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Forced Parents' Decision of Vaccination as a Psychological Ground for an Anti-Vaccination Paradigm

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***Background**: The existence of anti-vaccination paradigms hampers the vaccination coverage of infants in required for the population immunity formation volume. One of the significant factors of parents' refusal of immunization is that pediatricians don't have evidence-based tactics of interaction with them during the decision-making on their child's vaccination. **Objective**: Our aim was to study the psychological component of taking voluntary informed consent to vaccination by parents of a child-patient. **Methods**: Using structured interviews and research methods of problem situations in mothers of children-patients under 1 year, the alternative solutions for vaccination, when posing the question in the first and third person, were studied. **Results**: The interview was conducted with 76 mothers, 317 responses in the first person and 252 responses in the third were received according to 10 scenarios of decision-making. The received responses that reflect the courses of action were grouped into seven generic alternatives. It was found that 5 of 7 alternatives («get vaccinated,» «refuse vaccination», «falsify vaccination», «just wait, to postpone the decision,» «wait and obtain further consultation») are rarely considered in the first person as compared to the responses in the third person (4 and 8%, p = 0.043), the alternative of «get medical contraindication» in the first person is considered more often, the frequency of the alternative of «wait and keep watch over the child» did not change. **Conclusion**: The real consent to immunization is mentally stimulated in a large part of the parents. The discrepancy between the relative frequency of the parents-selected alternatives in the first and the third person, as well as a wider range of alternatives considered by parents, in comparison with physicians, indicates the desire of parents to accept psychologically independent, not imposed by a medical professional decision.*

***Keywords**: immunizations, voluntary informed consent, decision-making, children, parents.*

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BACKGROUND

According to the Russian Ministry of Health order № 125 N from 21.03.2014 "Concerning the establishment of the national calendar of preventive vaccination and calendar of preventive vaccination on epidemic indications", vaccination against pneumococcal disease is obligatory in children from the age of 2 months. It will raise the efficiency of preventing this infection [1, 2]. At the same time, we can assume that an increased number of injections in children of the first half-year of life will lead to increased psychological tension and fear of possible complications

in parents and, as a result, will make it difficult to start vaccination in early calendar terms. Refusals to vaccinate children with various health disturbances cause special anxiety. That's why a pro-vaccinal campaign aimed at the general audience is vital today [3, 4].

We assume that the parental apprehension can appear in the form of refusal to vaccination, while the physician's apprehension – in the form of baseless vaccination exemption. This topic is of current interest not only in Russian, but also in international medicine. The decision to vaccinate the concrete child at a certain point of time should not be made mechanically [5]. It requires individual evaluation of the vaccinal security. Thereby we can rightfully assume that the physician's decision can be modified under the psychological pressure of parents (threatening to make a complaint, falsification of the information concerning the child's health, etc.). The way out is a cooperative decision of both physician and parents. For this purpose G. Elwyn *et al.* recommend to consider the patients' preferences and allow him/her to select from several ways of possible treatment [6]. But this recommendation can hardly be useful in a situation of making vaccination decisions.

The problems of making cooperative decisions in pediatrics are under investigated so far. At the same time, research results are heterogeneous [7]. In the present context, the most obvious ways forward include rational argumentation in favour of the necessity of vaccination [8] and scientifically based responses to the objections of vaccination opponents [9-11]. In the psychological context, the rational argumentation has a sort of "side effect": in our view, substantial facts concerning vaccination advantages paradoxically provide the basis for anti-vaccination beliefs. One of the reasons of their formation may be the fact that both parents and medics find themselves in the situation of a "forced choice", which leads to "reactive resistance" – an impulse towards the opposite action, i.e. to refuse vaccination [11]. Refusal based on unconscious reactive resistance is further promoted by the apprehensions of both parents and physicians, which can't be totally removed since it is impossible to control all the possible consequences of vaccination. However, the manifestations of these apprehensions (to different degrees of awareness) can be corrected in general [12].

The parental decision to refuse vaccination can be influenced mechanistically, for example through the establishment of legal responsibility in such cases. But will these measures be helpful, and will they be adequate from deontological and ethical standpoints? There is a reasonably painful (especially for the physicians) change in the patient-physician interaction principle going on in modern pediatrics: a shift from paternalistic interaction to a collaborative one. In this context, the relevance of law enforcement aimed at parents raises great doubts. A dialog based on a position where the doctor understands the patient seems to be more promising.

The purpose of our study was to analyze the psychological component involved in the parental vaccination decisions.

