

Quality of life in parents of children and adolescents after systemic sting reactions

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Abstract

Introduction and objectives. The study aimed at evaluating the impact of Hymenoptera venom allergy (HVA) in children and adolescents, on their parents' QoL, taking into account their socio-demographic characteristics.

Materials and method. The study sample consisted of 101 parents of children and adolescents aged 9–17 years, with a history of systemic reaction after insect sting who were referred for consultations in the tertiary level allergology department. The mean age of the parents was 39 years (SD=8.1; range 25–65 years); the majority were mothers (68%) and rural inhabitants (62%). QoL in parents of HVA children and adolescents was measured with the Parents of Children with Hymenoptera Venom Allergy Quality of Life Scale, a questionnaire covering 5 dimensions: anxiety, caution, limitations and discomfort, support provided to the child and feeling of safety, each measured on the scale ranging from 1 to 5. Independent predictors of QoL were estimated using the Generalized Linear Model.

Results. Parents of urban children and adolescents treated with venom immunotherapy (VIT) up to 3 years (B=-1.37, 95CI=(-2.22;-0.53); p=0.001) and of rural children treated for more than 3 years (B=-0.94, 95CI=(-1.55;-0.33); p=0.003) reported lower anxiety than parents studied at diagnosis. In urban parents, individuals studied at VIT beginning reported a lower feeling of safety (B=-0.63, 95CI=(-1.11;-0.15); p=0.010); those studied up to 3 years of treatment reported a higher feeling of safety (B=0.64, 95CI=(0.11;1.16); p=0.018) than those studied at diagnosis. Contrariwise, in rural parents, those studied at the beginning of immunotherapy reported a higher feeling of safety than those studied at diagnosis (B=0.51, 95CI=(0.13;0.88); p=0.008).

Conclusions. The longest VIT duration in children and adolescents with HVA is related to the decreased anxiety of their parents. Parent's feeling of safety depends on the stage of treatment and place of residence.

Key words

quality of life, parents, insect sting, Hymenoptera venom allergy, cross-sectional study

INTRODUCTION

Allergic reactions to Hymenoptera venom (HV) observed after insect stings (ISs) may be divided into large local reactions (LLRs) and systemic reactions (SRs), categorized into 4 grades according to Mueller's classification [1]. Although only severe systemic reactions (grades 3 and 4) to ISs are potentially life-threatening, in spite of being almost 10-times less frequent in children compared to adults (0.4–0.8% vs. 3.0%), they still remain the second risk factor of anaphylaxis in the European population of children [2]. For this reason, Hymenoptera venom allergy (HVA) in children may impact not only on the patient's health-related quality of life, as observed in many other diseases in all age groups, but also the quality of life (QoL) of the patient's relatives, especially their parents [3–10].

OBJECTIVES

The aim of this study was to evaluate the impact of children's and adolescents' HVA on their parents' QoL, to assess relationships between the dimensions of parents' QoL, and their independent predictors in the context of both socio-demographic and clinical characteristics (as hypothesized in Figure 1).

MATERIALS AND METHOD

Study sample. This is a cross-sectional study, which results originate from the analysis of data from 101 parents of children and adolescents aged 9–17 (named children in the following part of the text) with a history of SR after IS, referred to tertiary level consultations in 2010–2013. The mean parental age equalled 39 years (SD=8.1, range 25–65 years); in the mentioned group mothers (68%) and rural inhabitants (62%) predominated. Written consent from the parents of HVA children was obtained. The study was approved by the local Bioethical Committee.

