BMC Psychology

RESEARCH

Open Access

Cross-sectional and longitudinal validation of the Slovene version of the health-related quality of life questionnaire in patients with Hymenoptera venom allergy (HRQLH-S)

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Abstract

Background This study aimed to determine to what degree venom immunotherapy can affect the Quality of Life (QoL) in patients hypersensitive to the Hymenoptera venom and to validate the Slovene version of the "Vespid Allergy Quality of Life Questionnaire."

Methods The "Vespid Allergy Quality of Life Questionnaire" (VQLQ), developed by Oude Elberink et al., has become a well-established diagnostic instrument. The Slovene version of the Health-Related Quality of Life Questionnaire for Hymenoptera venom allergy (HRQLH-S) was administered to 288 patients from different groups with a confirmed diagnosis of Hymenoptera venom hypersensitivity to achieve cross-sectional validation. The HRQLH-S results were compared among groups, with an Expectation of Outcome (EoO) questionnaire and a 10-point Likart scale question: (How much is your QoL reduced by being allergic to insect sting?). The questionnaire was administered to 49 patients treated with venom immunotherapy to establish longitudinal validity.

Results In cross-sectional study, statistically significant differences ($p < 0.001$) were observed in patients treated with venom immunotherapy compared to untreated patients. The median (Mdn) was used to compare the groups. Patients that have already been treated recorded a rise in QoL only six months into treatment (Mdn = 3.18), compared to the untreated (Mdn = 4.20). Further noticeable improvements in the QoL were recorded in patients treated for three to five years (Mdn = 2.47). Statistically significant correlations between the HRQLH-S results and the EoO were confirmed in cases of patients with wasp venom hypersensitivity (Q15r = 0.82; Q16r = 0.67; Q17r = 0.63; $p < 0.001$) and those with honeybee venom hypersensitivity (Q15r = 0.79; Q16r = 0.62; Q17r = 0.64; $p < 0.001$). The cross-sectional validation yielded a correlation coefficient of 0.96 (Cronbach α).

In the longitudinal validation, we showed a significant correlation between EoO and HRQLH-S (Q15r = 0.87; Q16r = 0.77; Q17r = 0.71; $p < 0.000.1$), with a good internal consistency (Cronbach α = 0.97). Furthermore, we found a significant difference ($p < 0.001$) in the QoL of pretreatment patients (Mdn = 3.91) compared to the value after five years of treatment (Mdn = 2.06).

Conclusions Results confirm the efficiency of VIT on QoL in patients with Hymenoptera venom hypersensitivity. The HRQLH-S questionnaire proved suitable for measuring QoL in wasp and honeybee venom-allergic patients.

Keywords Hymenoptera venom hypersensitivity, Venom immunotherapy, Quality of life

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Background

Up to 7.5% of the population experience a systemic reaction (SR) or anaphylaxis after a Hymenoptera sting [1–3]. Furthermore, European data from the network of severe allergic reactions (NORA) show that Hymenoptera stings cause 48.2% of all documented anaphylaxis episodes in adults. The most common sting culprits in Europe are wasps (*Vespula vulgaris, Polistes*), followed by honeybees (*Apis mellifera*) and European hornets (*Vespa crabro*) [4].

The majority of patients who have recovered from a Hymenoptera-caused systemic allergic reaction experience anxiety and quality of life impairment due to fear of future stings when performing outdoor activities. Moreover, it has been shown that high occupational or vocational exposure to stings can significantly affect the working ability of patients diagnosed with Hymenoptera venom anaphylaxis [5–7].

For the above reasons, the guidelines for prescribing specific venom immunotherapy (VIT) account not only for the severity of an allergic reaction after a sting when deciding who is an appropriate candidate for VIT but also for the quality of life impairment. Therefore, VIT is indicated for patients who have experienced Mueller grade III or IV systemic reaction (dyspnea and hypotension, respectively) and also for patients with mild reactions (urticaria/angioedema) who have significant impairment of quality of life-related to Hymenoptera venom allergy [8]. The main goals of VIT are thus to reduce the risk of life-threatening SRs to a future sting [9] and/or to improve the quality of life by minimizing the fear of consequences after being stung [10].