METHODS

Study design

We conducted a cohort study, interviewing the parents of vaccinated children.

Acceptance criteria

Mothers who gave their consent to vaccination and to this study.

Study conditions

The study took place at two child polyclinics located in two different parts of Yaroslavl ("Child polyclinic № 5", "Child polyclinic № 3"), immediately before the child's vaccination.

Study duration

The study period was from April to August 2015.

Interviewing

We had been studying vaccination decision alternatives for mothers of children under the age of 1 year, using a structured interview and the method of studying problematic situations [13].

Based on a pilot study [14] we prepared descriptions of 10 experimental situations where parents are making a vaccination decision (see Appendix). The respondents could refuse to answer questions about several situations and they could give more than one answer for any situation. That is why the concrete alternatives were grouped in a number of generalized alternatives. For an answer to be accepted for processing, it must be a complete discussion of a situation with a respondent in one (third or first) person. For example, the answer "You can never tell what reaction a child will demonstrate to vaccination. I don't know, maybe I should search for some information in the Internet" was qualified as an alternative to "wait and to put the decision on hold".

First, we were fixing the alternatives in third person using answers to the following questions: "What actions are possible for the mother in this situation?", "What can the mother do in general?". Then, we fixed the alternatives in first person: "What actions would you consider in such a situation?", "What would you do in such a situation?", "Why is the chosen alternative better than the rest?".

Ethical review

An ethical review of this study has not been conducted. We were not discussing with the mothers the possibility of real vaccination for their children in order to avoid a possible negative influence on their choice in the real situation.

Statistical analysis

Principles of sample size estimation

Having no preliminary data, the authors used the recommendations of Y.P.Lisicin. According to them, 69 respondents are enough to get approximate results [15].

Methods of statistical analysis

The received data was processed using R version 3.2.3 (USA) – a statistical software package [16]. In case of paired answers, we compared the frequencies of alternatives chosen by the respondents depending on the question's wording (in first or in third person). For this purpose, we used the McNemar's criterion.

RESULTS

The respondents

We invited 127 mothers to take part in this study, who had applied for preventive vaccination for their children under 1 year. 76 (60%) mothers gave consent to the interview.

Main results of the study

We received 317 answers in third person and 252 – in first person. All answers were grouped in 7 alternatives. Answers in third person are given in table 1; answers in first person are given in table 2.

Table 1. Alternatives of child vaccination decisions, given in third person

Alternatives	**Situations, abs. (%)***										
	1, *n* =45**	**2, *n* =38**	**3, *n* =31**	**4, *n* =31**	**5, *n* =33**	**6, *n* =34**	**7, *n* =23**	**8, *n* =28**	**9, *n* =27**	**10, *n* =27**	**Total, *n* =317**
To accept vaccination	37 (82)	23 (61)	25 (81)	23 (74)	4 (12)	34 (100)	12 (52)	21 (75)	12 (44)	24 (89)	215 (68)
To refuse vaccination	3 (7)	18 (47)	9 (29)	10 (32)	1 (3)	0	2 (9)	15 (54)	11 (41)	8 (30)	77 (24)
To falsify vaccination	0	0	7 (23)	6 (19)	0	0	0	0	0	0	13 (4)
To push for vaccination exemption	0	12 (32)	0	0	0	0	1 (4)	0	0	0	13 (4)
To wait and put the decision on hold	15 (33)	3 (8)	4 (13)	3 (10)	5 (15)	14 (41)	9 (39)	0	10 (37)	0	63 (20)
To wait and observe the child	1 (2)	0	0	0 из 31	2 (6)	0	2 (9)	0	0	1 (4)	6 (2)
To wait and take extra consultation	30 (67)	17 (45)	0	3 (10)	28 (85)	2 (6)	7 (30)	5 (18)	10 (37)	2 (7)	104 (33)

*Note (here and in table 2). * - The frequency of an alternative in 10 experimental situations (1-10). The description of situations is given in Appendix. ** - Number of answers for each situation.*

Table 2. Alternatives of child vaccination decisions, given in first person

Alternatives	**Situations, abs. (%)***										
	1, *n* =36**	**2, *n* =29**	**3, *n* =26**	**4, *n* =24**	**5, *n* =21**	**6, *n* =27**	**7, *n* =22**	**8, *n* =22**	**9, *n* =21**	**10, *n* =24**	**Total, *n* =252**
To accept vaccination	15 (42)	1 (3)	24 (92)	24 (100)	0	26 (96)	10 (46)	14 (64)	4 (19)	22 (92)	140 (56)
To refuse vaccination	3 (8)	5 (17)	1 (4)	0	0	0	0	5 (23)	3 (14)	1 (4)	18 (7)
To falsify vaccination	0	0	1 (4)	0	0	0	0	0	0	0	1 (0,4)