Measures. QoL in parents of HVA children and adolescents was measured with Parents of Children with Hymenoptera

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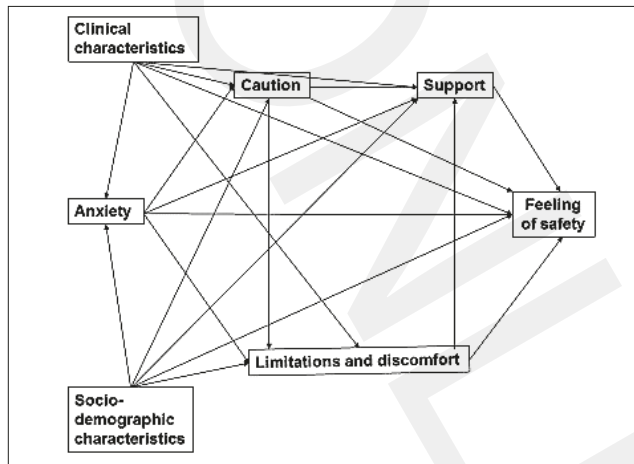


Figure 1. Model of the hypothesized relationships between dimensions of QoL of parents of children and adolescents with HVA

Venom Allergy Quality of Life Scale (PoCHVAQoLS), the first scale designed for this purpose [11,12]. This is a self-administered questionnaire consisting of 17 items covering 5 dimensions, parallel to those measured by the Children with Hymenoptera Venom Allergy Quality of Life Scale (CHVAQoLS) in young HVA patients: anxiety, caution, limitations and discomfort, support provided to the child and feeling of safety [13, 14]. Each dimension was measured with 3 items (except safety subscale and limitations and discomfort subscale, which consisted of 4 items), on a scale ranging from 1 to 5. In our previous study reliability for particular scales was estimated as 0.84 for anxiety, 0.75 – caution, 0.82 – limitations and discomfort, 0.81 – support provided to the child and 0.75 for feeling of safety [11]. Reliability of the scale in the sample under study was estimated as 0.91, 0.75, 0.79, 0.78 and 0.64 for respective subscales. Factor analysis conducted for the scale items revealed 4 factors with eigenvalues greater than 1, but a 5-factor solution provided a structure with a clearer interpretation: the first factor was defined by items from the anxiety and caution subscales, the second by 3 items from the discomfort and limitations subscale, the third by items from the support subscales, and the fourth by 3 items from the safety subscale. One of these items loaded with similar strength on the 5th factor which was defined by one item from safety and one from the discomfort and limitations subscale. The questionnaire was filled-in during in-patient visits, after diagnostic or immunotherapy procedures.

In the regression models, male gender was treated as a reference category, both in the case of parents and children. Age, both of parents and their children, was treated as a continuous variable. Additionally, as parental age was involved in interaction terms in some regression models, it was centred around its mean value. Place of residence was analysed as a binary variable indicating rural inhabitants compared to urban inhabitants (reference category).

Parents were categorized according to SR severity in their child, which was coded 1–4, according to the grades of Mueller's classification. Due to the small percentage of parents of the children with LLR, this category was aggregated with those with Mueller's 1st grade and called altogether dermal reactors (reference category). Whereas parents of children with at least 2nd grade of SRs severity were aggregated into the second category [15].

Parents were divided into 4 categories, according to the moment at which their QoL was measured in the context of child's stage of treatment: those studied at child's diagnosis (reference category), those studied at the incremental dose of venom immunotherapy (VIT) of their children, those studied for up to 3 years of maintenance dose, and those studied for more than 3 years after beginning VIT. The period census was selected so that the 3-year period was the shortest recommended time for VIT, and additionally, the sizes of the 2 categories were similar.

QoL measurements were performed at different stages of medical procedures: parents studied at diagnosis of their children and at the beginning of VIT with incremental dose were studied irrespective of the season of the year, whereas children studied at different stages of VIT with maintenance dose were studied during regular outpatient visits in September or October (regarded as the high season of Hymenoptera activity – in this study referred to as 'the season'). Accordingly, a binary variable was included as a confounder in the regression models, indicating parents studied outside the season.

Parents were classified with regard to culprit insects which caused SR in their children, as bee, wasp, or unidentified insect. The last category (reference group) included only parents studied at the diagnosis of their children.

Statistical analysis. Qualitative variables were described as counts (n) and percentages (%), whereas quantitative variables were described as means and standard deviations.