Therefore, in the current study, we aimed to evaluate the impact of honeybee or vespid VIT on patients'quality of life with systemic allergic reactions after honeybee, wasp, and/or hornet stings. We translated it into Slovenian to achieve that and validated the Vespid Allergy Quality of Life Questionnaire [11].

The validated questionnaire was then applied to different patient populations concerning VIT treatment (pre-VIT/6–12 months of VIT/3–5 years of VIT and post-treatment) that also differed concerning the culprit insect (wasp/hornet allergy vs. honeybee allergy). Given the high prevalence of systemic reactions occurring in Slovenia even after honeybee stings [12], it is crucial that a tool for assessing quality of life, such as HRQLH-S, allows for an accurate evaluation of the quality of life across a broader spectrum of patients with allergies to venoms from different species of Hymenoptera. The questionnaire allowed us to establish not only the impact of VIT on the quality of life of patients with Hymenoptera venom allergy (HVA) but also the validity of the questionnaire, which was prepared for patients with vespid allergy, for assessing the quality of life of patients with honeybee venom allergy.

Research aim and objectives

The aim of the study was to examine the relationship between specific immunotherapy and the quality of life of patients with hypersensitivity to Hymenoptera venom. Additionally, we aimed to assess the applicability of the Health-Related Quality of Life Questionnaire for Hymenoptera Venom Allergy (HRQLH-S), which was translated into the Slovene language for the first time, and to compare the results with those of previously conducted international studies.

The objectives of the study were: (1.) to assess the impact of specific immunotherapy on the quality of life of patients with hypersensitivity to Hymenoptera venom, (2.) to assess the reliability of the Slovene version of the Health-Related Quality of Life Questionnaire for Hymenoptera Venom Allergy (HRQLH-S), and (3.) to evaluate the validity of the Slovene version of the HRQLH-S in this patient population.

Methods

Patients selection

Between September 2016 and October 2017, we conducted a cross-sectional study at the University Clinic for Respiratory and Allergic Diseases Golnik, the largest center for the treatment of Hymenoptera venom allergy in Slovenia. During this period, the clinic was also the only center introducing new patients to specific venom immunotherapy (VIT). We included 288 consecutive adult patients with Hymenoptera venom allergy who were either undergoing VIT or waiting to begin VIT. Patients who were not candidates for VIT were excluded.

This sample of 288 patients represents a significant portion of the more than 500 patients treated at our clinic during that time. Due to the lack of precise data on the total number of patients treated in Slovenia, it is not possible to determine the exact proportion of patients receiving VIT on a national scale. However, based on the size of our sample and previous experience at our clinic, we believe that it is sufficiently large to conduct a meaningful statistical analysis and that the results can reflect the effectiveness of treatment.

The patients were divided into three groups, namely: (a.) patients waiting to begin VIT ($n = 100$), (b.) patients receiving VIT for 6 to 12 months ($n = 81$), and (c.) patients receiving VIT for 3 to 5 years ($n = 107$). Within groups b and c, the patients were further divided into subgroups of patients who have been stung/have not been stung by a culprit insect during VIT.

A longitudinal study (2023) gave the questionnaire to 49 adult patients treated with Hymenoptera venom

immunotherapy. All patients completed the Slovene version of the Health-Related Quality of Life Questionnaire for Hymenoptera venom allergy (HRQLH-S) at baseline (i) before VIT and (ii) after five years of treatment.

Quality of life questionnaire

We used a translated and adapted version of the Vespid Allergy Quality of Life Questionnaire (VQLQ) to measure the quality of life. It was developed and validated in 2002 by Oude Elberink to measure the quality of life (QoL) in patients allergic to wasp venom who were receiving specific VIT.

