knowledge and attitudes were associated to the categorical characteristics of the participants.

To determine the association between the categorical characteristics of the participants and the categorical variables related to their interest in immunization training, a chi-square test was performed.

To examine the correlation between "the behavior of the HCPs towards encouraging parents to vaccinate their children with routine vaccines" and knowledge level, attitudes, and the continuous characteristics of the participants, a Pearson's correlation coefficient was computed. To examine the association between the mean score of the HCPs' behavior and the participant categorical characteristics and the variables "the percentage of children vaccinated as recommended by their age", and "the number of parents encountered by the HCP during the three months preceding the survey, who were opposed to and feared vaccines", a one-way ANOVA test was performed.

To identify the factors independently associated with the behavior of the HCPs to encourage parents to vaccinate their children with the routine vaccines, we conducted a linear regression model.

For all statistical tests, differences were considered significant at $p < 0.05$.

2.4. Ethical considerations

The study was approved by the Ethics Committees of the University of Haifa, the Israeli Ministry of Health and the health funds, and received approvals from the Directors of the Institutions in which the study was performed.

3. Results

The study included 271 workers, of whom 107 were physicians (81 from the curative service and 26 from the preventive service), and 164 nurses (53 from the curative service and 111 from the preventive service). The overall response rate was 72.2%. Socio-demographic and professional characteristics are summarized in Table 1.

Only half of the HCPs stated that >95% of the children in their care had been vaccinated according to their age. Moreover, of them, 69.5% and 66.4% respectively, had met at least one parent who either opposed or had concerns towards vaccines during the three months preceding the survey (Table 2).

3.1. Knowledge and attitudes towards routine childhood vaccinations

Frequency of responses to knowledge and attitudes are presented in Table 3. Only 37.3% of the participants answered correctly to all the knowledge questions (43.8% and 30.6% of HCPs from the preventive and curative services, respectively). In general, the mean score of knowledge level among HCPs from the preventive service was higher than among the HCPs from the curative service (5.2 ± 0.91 and 4.71 ± 1.21 respectively, p = 0.000). There was no significant difference in the mean score of knowledge levels between physicians and nurses (4.82 ± 1.13 and 5.04 ± 0.91 respectively, p = 0.106). In terms of attitudes, there was also a significant difference between HCPs from the preventive service and those from the curative service (45.40 ± 5.98 and 42.95 ± 6.84 respectively, p = 0.002). There was no significant difference in the attitude scores between physicians and nurses (45.02 ± 6.30 and 43.68 ± 6.62 respectively, p = 0.106).

Table 1
Characteristics of the study population.

Categorical characteristics	N (%)
Gender	
Male	52 (19.2)
Female	218 (80.4)
Nationality	
Jewish	205 (75.6)
Arab and other	66 (24.4)
Religious observance	
Secular	169 (62.4)
Non-secular (observant or religious)	94 (34.7)
Profession	
Nurse	164 (60.5)
Physician	107 (39.5)
Type of service	
Preventive service*	137 (50.6)
Curative service	134 (49.4)
Continuous characteristics	Mean (±SD)
Age (years)	49.5 (±11.3)
Professional experience (years)	23.7 (±11.4)
Professional pediatric experience (years)	20.9 (±11.3)

* 48 of them worked in both MCHCs and in a primary clinic.

3.2. The HCP's behavior to encourage parents to vaccinate their children with the routine vaccines and related factors

Frequency of HCPs' responses to behavior questions are presented in Table 4.