To push for vaccination exemption	2 (6)	17 (59)	0	0	0	0	0	0	0	0	19 (8)
To wait and put the decision on hold	7 (19)	1 (3)	1 (4)	0	3 (14)	1 (4)	9 (41)	2 (9)	4 (19)	0	28 (11)
To wait and observe the child	1 (3)	0	0	0	1 (5)	0	1 (5)	0	1 (5)	1 (4)	5 (2)
To wait and take extra consultation	14 (39)	7 (24)	0	0	19 (91)	0	2 (9)	2 (9)	9 (43)	0	53 (21)

The comparison of the relative frequencies of alternatives given by the mothers has shown differences in their distribution between answers in third person and in first person. When a question was stated in first person, the respondents were considering each of the analyzed alternatives (except “to wait and observe the child”) less frequently than after questions in third person. The alternative “to push for vaccination exemption” was considered in first person more frequently (table 3).

Table 3. Comparison of alternative suggestion frequencies while answering in third and first person (for paired answers only, *n=200*)

Alternatives	**Suggestion in third person, abs. (%)**	**Suggestion in first person, abs. (%)**	***p****
To accept vaccination	160 (80)	115 (58)	0,001
To refuse vaccination	59 (30)	16 (8)	0,001
To falsify vaccination	11 (6)	1 (0,5)	0,019
To push for vaccination exemption	8 (4)	16 (8)	0,043
To wait and put the decision on hold	43 (22)	18 (9)	0,001
To wait and observe the child	6 (3)	0	1,000
To wait and take extra consultation	64 (32)	43 (22)	0,008

*Note. * - p was calculated in the McNemar test with Bonferroni-Holm correction.*

DISCUSSION

Summary of the main study result

The alternatives considered by mothers while making a child vaccination decision are different when answering in first and in third person. 5 of the 7 alternatives (“to accept vaccination”, “to refuse vaccination”, “to falsify vaccination”, “to wait and put the decision on hold”, “to wait and take extra consultation”) are less frequently considered in first person compared to answers in third person (4 and 8%; p=0,043). The alternative “to push for vaccination exemption” is considered in first person more frequently. The frequency of the “to wait and to observe the child” alternative was equal in prevalence in first and in third person.

Discussion of the main study result

3 directions can be detected in the present international studies on vaccination decisions. In the first one, the connection between refusals to vaccination and genesis of the corresponding diseases is shown on the basis of quantitative data. It is reported that approximately half of the refusals have no medical reasons [17]. Studies of the second direction consider informed consent in a bioethical context and the context of the parents' right to refuse vaccination [18-20]. In the third direction, factors of the informed consent itself are being discussed. D.D. Fredrickson et al. points at the positive effect brought by the possibility to discuss with parents their vaccination apprehensions [21]. L. Brabin et al. consider that parental vaccination beliefs and their perception of a vaccine as effective and safe are determined by general vaccination awareness [22]. In the context of our study purpose, it is essential that an increase in general awareness (according to the named authors) may lead to negative beliefs as well. The following studies can be referred to the third group as well: A.M. Hurley et al. [9], A. Kata [10] and D. Whitehead & G. Russell [11]. These studies discuss parental reactive resistance to vaccination.

Given the acquired data, the problem of informed consent to vaccination appears more complicated than the formal consent / refusal registered in medical documents. In terms of psychology, decision-making by definition contemplates some generally unavoidable risk. In the situation with no risk and with total distinctness, it would not be correct to speak about decision-making, but about making a choice of optimal actions. The solution of risk-taking problems can't be the same for all situations. Parental consent to hospitalization and to vaccination will most likely differ by their psychological mechanisms.

According to our data, parents consider the alternative "to accept vaccination" (compared to the rest alternatives) less frequently in first person than in third person. Such a result corresponds to the well-known fact of contradiction between declared beliefs and real behavior, if we assume (as we did in the study planning) that answers in third person ("mother, described in this situation, should accept vaccination") represent the declared beliefs, while answers in first person ("in such a situation I would accept vaccination") more exactly characterize the real behavior [23]. However, the situation was opposite in our study: all respondents have already accepted vaccination on the real behavior level. A "sampling error" towards the overvaluation of the consent frequency could have been expected. However, the real behavior appears to be more positive towards vaccination than even the declared beliefs.