The original questionnaire consisted of 14 questions with 7 response options, scoring 1–7, with lower scores representing higher QoL. In addition, there are two questions with the Expectation of Outcome (EoO), asking the patients about the intensity of their fear, the frequency of feelings of unease, and anxiety when in contact with the Hymenoptera species. The EoO questionnaire was required to be used as an external reference point to validate the previous 14 questions.

Our questionnaire included an additional control question (Q15: "How is the quality of your life affected by insect venom allergy?"). An eleven-point Likert scale (0–10) was used to measure the answers to the control question, where 0 meant that QoL was not affected at all and 10 meant that the QoL was maximally reduced.

Translation

The English version of the questionnaire was translated into Slovene with the author's permission. First, the questions were translated into Slovene and then retranslated into English by two independent people. Finally, all four translators discussed the items without consensus to find a common solution.

Statistical analysis

Statistical analyses were performed using program R (R Foundation for Statistical Computing, Austria) and SPSS (International Business Machines Corporation, USA). The data are presented as median (Mdn) and range for normally/not normally distributed variables. The normality of the distribution of the variables was evaluated using the Shapiro–Wilk test. The mean/median values of the variables were compared among groups using the t-test (for normally distributed variables) or the Mann–Whitney U test (for not normally distributed variables). The correlation between variables was assessed using Pearson's (for normally distributed variables) or Spearman's (for not normally distributed variables) correlation coefficients. The sample proportions were compared using the Fisher Exact Test. A p-value < 0.05 was regarded as statistically significant. The Cronbach's alpha internal consistency reliability coefficient was calculated for questions 1 through 14 to estimate the reliability of the questionnaire. Also, the correlation between the HRQLH-S and the EoO regarding external validation was given. Before the main study, a pilot study with 15 participants was carried out to test the understanding of the questionnaire.

Ethics approval and informed consent

The study was approved by the National Medical Ethics Committee in Slovenia (74/02/17).

All acquired data are carefully protected in accordance with the Code of Ethics in Healthcare (Official Gazette of the Republic of Slovenia, No. 71/2014), the Personal Data Protection Act (No. 67/07), and the General Data Protection Regulation (EU 2016/679).

Ethical guidelines (World Medical Association, 2013) were followed throughout the research process. The individuals included were not put at risk, as the research was purely theoretical (no samples were collected). All patients were provided with oral and written information on the study and consented to their participation by signing a consent form.

Results

Cross-sectional validation

Of the included 288 participants, 62.2% were males, with a median age of 48.0 years.

Characteristics of the groups are presented in Table 1.

Table 1 Characteristics of the groups

	Systemic reactions (Mueller grade) (n (%))				Sex (n (%))		Culprit insect (n (%))			Total (n (%))
Duration of VIT	**I. grade**	**II. grade**	**III. grade**	**IV. grade**	**male**	**female**	**wasp**	**honeybee**	**hornet**	
3–5 years	4 (1.4)	11 (3.8)	37 (12.9)	55 (19.1)	64 (22.2)	43 (15.0)	35 (12.2)	53 (18.4)	19 (6.6)	107 (37.2)
6 months – 1 year	0 (0.0)	4 (1.4)	23 (8.0)	54 (18.7)	55 (19.1)	26 (9.0)	29 (10.1)	36 (12.5)	16 (5.5)	81 (28.1)
Before VIT	2 (0.7)	10 (3.5)	28 (9.7)	60 (20.8)	60 (20.8)	40 (13.9)	39 (13.5)	53 (18.4)	8 (2.8)	100 (34.7)
Total	6 (2.1)	25 (8.7)	88 (30.5)	169 (58.7)	179 (62.2)	109 (37.8)	103 (35.8)	142 (49.3)	43 (14.9)	288 (100.0)

Legend: *VIT* Venom immunotherapy

The groups (a. before VIT; b. 6–12 months of VIT; c. 3–5 years of VIT) did not differ concerning the demographic variables and the severity of the Hymenoptera venom allergy, except for the fact that the patients in the before VIT group were significantly younger than the patients in the other two groups. However, the statistical significance was lost when we adjusted (Bonferroni adjustment) for the number of comparisons.