Factor analysis using the principal component method with Varimax rotation was used to investigate factor structure of the items constituting PoCHVAQoLS, and Cronbach alpha coefficient was used to estimate reliability of the scale.

To assess independent predictors of parents' QoL, linear regression models were estimated using the Generalized Linear Model (GZLM) with identity linking function, and variables of normal distribution as dependents. Regression results were presented as raw regression coefficient B, respective 95% confidence intervals and respective p value. All 2-way interactions between variables in the model were tested.

Some variables represented nested effects, e.g. Mueller's grade of a child's anaphylactic reaction, stage of treatment and culprit insect, in the sense that dermal reactors, as well as an unidentified culprit insect, were observed only in parents studied at diagnosis of their children. In these variables, separation of the effects was not fully possible, they were therefore tested in separate models and the most significant was included in the final regression model.

Differences at $p < 0.05$ were treated as statistically significant. IBM SPSS Statistics 21 for Windows statistical software was used.

RESULTS

Demographic characteristics of parents and clinical characteristics of their children. The parents were studied at different stages of the medical procedures undertaken with their children – mostly during diagnostic evaluation, to a lesser extent at the moment of VIT introduction and at different stages of the maintenance phase of VIT; among the urban-dwellers, there were no parents of children treated for

more than 3 years. In 50%, the parents were studied outside the season. The mean age of children of the studied parents was 10.4 years (SD 3.8), they were mostly boys (72%), and the majority of children of studied parents were sensitized to bee venom (B.v.), while in 20% of the entire study group (40% of parents studied at their children's diagnosis), the type of insect was unidentified. There was a predominance of Mueller's 2nd grade pre-diagnosis systemic reaction in children of studied parents, followed by 3rd and 4th SR (Tab. 1).

Table 1. Clinical characteristics of children of studied parents

		N	%
Culprit insect	Not identified	20	19.8
	Wasp	37	36.6
	Honey bee	44	43.6
Stage of treatment	Diagnosis	48	47.5
	VIT beginning	23	22.8
	Up to 3 years of VIT	16	15.8
	3 years of VIT or longer	14	13.9
Mueller's grade of anaphylactic reaction before treatment			
	LLR or 1 st	16	15.9
	2 nd	33	32.7
	3 rd	26	25.7
	4 th	26	25.7
Total		101	100

Quality of life. According to the classification suggested by the authors (1–1.79 – very low, 1.8–2.59 – low, 2.6–3.4 – moderate, 3.41–4.2 – high, 4.21–5.0 – very high), in the parents of children with HVA, the levels of anxiety and safety as well as of limitations and discomfort may be treated as moderate. The level of caution and support provided to children may be treated as high (Tab. 2) [16].

Table 2. Mean levels of QoL dimensions in studied parents of HVA children

Dimension	mean	SD	No. of items
Anxiety	3.3	0.9	3
Caution	3.8	0.9	3
Limitations and discomfort	2.6	0.9	4
Support provided to children	3.8	0.8	3
Feeling of safety	3.2	0.7	4

Multivariate analysis. Due to a significant interaction between the stage of treatment and place of residence, the results of the regression model for anxiety were presented separately for urban and rural-dwelling parents. A significant interaction was observed in rural parents between their gender and age which showed that paternal anxiety decreased and maternal anxiety increased along with their age. The difference between the slopes of these relationships was significant. Parents of urban children and treated with VIT for up to 3 years, as well as parents of rural living children, but treated longer than 3 years, reported lower anxiety than the parents of children studied at diagnosis. A significant interaction also occurred in parents whose children were studied at the beginning of VIT – their anxiety increased with age significantly faster than in parents of diagnosed

children, irrespective of place of residence. Additionally, in rural-dwelling parents studied at the beginning of VIT, anxiety decreased significantly faster, together with the child's age, whereas in those studied up to 3 years of VIT, anxiety increased significantly faster, together with the child's age, compared to the parents of children studied at diagnosis (Tab. 3).