Given this fact, we can assume that the real consent to vaccination is psychologically forced in a substantial proportion of respondents (32% to 44% of answers). It means that the parent is not accepting the responsibility which is presumed by informed consent. At the onset of negative consequences, the parents could immediately cancel such a consent. It can appear as a complaint to the medics' work, as a refusal to further vaccinations, as informing friends about the danger of vaccination, etc.

Parents consider wider alternatives than medics. They distinguish 4 alternatives which are not distinguished by medics: "to push for vaccination exemption", "to wait and put the decision on hold", "to wait and observe the child", "to wait and take extra consultation". Medics regard these alternatives as refusal to vaccination while parents consider them as separate ones. The alternatives "to wait and put the decision on hold", "to wait and observe the child", "to wait and take extra consultation" (55% of answers in third person; 34% of answers in first person) indicate that parents want to make a psychologically independent decision, which is not forced by a physician. The divergence of frequencies of mentioning the alternatives in third and in first person confirms that.

According to the present conception of psychological defense mechanisms, in the context of vaccination we regard the comparison of relative alternative frequencies (within answers in first and in third person) as a psychological indicator of taking unavoidable risk [12]. If parents really regarded vaccination as beneficial, we should expect coordinated answers in first and in third person. In other words, if a parent thinks that other parents should choose the alternative to accept vaccination, then he/she should choose this alternative for his/her child as well. Deviations from this correspondence indicate a psychologically forced consent. The important point is that we are talking not about legal but about psychological decision-making. Correspondingly, the informed consent is interpreted psychologically, but not legally. On the behavioral level, informed consent should manifest itself in the parental readiness to solve the possible after-vaccination problems.

Let us remark that it is almost impossible to have an informed consent in its pure form. In any case, there will be a possibility of the consequences, which would lead to the cancellation of the consent. Our interest is if there is a possibility to achieve a psychologically independent consent in such a proportion of parents that would be enough to form population immunity.

If objectively adverse consequences would be required for consent cancellation, we could disregard the psychological aspects of decision-making. The objectively adverse consequences are fairly rare (judging by literature data [5]) and the necessary actions in these cases are well-known. However, judging by the acquired data, parents are ready to cancel their consent not only because of objective but also because of subjective reasons. In the latter case, medics will have nothing to say – parental subjective discontent is nonfalsifiable by objective data, and most likely, there will be a conflict with no reason. Furthermore, dissemination in mass- and social media (Internet forums, social networks) of the information about allegedly harmful vaccines leads to vaccination refusals with no objective reasons.

A full-scale investigation of the subjectively adverse consequences of vaccination is difficult to conduct, for at their onset parents either avoid contact with medics or start a conflict.

Study limitations

Sample size sufficiency was evaluated posttest through calculating the sample size, required to attain the 0,8 cardinality of secured data. The calculation was made using the power.prop.test function, which is recommended by A.B.Shipunov et al. [25]. The sufficient minimum of the sample size for different alternatives was 69 to 269 respondents. Congruence between a priori- and minimal posterior estimates lets us regard the size of our sample as sufficient, but only for the problem statement.

CONCLUSION

Rational recognition of the vaccination benefits paradoxally creates the impression of non-alternativity, necessity of making a vaccination decision not only for parents, but also for medics. The situation of forced choice creates psychological resistance and predetermines the onset and existence of anti-vaccinal beliefs. Nevertheless, the aquired data lets us regard the perspectives of working with parents as optimistic. In order to preserve and increase the high proportion of vaccinated children, further investigations can be planned and conducted on the basis of our findings. These findings can be used for elaboration of psychologically- and deontologically-based tactics of interaction between medics and parents. Psychologically independent parental

decisions do not guarantee, but substantially rise their loyalty even in cases of vaccination complications. It will significantly reduce psychological stress for local pediatricians. Today, in order to conduct vaccination within the established terms, a purposeful work with prospective parents seems to be the most promising, since the window of maximal vaccination efficiency is quite short in time after birth, and this fact makes the decision-making difficult.

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Conflict of interests

The authors declared they have no competing interests to disclose.

APPENDIX

Experimental situations where parents are making a decision concerning their child's vaccination.