The validity of the Slovene version of HRQLH-S was confirmed by assessing the correlations between the mean value of questions 1 through 14 (mean 1–14) and the control questions (15 to 17). A very high, statistically significant correlation between all the control questions and the mean 1–14 was found, both for patients allergic to wasp venom and those allergic to honeybee venom. In the group of wasp venom allergic patients, the highest level of correlation was found between mean 1–14 and question 15 (r= 0.82). A small, yet also statistically significant correlation was present between mean 1–14 and questions 16 (r= 0.67) and 17 (r= 0.63). Similarly, in the group of honeybee allergic patients, the highest level of correlation was present between mean 1–14 and question 15 (r= 0.79) and, again, a small but still statistically significant correlation between mean 1–14 and questions 16 (r= 0.62) and 17 (r= 0.64) (Table 3).

The value for Cronbach's alpha coefficient was 0.96, which implies that the questionnaire is highly reliable.

The validity of the Slovene version of the HRQLH-S questionnaire was assessed by correlations between questions 1–14 and control questions EoO (15 to 17) (Table 2) and by correlations between mean 1–14 and control questions EoO (15 to 17) (Table 3).

After establishing the validity of the Slovene version of HRQLH-S for patients allergic to vespid and honeybee venom, we used the questionnaire to assess the impact of the severity of the allergic reaction, VIT, and field sting during VIT on QoL of patients.

QoL was mainly impaired in patients with more severe reactions. Statistically significant (p= 0.045) difference was observed between the HRQLH-S scores of grade I (Mdn =1.82) reactors compared to grade III (Mdn

Table 2 Spearman's correlation coefficients ($p < 0.05$) between questions 1–14 and control questions EoO for wasp and honeybee allergy

	Correlations ($p < 0.05$) between 1–14 and EoO for wasp allergy			Correlations ($p < 0.05$) between 1–14 and EoO for honeybee allergy		
	Q15	**Q16**	**Q17**	**Q15**	**Q16**	**Q17**
Q1	0.60	0.65	0.59	0.57	0.44	0.46
Q2	0.58	0.52	0.47	0.59	0.44	0.47
Q3	0.50	0.51	0.48	0.50	0.43	0.42
Q4	0.55	0.58	0.54	0.60	0.52	0.52
Q5	0.60	0.48	0.47	0.44	0.38	0.41
Q6	0.64	0.52	0.53	0.58	0.36	0.50
Q7	0.75	0.56	0.57	0.78	0.49	0.60
Q8	0.79	0.55	0.52	0.72	0.55	0.58
Q9	0.82	0.59	0.57	0.79	0.57	0.56
Q10	0.62	0.42	0.49	0.54	0.52	0.53
Q11	0.81	0.63	0.60	0.64	0.59	0.56
Q12	0.78	0.57	0.53	0.79	0.58	0.62
Q13	0.79	0.62	0.52	0.75	0.57	0.52
Q14	0.83	0.60	0.57	0.77	0.50	0.52

Legend: *Q* Question

Table 3 Spearman's correlation coefficients ($p < 0.05$) between the mean of questions 1–14 and control questions EoO for wasp and honeybee allergy

	Correlations ($p < 0.05$) between the mean of 1–14 and EoO for wasp allergy			Correlations ($p < 0.05$) between the mean of 1–14 and EoO for honeybee allergy		
	Q15	**Q16**	**Q17**	**Q15**	**Q16**	**Q17**
Mean Q1-Q14	0.82	0.67	0.63	0.79	0.62	0.64

Legend: *Q* Question

=3.53) reactors and borderline difference (p= 0.055) between grade I and grade IV (Mdn =3.19) reactors.