The results of the bivariate analysis to characterize factors associated with the variable "HCP's behavior to encourage parents to vaccinate their children with routine vaccines" demonstrated significant correlations with the following variables: knowledge level, attitudes towards routine vaccinations, the type of service in which the HCP is employed, and the number of parents encountered by the HCP during the last three months who feared or were opposed to vaccinations (Table 5). These variables were included in the multivariate linear regression model (Table 6). Accordingly, the only factors that were statistically significantly associated with "HCP's behavior to encourage parents to vaccinate their children with routine vaccines" were workplace (higher behavior score among HCPs from preventive service versus curative service) and "the number of parents encountered by the HCP during the last three months who feared or were opposed to vaccines" (higher behavior score among HCPs who encountered parents that opposed or feared vaccines versus those who reported that they did not encounter any). No significant associations were found with the HCP's knowledge level and attitudes.

3.3. Immunization training

Of all the participants, 61.3% had immunization training at the beginning of their current work, and 63.1% participated in refresher courses and updated their knowledge on the topic during the last two years prior to the study. 79.3% of the participants were interested in periodic refresher/training courses on immunization, and 66.1% were interested in participating in a workshop to improve their communication skills to cope with parents who feared or opposed vaccinations.

Analysis of the results indicated that HCPs from the preventive service expressed a greater interest in participating in a workshop to improve their communication skills to cope with parents' fears and oppositions to vaccines compared with HCPs from the curative service (74.3% and 58.6%, p = 0.01, respectively). However, no significant difference was found in the HCPs' interest to receive refresher or training courses on vaccinations according to the type of service (83.7% and 76.7%, p = 0.169, respectively). When comparing between physicians and nurses, more nurses expressed interest in receiving training on vaccinations than physicians (84.7% and 73.3%, p = 0.028, respectively), or willingness to participate in a workshop on improving communication skills to cope with parents' fears of vaccines (76.6% and 50.9%, p = 0.000, respectively).

4. Discussion

The findings of this study indicate that the knowledge level of HCPs from the preventive services is higher than that of HCPs from the curative services. A higher knowledge level of HCPs from the

Table 2
Routine vaccinations among the pediatric population in the care of the HCP.

		≥95% n (%)	75–94% n (%)	<75% n (%)	Do not Know n (%)
What is the percentage of children in your care who are vaccinated according to their age?		131 (48.3)	100 (36.9)	10 (3.7)	24 (8.9)
	>5 n (%)	2–5 n (%)	1 n (%)	0 n (%)	Did not discuss compliance to vaccines n (%)
How many parents met during the last 3 months opposed vaccines?	37 (13.7)	108 (39.9)	43 (15.9)	67 (24.7)	10 (3.7)
How many parents met during the last 3 months were concerned about vaccines?	55 (20.3)	103 (38.0)	22 (8.1)	70 (25.8)	11 (4.1)

Table 3
HCPs' itemized responses to knowledge and attitudes.

Knowledge level regarding vaccines	Correct answer, n (%)	Incorrect answer, n (%)
Should a child with autism be vaccinated with the routine vaccines?	251 (92.6)	20 (7.4)
Should a child be vaccinated when there is a family history of epilepsy?	254 (93.7)	17 (6.3)
Can vaccines cause autism or multiple sclerosis?	213 (78.6)	55 (20.3)
Is it recommended to vaccinate a toddler with a live attenuated influenza vaccine if he/she has received a vaccine against measles, mumps, rubella and varicella (MMRV) 2 weeks before?	204 (75.3)	65 (24.0)
A toddler received 2 doses of Hepatitis B vaccine with a 1-month interval 3 years ago. Should these doses be repeated before giving the booster dose?	223 (82.3)	45 (16.6)
A 6.5 year old child had a deep wound (> 1 cm) due to an injury from a dirty iron object. The child is vaccinated as recommended for his age. 5 years have passed since the last anti-tetanus dose (booster). Should you vaccinate him/her with the available anti-tetanus vaccine in the primary clinic (Td)?	198 (73.1)	69 (25.5)