1. Ekaterina's son is 7 months old. He had neonatal hemolytic disease when he was at maternity home because of his and his mother's blood incompatibility. On discharge the mother was told that her child's health gives no ground for anxiety, but the child is hypermotive. A vaccination exemption until the age of 6 months was given for the child. At the age of 6 months the boy was examined by a neurologist, who detected some motoric abnormalities. Prescribed brain ultrasonography showed the absence of any structural changes. The neurologist prescribed gymnastics and massage. The question about vaccination remained untouched. The local pediatrician insists on vaccination. Ekaterina is scared and has no idea what to do. She thinks that her child is healthy and active, but he sleeps poorly, doesn't crawl and his teeth aren't cutting through. And now, a Mantoux test has been prescribed for the child.
2. Natalia was discharged from the maternity home with a daughter, who was diagnosed with pyoderma. The neonatologist wrote a vaccination exemption (BCG, DPT) in the case sheet and explained that such vaccinations should not be made until the age of 1 year. The local pediatrician disagreed with the neonatologist and said that the child is healthy, and Natalia should accept vaccination. Whatever Natalia was objecting (about possible consequences), the pediatrician told her that she is "the sharpest crayon in the box". She told Natalia that neonatologist should give her a certificate of vaccination exemption or Natalia should write a refusal herself, because the Sanitary & Epidemiological Service will check it.
3. Marina has been walking with her 12 months old son – Roman when she met the local pediatrician - Elena Nikolaevna. She reminded Marina about the upcoming vaccinations and said that she will be waiting for Marina and her son one of these days. But Marina did not come - neither on one of these days, nor later. Her child was growing up healthy. In order not to risk her child's health for nothing, Marina decided to do no vaccinations. "Anyway, vaccination has not much use", - she thought. When the time had come for Roman to go to kindergarten, Marina made an agreement with one physician - her friend – that he will give her the required certificates about vaccinations.
4. Anna studied a lot of information about vaccination. She was determined not to do vaccinations for her child since there was too many facts stating the harm of vaccination. Her child did not receive BCG vaccination, while to Hepatitis B she signed a refusal.

After a month, she was in hospital since her child acquired acute bronchitis. Anna decided that she would apply to her friend – a physician – for a falsified vaccination certificate if it is required at hospital.

5. 10 months old Sergey received Hepatitis B vaccination. The next day his mother noticed an allergy rash all over his body. She immediately flew at medics with claims. However, nothing serious happened – it was a reaction to the vaccine, which passed entirely in 2 days.
6. Alla is a young mom. She has a daughter (2 years old) and twins (6 months old). Her daughter received all the prescribed vaccinations with normal reactions to them. Now, after hearing different information about vaccination Alla feels lost in thoughts if there is any use to vaccinate the twins.
7. Olga received vaccination against diphtheria, tetanus, pertussis, poliomyelitis and hip disease (Haemophilus influenzae). On the 4-th day after the vaccination she felt bad – she started to vomit at night, and in the morning the ambulance hardly came in time to bring her to the hospital. Everything turned out well, but what to do with vaccination? The girl's parents are sure that it was the vaccine that caused their child's life-threatening condition. Medics deny even the possibility of that. According to the official letter, the child had an infection (most likely – rotavirus infection), which manifested in the post-vaccinal period.
8. Elena's son is 6 years old. He received all the prescribed vaccinations. At the age of 4,5 he had light pertussis, while 50% of children from his group had pertussis as well. At the age of 6, he woke up at the morning and was unable to stand up, but could eventually later the same day and felt normal. His legs were rubbery and disobeyed. Elena started to delve together with the physician and they found that a revaccination was made on the eve. Diagnosis and causes of this case were never found and the child went back to kindergarten. Usually his illnesses pass severely – the temperature is high for 1-2 days and antipyretics don't work. By contrast, Elena's daughter (3 years old) received only BCG vaccination (Elena refused other vaccinations). She was ill only once, because of Elena's parents' inadvertence (they allowed her to catch a cold in winter). At that time, she grew hoarse, but there was no increased temperature and no complications.
9. Kolya is 6 months old. His mother doesn't want to vaccinate him, and she is going to sign a refusal to vaccination. The child has signs of diathesis. The first child of this woman had a severe allergic reaction to vaccinations. Subsequently, atopic dermatitis and asthma were diagnosed in him.
10. Maria decided to refuse all vaccinations. A few times different physicians tried to change her mind without any zeal and without threatening her (as other parents told her they would). Maria signed a refusal and after a while her son caught rubella.

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