In addition, we also established a positive correlation between VIT and the QoL of allergic patients. A statistically significant difference (p< 0.001) in HRQLH-S scores between the group that has been treated for 6 to 12 months (Mdn =3.18) and the before-treatment group (n= 100, Mdn =4.20) was present, and the QoL after 3 to 5 years of VIT improved even further (n= 107, Mdn =2.47; p< 0.001) (Fig. 1). Moreover, a lower degree of feeling of being limited in outdoor activities was documented among treated patients (Mdn =2.5) compared to untreated ones (Mdn =4.08), and also, the levels of fear and anxiety in the presence of a Hymenoptera species were lower among the treated patients (Mdn =3.17 vs. 4.0; p< 0.001).

Sixty-five (34.6%) treated patients received a field sting during VIT. The evidence that field sting during VIT improved QoL was somewhat limited since the difference between the group that was stung and the group that was not stung was only borderline significant (Mdn =2.35 vs. 2.93; p= 0.065).

There was no difference in the HRQLH-S scores when comparing groups allergic to honeybees, wasps, and hornets.

Longitudinal validation

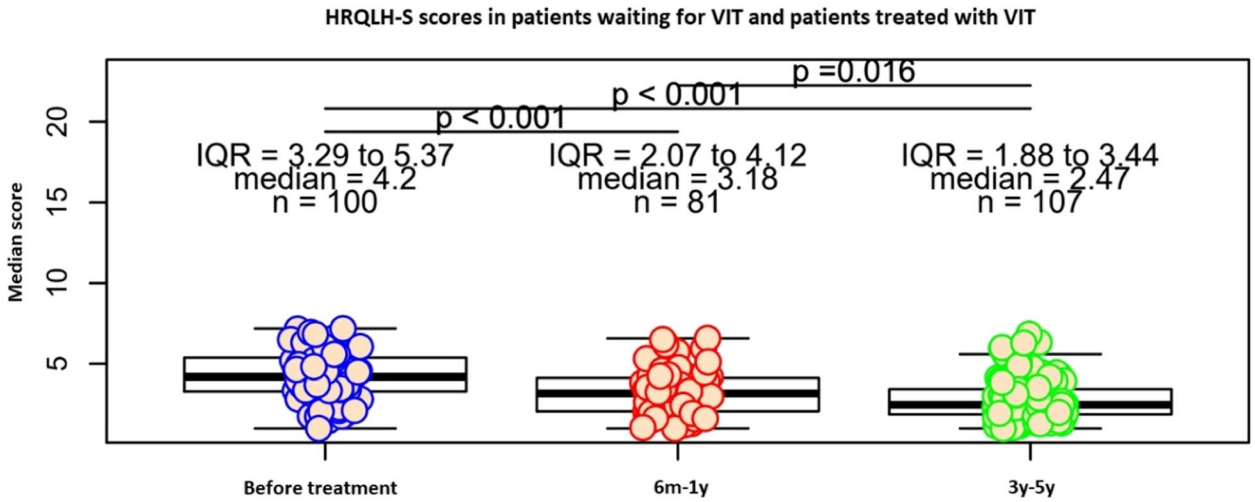
The questionnaire was given to 49 adult patients treated with Hymenoptera venom immunotherapy. All patients completed the HRQLH-S at baseline before VIT and after 5 years of treatment. The results are shown as median values (Mdn) where 1 means good, and 7 means poor QoL. The longitudinal validity of the Slovene version of HRQLH-S was confirmed by assessing the correlations between the mean value of questions 1 through 14 (mean 1–14) and the control questions (15 to 17). A very high, statistically significant correlation was found between all the control questions and the mean 1–14. The highest level of correlation was found between mean 1–14 and question 15 (r= 0.87). A small yet also statistically significant correlation was present between mean 1–14 and questions 16 (r= 0.77) and 17 (r= 0.71) (Table 5), with a good internal consistency of HRQLH-S (Cronbach α= 0.97).