Parental caution increased along with their increasing anxiety ($B=0.72$, 95%CI=(0.58; 0.85); $p<0.001$), but decreased slightly with the age of their children ($B=-0.04$, 95%CI=(-0.07;-0.01); $p=0.049$).

Limitations and discomfort of the parents were higher in those whose children were sensitized to wasp venom ($B=0.63$, 95%CI=(0.22; 1.03); $p=0.003$) or to bee venom ($B=0.56$, 95%CI=(0.18; 0.95); $p=0.004$) than in those whose children were stung by unidentified insects. The level of limitations and discomfort of the studied parents increased along with their anxiety ($B=0.44$, 95%CI=(0.23; 0.65); $p<0.001$) and caution ($B=0.23$, 95%CI=(0.01; 0.45); $p=0.044$).

Significant interaction between the parental gender and Mueller's grade of their child's SR indicates that in parents of children being dermal reactors only, mothers gave their children more support than the fathers ($B=1.23$, 95%CI=(1.04; 2.88); $p<0.001$), but this difference was compensated in children with higher grades: ($B=-1.74$, 95%CI=(-2.82; -0.67); $p=0.002$) for 2nd grade, and ($B=-1.44$, 95%CI=(-2.51; -0.38); $p=0.008$) for Mueller's 4th grade. For this reason, the results of the regression model were presented separately for fathers and mothers.

Among the fathers there was a significant interaction between their age and the evaluation of support in the context of season. This indicated that the level of provided support decreased together with the age of the parent only in those studied outside that season. Fathers of children with at least Mueller's 2nd grade gave more support to their children than fathers of dermal reactors, whereas in mothers, there was no significant difference in the level of provided support in relation to grade of anaphylactic reaction. Parents of treated children provided them less support than parents of those diagnosed and those studied at the beginning of VIT; however, the only significant difference was observed between the mothers of children treated for more than 3 years, compared to those studied at diagnosis. Support increased with an increase in the level of limitations and discomfort (Tab. 4).

Due to significant regression coefficients for the interaction between stage of treatment and place of residence, the results of the regression model for feeling of safety were presented separately for urban and rural-dwelling parents. In urban inhabitants, the parents of girls reported higher feeling of safety than parents of boys. In rural dwellers, the fathers of girls reported a lower level of this emotion than fathers of boys, whereas mothers of girls reported a higher level of feeling of safety than mothers of boys. Only in urban-living parents there occurred a significant decrease in the feeling of safety level related to an increase of the child's age. Parents studied outside the season reported a lower level of feeling of safety; however, the difference was significant only in rural dwellers. In urban living parents, those studied at the beginning of VIT reported a lower feeling of safety, whereas those studied up to 3 years of treatment reported a higher level of this emotion than those studied at diagnosis. Contrariwise, in rural living parents, those studied at the

Table 3. Independent predictors of anxiety in parents of HVA children and adolescents with respect to their place of residence

	Urban				Rural			
	B	95% CI	p	B	95% CI	p		
Gender: F vs. M	0.15	-0.60	0.91	0.695	0.05	-0.38	0.47	0.824
Parent's age	-0.04	-0.16	0.07	0.491	-0.04	-0.08	0.00	0.063
Interaction between gender and parent's age	-0.02	-0.15	0.10	0.736	0.06	0.01	0.11	0.027
VIT beginning vs. diagnosis	-0.03	-0.93	0.86	0.943	0.09	-0.43	0.61	0.736
Up to 3 yrs of VIT vs. diagnosis	-1.37	-2.22	-0.53	0.001	-0.31	-1.02	0.40	0.395
3 years of VIT or longer vs. diagnosis	-	-	-	-	-0.94	-1.55	-0.33	0.003
Interaction between stage of treatment and parents' age								
VIT beginning by parent's age	0.18	0.01	0.36	0.041	0.10	0.01	0.19	0.028
Up to 3 yrs of VIT by parent's age	0.03	-0.17	0.24	0.757	0.02	-0.05	0.07	0.631
3 yrs of VIT or longer by parent's age	-	-	-	-	0.02	-0.06	0.10	0.629
Child's age	0.05	-0.06	0.16	0.349	-0.02	-0.10	0.07	0.679
Interaction between stage of treatment and child's age								
VIT beginning by child's age	-0.32	-0.85	0.21	0.236	-0.18	-0.33	-0.03	0.016
Up to 3 yrs of VIT by child's age	-0.19	-0.46	0.09	0.184	0.21	0.03	0.39	0.021
3 yrs of VIT or longer by child's age	-	-	-	-	0.00	-0.20	0.20	0.988
Constant	3.38	2.73	4.03	<0.001	3.38	2.93	3.83	<0.001