Attitudes toward vaccines	Strongly agree n (%)	Agree n (%)	Agree and disagree n (%)	Disagree n (%)	Strongly disagree n (%)
The child should be given all the vaccines as recommended by the Ministry of Health	218 (80.4)	39 (14.4)	10 (3.7)	1 (0.4)	3 (1.1)
Only a child at a risk group should receive vaccinations	5 (1.8)	5 (1.8)	3 (1.1)	60 (22.1)	196 (72.3)
The fear of side effects from vaccines prevents me from recommending them	4 (1.5)	2 (0.7)	14 (5.2)	73 (26.9)	177 (65.3)
The list of the recommended routine vaccines is too long	11 (4.1)	23 (8.5)	34 (12.5)	90 (33.2)	113 (41.7)
Vaccines are the safest forms of medicine that have ever been developed	79 (29.2)	99 (36.5)	54 (19.9)	25 (9.2)	14 (5.2)
Those who maintain a healthy lifestyle do not need vaccines	1 (0.4)	1 (0.4)	7 (2.6)	73 (26.9)	189 (69.7)
The benefits of vaccines outweigh their disadvantages	170 (62.7)	74 (27.3)	8 (3.0)	8 (3.0)	8 (3.0)
It is justified that there is no need for vaccinations in the first months of life	3 (1.1)	13 (4.8)	24 (8.9)	94 (34.7)	137 (50.6)
There is an advantage to split vaccines and not give them at one visit	12 (4.4)	53 (19.6)	54 (19.9)	72 (26.6)	80 (29.5)
Parents who do not vaccinate their children are irresponsible to the public	73 (26.9)	100 (36.9)	59 (21.8)	29 (10.7)	10 (3.7)
Opposition to vaccines is based on superstition	38 (14.0)	75 (27.7)	84 (31.0)	58 (21.4)	15 (5.5)
Vaccines have become better and safer over the years as a result of medical research	119 (43.9)	125 (46.1)	18 (6.6)	5 (1.8)	3 (1.1)
Most of the reasons for refusal to vaccinate are based on scientific findings	5 (1.8)	9 (3.3)	47 (17.3)	116 (42.8)	92 (33.9)
I am concerned that the child's immune system may be weakened by too many vaccines	2 (0.7)	13 (4.8)	21 (7.7)	115 (42.4)	119 (43.9)

Table 4
HCP's behavior to encourage parents to vaccinate their children with the routine vaccines (during the year preceding the survey).

	For everyone %	For some of them %	For none of them %	Irrelevant
Statements regarding HCP's behavior towards all the parents				
I recommended parents to vaccinate their children according to the routine immunization program	223 (82.3)	15 (5.5)	32 (11.8)	0
I recommended several vaccines in a single visit according to the routine immunization program	179 (66.1)	25 (9.2)	66 (24.4)	0
There are routine vaccines recommended by the Ministry of Health that I do not recommend that parents give their child	9 (3.3)	11 (4.1)	250 (92.3)	0
I inquired with the parent as to whether their child had received the routine vaccines	91 (33.6)	85 (31.4)	92 (33.9)	0
I initiated discussion with parents about their concerns regarding vaccines	55 (20.3)	121 (44.6)	91 (33.6)	0
Statements regarding the HCP's behavior toward parents who fear or oppose vaccines				
I tried to explain and convince parents to vaccinate their child	146 (53.9)	79 (29.2)	44 (16.2)	0
I explained to the parents that they are responsible for any outcome thereby removing responsibility from myself	80 (29.5)	52 (19.2)	136 (50.2)	0
I took further action and reported vaccine opponents	71 (26.2)	60 (22.1)	135 (49.8)	0
I felt confident talking with parents about their concerns relating vaccine safety	166 (61.3)	45 (16.6)	56 (20.7)	0
I felt that I had the communication tools to handle parents' fears and oppositions towards vaccines	131 (48.3)	83 (30.6)	54 (19.9)	0

preventive service was observed in a previous study comparing between HCPs from the preventive services and pediatric HCPs in hospitals [14]. In the current study, only 37.3% of the participants were able to correctly answer all the 6 knowledge questions. This rate is low and unexpected, given the fact that these questions were compiled to suit the day-to-day practice of the childcare staff in the community, whether it was the curative or preventive service. An insufficient level of knowledge about vaccines may lead, among other things, to errors in their administration and convey misconceptions to parents of children in the context of vaccine safety and thus add to their hesitancy.