The validity of the Slovene version of the HRQLH-S questionnaire was assessed by correlations between questions 1–14 and control questions EoO (Table 4) and by correlations between the mean of questions 1–14 and control questions EoO (Table 5).

Furthermore, we found a significant difference (p< 0,001) in QoL of pretreatment patients with a median value (Mdn =3.91) compared to the value after 5 years of treatment (Mdn =2.06).

Discussion

We performed, to our knowledge, the most extensive prospective study of the effect of different modalities of HVA (severity of reaction after a sting, Hymenoptera culprit responsible for HVA) and/or HVA-related treatment (length of VIT, culprit insect sting during VIT) on the QoL in HVA patients. Furthermore, we translated the VQLQ into Slovene and established the validity of the



Statistically significant differences (p < 0.05) were observed between groups.
IQR: interquartile range

Fig. 1 HRQLH-S scores in patients waiting for VIT and patients treated with VIT. (group before treatment; group treated with VIT for 6 months – 1 year; group treated with VIT for 3–5 years)

Table 4 Spearman's correlation coefficients ($p < 0.05$) between questions 1–14 and control questions EoO

	Q15	Q16	Q17
Q1	0.72	0.78	0.74
Q2	0.71	0.72	0.67
Q3	0.56	0.53	0.49
Q4	0.66	0.79	0.71
Q5	0.52	0.52	0.43
Q6	0.65	0.48	0.49
Q7	0.82	0.63	0.64
Q8	0.81	0.64	0.62
Q9	0.80	0.66	0.64
Q10	0.55	0.45	0.37
Q11	0.78	0.61	0.63
Q12	0.85	0.65	0.60
Q13	0.76	0.70	0.63
Q14	0.84	0.69	0.66

Legend: *Q* Question

Table 5 Spearman's correlation coefficients ($p < 0.05$) between the mean of questions 1_14 and control questions EoO

	Q15	Q16	Q17
Mean Q1-Q14	0.87	0.77	0.71

Legend: *Q* Question

VQLQ, a questionnaire used/validated for assessing QoL in Vespid venom allergic patients and patients allergic to honeybee venom.

The VQLQ is the most widely used questionnaire for assessing the QoL in patients with HVA. It was developed in the Netherlands and subsequently translated and validated in other languages. We translated the English version of the questionnaire and validated it similarly to the one described for the validation of the same questionnaire translated into Turkish, German, Spanish, Polish and Italian [13–17]. For the verification process, we used three control questions, and like other groups, we showed a very high correlation between specific questions and control questions (correlation coefficients between 0.62–0.82) in both wasp and honeybee venom allergic patients [16]. Although the VQLQ was initially developed to measure the QoL in wasp-allergic patients, the Turkish and Polish versions, as well as the results of the current study, show that it is equally helpful for evaluating QoL in honeybee-allergic patients. [16, 18]. Using VQLQ, we showed that reaction severity negatively influences the QoL and that VIT positively impacts QoL, which is more evident with longer VIT durations.

The results of our study regarding the reaction severity and QoL are contrary to the results of the German group [15] and in accordance with the results of the Polish group [18], which also showed that patients with more severe reactions have more pronounced QoL impairment. The difference in the results compared to the German group is probably due to the different severity profiles of patients included in the study. In our group, 58.7% of patients had Mueller grade IV reaction in contrast with the German group, where only 2% of patients presented with grade IV reaction.

As for the QoL change regarding VIT, we showed that the QoL already improves at the beginning of VIT (6–12 months post-beginning) and that further improvements are noticeable with longer VIT durations. Before the beginning of VIT, patients are informed that the treatment protects against allergic reactions when the maintenance dose is reached and that the maintenance dose is higher than the amount of allergen the insect delivers. This clarification, together with the explanation of the results of sting challenge studies that showed good tolerance of stings after only a few days of treatment [19], is probably reassuring for patients, reflected in the observed QoL improvements.