Table 4. Support provided to young HVA patients by their parents with respect to parents' gender

	Fathers				Mothers			
	B	95% CI	p	B	95% CI	p		
Parent's age	0.01	-0.02	0.04	0.440	0.00	-0.04	0.03	0.818
Studied outside season of insect's activity	-0.11	-0.52	0.29	0.585	-0.26	-0.65	0.14	0.209
Interaction between studied outside season and parent's age	-0.06	-0.11	-0.01	0.012	-0.02	-0.07	0.02	0.349
VIT beginning vs. diagnosis	-0.08	-0.60	0.44	0.754	-0.14	-0.65	0.37	0.582
Up to 3 yrs of VIT vs diagnosis	-0.34	-0.99	0.30	0.297	-0.16	-0.68	0.36	0.556
3 yrs of VIT or longer vs diagnosis	-0.46	-1.07	0.15	0.136	-0.81	-1.43	-0.18	0.011
II vs I or LLR	1.36	0.62	2.10	<0.001	-0.01	-0.57	0.54	0.960
III vs I or LLR	1.27	0.46	2.08	0.002	0.29	-0.26	0.85	0.297
IV vs I or LLR	1.50	0.69	2.32	<0.001	-0.26	-0.82	0.31	0.374
Limitations & discomfort	0.17	-0.08	0.41	0.192	0.42	0.20	0.64	<0.001
Constant	2.33	1.52	3.14	<0.001	3.00	2.31	3.69	<0.001

Table 5. Independent predictors of feeling of safety in parents of HVA children and adolescents with respect to their place of residence

	Urban				Rural			
	B	95% CI	p	B	95% CI	p		
Parents' gender: F vs. M	0.00	-0.49	0.50	0.991	-0.16	-0.49	0.18	0.362
Child's gender: F vs. M	0.81	0.16	1.46	0.015	-0.85	-1.51	-0.20	0.011
Interaction between parents' gender and child's gender	0.03	-0.66	0.72	0.941	1.05	0.25	1.84	0.010
Child's age	-0.14	-0.20	-0.09	<0.001	0.01	-0.03	0.05	0.501
Outside season of insect's activity	-0.29	-0.65	0.06	0.107	-0.38	-0.68	-0.08	0.014
VIT beginning vs. diagnosis	-0.63	-1.11	-0.15	0.010	0.51	0.13	0.88	0.008
Up to 3 yrs of VIT vs diagnosis	0.64	0.11	1.16	0.018	0.01	-0.43	0.45	0.976
3 yrs of VIT or longer vs diagnosis	-	-	-	-	-0.02	-0.46	0.41	0.916
Parents' anxiety	0.20	-0.15	0.55	0.269	-0.21	-0.43	0.01	0.059
Parents' caution	-0.52	-0.89	-0.15	0.006	-0.19	-0.41	0.02	0.074
Constant	4.08	3.20	4.96	<0.001	5.02	4.24	5.81	<0.001

beginning of VIT reported a higher feeling of safety than those studied at diagnosis. Higher safety was accompanied by lower caution, irrespective of the place of residence, whereas in rural living parents, it was also accompanied by lower anxiety (Tab. 5).