This study demonstrated that the general attitude of HCPs towards routine childhood vaccinations was positive. Although the attitude mean score of the participants from the preventive services compared with the curative services was higher, the score gap was small. It should be noted that 56% of the participants disagreed with the statement that there was an advantage in splitting vaccinations given at one time, and about 7% expressed some concern about the side effects of vaccinations to the point of avoiding recommending vaccinations. These findings require special attention given the influence that HCPs have on the promotion and support of the routine immunization program and the adherence to it.

Most of the HCPs encountered at least one parent who either opposed or feared vaccines during the last three months preceding the survey. This finding reflects the scope of the phenomenon and the importance of assessing the behavior of HCPs with parents who fear or oppose vaccines with regard to encouraging the receipt of routine vaccines. Of the participants, only 20.3% initiated a discussion with the parents about concerns related to the vaccines, and only half of them tried to explain and convince all parents who

Table 5
Bivariate analysis to identify factors associated with the HCP's behavior to encourage parents to vaccinate their children with routine childhood vaccines.

Categorical independent variables	Behavior score mean (± SD)	df	F	p-value
Gender	12.496 (4.742)	252	1.867	0.173
Male	11.686 (4.641)			
Female	12.699 (4.757)			
Nationality	12.486 (4.735)	253	8.306	0.004
Jewish	12.959 (4.470)			
Arab and other	10.984 (5.258)			
Religious observance	12.488 (4.760)	246	1.462	0.228
Secular	12.761 (4.410)			
Non-secular (observant or religious)	12.000 (5.317)			
Profession	12.486 (4.735)	253	3.845	0.051
Physician	11.772 (4.440)			
Nurse	12.955 (4.877)			
Workplace	12.486 (4.735)	253	70.204	0.000
Preventive service	14.646 (3.821)			
Curative service	10.240 (4.557)			
Children vaccinated as recommended to their age	12.855 (4.423)	225	2.313	0.101
95%≤	12.276 (4.538)			
75–94%	13.526 (4.316)			
75%>	13.600 (3.169)			
Number of parents who opposed vaccines in the past three months	12.742 (4.562)	236	24.872	0.000
0	9.231 (4.485)			
1	12.707 (4.880)			
2–5	14.495 (3.354)			
>5	14.342 (3.589)			
Number of parents who feared vaccines in the past three months	12.821 (4.591)	230	24.357	0.000
0	9.258 (4.941)			
1	13.714 (3.621)			
2–5	14.086 (3.804)			
>5	14.650 (3.211)			
Continuous independent variables	rp			p-value
Age	0.070			0.280
Professional experience	0.042			0.516
Professional pediatric experience	−0.022			0.733
Knowledge level score	0.156			0.013
Attitude score	0.158			0.013

Table 6
Multiple linear regression model for predicting the HCP's behavior to encourage routine childhood vaccinations .[1]

Independent variables	B	β	t	95% CI for B	P-value
Attitude score	0.046	0.062	1.088	−0.037, 0.128	0.278
Knowledge level score	−0.026	−0.006	−0.107	−0.501, 0.450	0.915
Workplace[2]	−2.880	−0.314	−4.978	−4.020, −1.739	0.000
Nationality	0.665	0.062	1.065	−0.566, 1.895	0.288
Number of parents who opposed vaccines in the past 3 months					
1 parent	0.828	0.069	0.935	−0.918, 2.574	0.351
2–5 parents	2.191	0.237	2.738	0.614, 3.768	0.007
>5 parents	2.045	0.160	2.045	0.074, 4.016	0.042
Number of parents who feared vaccines in the past 3 months					
1 parent	2.614	0.163	2.517	0.567, 4.662	0.013
2–5 parents	2.994	0.321	4.069	1.544, 4.445	0.000
>5 parents	2.854	0.265	3.217	1.105, 4.603	0.001

[1] The dependent variable.
[2] Curative versus preventive service.

feared or opposed vaccinations to vaccinate their child as recommended. This finding is unsatisfactory particularly at a time when we are aware of an increase in the number of parents who hesitate to vaccinate their children [4,5].