Tolerated sting challenge improved QoL in a German study in individuals treated with wasp VIT (from 5.99 ± 0.88 to 5.88 ± 1.06, where 7 was the best QoL) [20]. In 80% of treated patients, the increase in QoL reached a clinically meaningful value of > 0.5. We did not perform sting challenges but recorded field stings during VIT. Surprisingly, well-tolerated stings did not significantly impact QoL in our patients; however, the result was borderline significant ($p = 0.065$), and increasing the number of patients would probably produce a significant result (as seen with the Germans).

Conclusions

Specific venom immunotherapy improves the quality of life in HVA patients. The results of the study showed that VIT improves quality of life impairment related to fear of future stings. Patients who received specific immunotherapy felt less limited in their outdoor activities and less disturbed in the presence of Hymenopterans. The improvements in the quality of life are proportional to the duration of the immunotherapy. However, our study did not include long-term follow-up, which limits the assessment of the sustained effects of venom immunotherapy on quality of life.

Furthermore, we also established an inverse correlation between the severity of the systemic reaction and the QoL – the higher the severity, the lower the QoL score. There was no statistically significant difference in the scores regarding the type of insect venom the patients are allergic to (wasp, honeybee, or hornet). The key finding

confirmed that the Slovene version of HRQLH-S is reliable for evaluating QoL in patients with both wasp and honeybee venom allergies. The HRQLH-S is sensitive to change and has cross-sectional and longitudinal reliability and validity in a Hymenoptera venom-allergic patient population.

Limitations

The absence of accurate data concerning the overall population of patients with Hymenoptera venom allergy in Slovenia poses challenges in assessing the representativeness of our sample relative to the national population. Although our sample of 288 patients constitutes a substantial proportion of those treated at our clinic, the precise number of patients undergoing treatment nationwide remains indeterminate.

Despite these limitations, we believe that our findings may contribute to a better understanding of the efficacy of specific immunotherapies in the clinical population. Further studies including a larger sample of patients from different healthcare settings across Slovenia would provide a more representative view of the effectiveness of specific immunotherapy at a national level. Additionally, research that captures data from patients several years after the completion of specific immunotherapy would allow for the assessment of the durability and long-term effects of the treatment.

Appendix

The Slovene version of the Health-Related Quality of Life Questionnaire for Hymenoptera venom allergy (HRQLH-S)

(The English version of the VQLQ can be found in reference 11)

Spoštovani,

namen vprašalnika je izmeriti, koliko diagnoza preobčutljivosti za pik žuželke vpliva na kakovost vašega življenja. Pozorno preberite vseh 17 vprašanj in odgovorite na vsa vprašanja.

Prosimo, obkrožite alinejo poleg odgovora, ki je po vašem mnenju najustreznejši.

1. Kako močno se bojite oziroma ste prestrašeni, da bi vas ponovno pičil kožekrilec, za katerega ste alergični (ose, sršeni, čebele)?

– Sploh nisem prestrašen/a
– Sem komaj kaj prestrašen/a
– Sem izredno malo prestrašen/a
– Sem nekoliko prestrašen/a
– Sem zmerno prestrašen/a
– Sem precej prestrašen/a
– Sem zelo močno prestrašen/a

2. Kako pogosto se zaradi svoje alergije vznemirite v prisotnosti kožekrilcev, za katere ste alergični (ose, sršeni, čebele)?

– Nikoli se ne vznemirim
– Skoraj nikoli se ne vznemirim
– Včasih se vznemirim
– Običajno se vznemirim
– Pogosto se vznemirim
– Skoraj vedno se vznemirim
– Vedno se vznemirim

3. Kako pogosto se zaradi alergije odmaknete od mesta, kjer se pojavljajo kožekrilci, za katere ste alergični (ose, sršeni, čebele)?