DISCUSSION

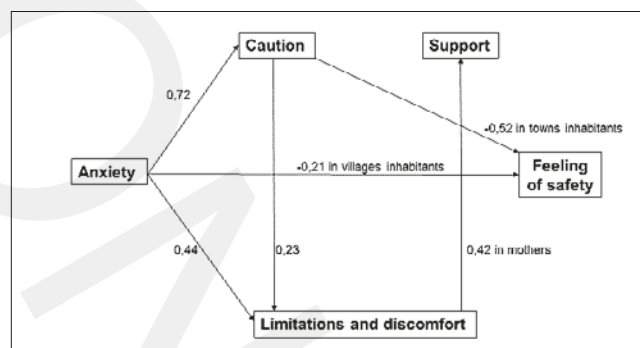


Figure 2. Statistically significant relationships between dimensions of QoL of parents of children and adolescents with HVA. Numbers are unstandardized linear regression coefficients

This study presents the results of the first investigation concerning the QoL of parents of HV-allergic children and adolescents conducted with the use of PoCHVAQoLS – the only scale developed especially for the measurement of QoL in this parental group [11, 12]. The results of the study show that particular dimensions of the parents' QoL are affected by their children's clinical characteristics, children's and parents' demographic characteristics, as well as their relationship to some other dimensions of QoL (Fig. 2).

The study shows that the parents of children treated for a longer time reported lower anxiety than those studied at diagnosis or at the beginning of VIT; however, the stage of treatment at which this difference was observed differed between urban and rural-dwelling parents. This difference might have occurred because rural living children are at a greater risk of being stung, in spite of the fact that VIT-treated children are protected against SR immediately after reaching the maintenance dose of treatment. In a previous study by the authors addressed to the parents of VIT-treated children aged up to 13 years they showed that there was a non-linear relationship between the level of anxiety and treatment duration: the parents of children treated from half-a-year to 2 years reported lower anxiety than the parents of children treated for shorter as well as for longer periods [17].

There was a gender-related difference in the slopes of the relationship between parental age and anxiety. These results, to some extent, are similar to those reported by Wrześniewski et al., who showed that in a normalization sample drawn from the Polish general population, the anxiety trait, (tendency to perceive as dangerous situations which objectively do not pose any threat) increases along with age in both genders [18]. This similarity may result from the fact that items of PoCHVAQoLS ask for a person's common feelings and behaviours concerning the occurrence of a particular situation, in the same way as items measuring the anxiety trait. Age significantly impacts parental anxiety, especially in those studied at the beginning of VIT. In spite of the fact that starting treatment of the child, which should increase

parental safety, the incremental dose of VIT itself may result in systemic, sometimes life-threatening reactions. A positive regression coefficient for the interaction between the age of parents of VIT-starting children and anxiety may indicate that older parents are more aware of this possibility, or are more sceptic about VIT efficiency.

A similar relationship was observed in the case of impact of the child's age on parental anxiety, which interacted with the stage of treatment. It seems obvious that the parents of older children appeared to feel safer due to having more independent children, what connected with the beginning of treatment may reduce the anxiety of the parents. However, in children treated for up to 3 years, the relationship between the child's age and parents anxiety was the reverse, and may also result from the greater extent of independence presented by older children, as the parents have a diminished possibility to control them.

The relationship between anxiety, child's age and caution seems to be obvious: increasing anxiety provokes the parents to a greater number of cautious behaviours in order to retain a comfortable feeling of safety, whereas as the age of the child increases, his/her self-responsibility also increases. A similar relationship concerning anxiety and caution was observed in Polish adolescents with HVA [19]. In previous studies by the authors of the current paper, performed with an adaptation of the Vespil Quality of Life Questionnaire (VQLQ) for parents of Polish children (aged up to 13 years), a reversed U-shaped relationship was obtained: caution was the lowest in parents of children aged 10 or less, and the highest in parents of 11-year-old children [17].

The level of limitations and discomfort of the parents was related to the type of culprit insect – parents of children with a known culprit insect had higher scores in this dimension than those who did not know the culprit insect. This may suggest that being aware of the reason for the health problems of the child is a greater burden than lack of this awareness. This was also related to the level of anxiety and caution, suggesting that higher anxiety about the child, its safety and health, may cause higher discomfort, whereas a greater amount of cautious behaviours may increase the feeling of limitations in parents. Previous studies by the authors provided results which, to some extent, are similar and showed that the discomfort of parents increased along with their caution [17]. A similar impact of anxiety and caution on limitations was also observed in Polish adolescents with HVA [19].