This phenomenon may be related to the fact that the HCP feels less confident to talk to the parent about the subject, or lacks the communication tools to deal with the problem. This assumption is supported by the fact that only 61.3% of the participants felt confident about talking to those parents who opposed or feared vaccinations, and only 48.3% felt they had the communication tools to deal with those fears.

According to the linear regression model, the only two variables that predicted the behavior of HCPs to encourage parents to vaccinate their children with routine vaccines were the place where the HCP was employed, and the number of parents encountered by the HCP who opposed or feared vaccinations. A higher behavior score was found among preventive service staff and among HCPs who encountered parents who opposed or feared vaccines. This finding is consistent with findings from a previous study which demonstrated that a HCP's recommendation to vaccinate or not according to the routine immunization program was associated with the workplace [14]. On the face of it, this result is not surprising because vaccines are at the core of the HCPs' preoccupation in the preventive services more than in the curative services. However, unlike the previous study, in which the comparison was mainly between nurses in MCHCs and pediatric nurses in the hospital, our current study compares between HCPs in MCHCs and HCPs in community clinics. In contrast to teams in hospitals, HCPs in

community care have an ongoing relationship with parents, and therefore their role is more influential on the decision-making process to vaccinate their children or not. Accordingly there is a higher expectation that HCPs will play a more central role in encouraging parents to vaccinate their children as recommended.

It should be noted that a large proportion of the participants reported that they had not received vaccine-related training at the beginning of their work and/or had not participated in refresher courses on the topic during the last two years preceding the survey. On the other hand, most of the participants in both types of services expressed interest in receiving training or acquiring further knowledge about vaccines, and would like to participate in workshops on improving communication skills to handle parents' fears of vaccinations.

This is a finding that requires an administrative approach to building a suitable training program for the medical teams, which would include communication skills to respond to and cope with issues related to parents' fears and/or opposition to vaccinations in particular, as well as providing quality public health services in general. According to the findings of this study, HCPs are expected to comply with such a program.

To the best of our knowledge, this is the first study that assesses the behavior of HCPs to encourage routine childhood vaccinations and its predictors in Israel.

The study has some limitations. First, this is a cross-sectional study, and therefore it was possible to conclude about associations between the various variables, but it was not possible to come to a conclusion regarding causality.

Second, the study population included pediatric HCPs only from the preventive and curative services in the Jewish sector and in one district of Israel, and therefore did not represent all HCPs working in these frameworks. However, this area includes a diverse cross-section of the Jewish population encompassing most groups of Israeli Jews. In the Arab population in Israel, the routine immunization coverage rate is very high, and the vaccine hesitancy phenomenon is not significant [15]. Therefore the current study was not conducted among them.

Third, the research instrument was based on a self-administered questionnaire, so there may be information bias.

Fourth, although the response rate was satisfactory (72.2%), there may be a non-response bias. Since responses were anonymous, a comparison between respondent and non-respondent characteristics could not be made.

Fifth, the sample size of this study was small, which limited us from obtaining more statistically powerful analysis for subgroups.

5. Conclusions

There is a need to: (1) increase the commitment of pediatric HCPs in the community to encourage parents to vaccinate their children with routine vaccines; (2) to improve their level of knowledge about vaccines; and (3) to provide them with communication tools to deal with parents who fear or oppose vaccines.

Conflict of interest

The authors declare no conflict of interests

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