A positive correlation between support and level of limitations and discomfort may be interpreted as giving support to a child may by itself cause discomfort to parents. Education of the child in safety behaviours may be one of the coping strategies for parents to increase their personal comfort.

Lower support given by mothers of children treated more than 3 years also seems to be an obvious result, because children who are treated for such a long time are fully protected by VIT, they are also generally older, more independent, and do not need so much support, irrespective of the treatment effects. The difference between parent's gender showed that the level of support given by mothers was independent of the severity of the child's anaphylactic reaction, whereas the fathers of children with at least Mueller's 2nd grade provided their children with higher support. This observation may result from the fact that mothers treat their children's disease

as serious, irrespective of its clinical severity, whereas fathers start a supportive action when the disease is confirmed by a doctor's diagnosis and at the start of treatment, which usually refers to children with at least 2nd grade of severity of reaction.

Although the pattern of relationship between safety and anxiety is obvious, the direction of another relationship seems to be the most surprising, as one may expect that a higher level of feeling of safety should correspond to a higher level of caution. However, this result may indicate that parents may inhibit some cautious behaviours to increase their and/or their children's level of safety, therefore greater caution occurs as a way of compensating for the low level of safety feeling. The lower level of safety in parents studied outside the activity period of insects, observed in rural-dwellers may be surprising. It should be mentioned that the parents of diagnosed children or of those starting VIT are usually studied outside the season, thus, such parents are shortly after an experience of SR in their children, and are aware that the risk of a subsequent sting for their children is rather high. They may be afraid of such an event being repeated, or may expect SR as a side-effect of a VIT incremental dose.

It was observed in urban parents that the level of feeling of safety decreased along with the increasing age of the child, which may result from the potential risky behaviours in this age group, regardless of HVA. The relationships between parents' and children's gender compared to place of living and feeling of safety, may be explained by the higher availability of urban medical services. Despite early protection due to the introduction of VIT, differences among urban and rural inhabitants, in the feeling of safety at various stages of the VIT treatment, may occur due to a higher probability in the latter group of being stung.

There is no possibility to compare the presented results with the results obtained in studies of HRQoL of adult patients with HVA. All such studies were conducted using the VQLQ scale, which contains items concerning anxiety, caution and discomfort; however, the authors defined the tool as uni-dimensional [20–28].

Limitations of the study. It should be mentioned that contrary to the previous studies by the authors, the current study did not include the parents of children who completed treatment, therefore it could not provide a full comparison of their QoL across different stages of treatment. The cross-sectional design of the study imposes some limitations concerning interpretation of the relationship between stage of treatment and parental QoL. The lack of children treated with protocols other than ultra-rush also limited the possibility of generalizing the results, as in previous studies by the authors, which revealed an impact of VIT protocol on some QoL dimensions. It should be also noticed that the model of the study could be examined using structural equation modelling (SEM) to test the relationships between all studied variables simultaneously. The SEM requires a much larger sample sizes than that presented – in the literature it is suggested that it should exceed 200 [29]. In the case of rare diseases, such as HVA, it would be very time consuming, usually it is possible to include to the study 10–15 children within the year, which would lead to an oversampling of diagnosed children, with a proportionally too small representation of patients at different stages of treatment. A greater sample size would also result in a higher power of the study.

CONCLUSIONS

The longest VIT duration in children and adolescents with HVA is related to the decreased anxiety of their parents. Caution increases along with increasing anxiety, whereas limitations and discomfort increase along with increase of both these variables. The gender of the parent and severity grade influence the level of support given to children. In mothers, greater support is related to a greater level of limitations and discomfort. The feeling of safety of the parents depends on the stage of treatment and the place of residence.

Conflict of interests

The authors declare that they have no competing interests.

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