– Nikoli se ne odmaknem
– Skoraj nikoli se ne odmaknem
– Včasih se odmaknem
– Običajno se odmaknem
– Pogosto se odmaknem
– Skoraj vedno se odmaknem
– Vedno se odmaknem

4. Kako pogosto se zaradi svoje alergije prestrašite, če vas piči kožekrilec?

– Nikoli se ne prestrašim
– Skoraj nikoli se ne prestrašim
– Včasih se prestrašim
– Običajno se prestrašim
– Pogosto se prestrašim
– Skoraj vedno se prestrašim
– Vedno se prestrašim

5. Kako pogosto se izogibate določenemu mestu (lokaciji) zaradi alergije?

– Nikoli se ne izogibam določenemu mestu (lokaciji)
– Skoraj nikoli se ne izogibam določenemu mestu (lokaciji)
– Včasih se izogibam določenemu mestu (lokaciji)
– Običajno se izogibam določenemu mestu (lokaciji)
– Pogosto se izogibam določenemu mestu (lokaciji)
– Skoraj vedno se izogibam določenemu mestu (lokaciji)
– Vedno se izogibam določenemu mestu (lokaciji)

6. Kako pogosto zaradi svoje alergije preverite, ali je v določenem okolju kožekrilec, ki bi vas lahko pičil?

– Nikoli ne preverjam
– Skoraj nikoli ne preverjam
– Včasih preverjam
– Običajno preverjam
– Pogosto preverjam
– Skoraj vedno preverjam
– Vedno preverjam

7. Ali se vam zdi, da vam alergija omejuje dejavnosti v poletnih mesecih?

– Ne počutim se niti najmanj omejenega/omejeno
– Počutim se zgolj malo omejenega/omejeno
– Počutim se nekoliko omejenega/omejeno
– Počutim se zmerno omejenega/omejeno
– Počutim se precej omejenega/omejeno
– Počutim se zelo omejenega/omejeno
– Počutim se izjemno omejenega/omejeno

8. Kako pogosto vas zaradi alergije vznemirja oziroma moti dejstvo, da ste pozorni na kožekrilce, za katere ste alergični?

– Nikoli me ne vznemirja
– Skoraj nikoli me ne vznemirja
– Včasih me vznemirja
– Običajno me vznemirja
– Pogosto me vznemirja
– Skoraj vedno me vznemirja
– Vedno me vznemirja

9. Kako pogosto vas moti, da morate biti zaradi svoje alergije pozorni na kožekrilce v zunanjem okolju?

– Nikoli me ne moti
– Skoraj nikoli me ne moti
– Včasih me moti
– Običajno me moti
– Pogosto me moti
– Skoraj vedno me moti
– Vedno me moti

10. Ali ste zaposleni? *Ne. Pojdite na vprašanje 11.*

Da. Kako pogosto vas moti, da morate biti zaradi svoje alergije pozorni na kožekrilce v delovnem okolju?

– Nikoli me ne moti
– Skoraj nikoli me ne moti
– Včasih me moti
– Običajno me moti
– Pogosto me moti
– Skoraj vedno me moti
– Vedno me moti

11. Ali počitnikujete? *Ne. Pojdite na vprašanje 12.*

Da. Kako pogosto vas moti dejstvo, da morate biti pozorni na kožekrilce, za katere ste alergični, ko ste na počitnicah?

– Nikoli me ne moti
– Skoraj nikoli me ne moti
– Včasih me moti
– Običajno me moti
– Pogosto me moti
– Skoraj vedno me moti
– Vedno me moti

12. Ali vrtnarite? *Ne. Pojdite na vprašanje 13.*

Da. Kako pogosto vas moti dejstvo, da morate biti pozorni na kožekrilce, za katere ste alergični, ko vrtnarite?

– Nikoli me ne moti
– Skoraj nikoli me ne moti
– Včasih me moti
– Običajno me moti
– Pogosto me moti
– Skoraj vedno me moti
– Vedno me moti

13. Ali kdaj jeste na prostem (na primer na vrtu restavracije, piknik, sladoled)? *Ne. Pojdite na vprašanje 14.*

Da. Kako pogosto vas moti dejstvo, da morate biti pozorni na kožekrilce, za katere ste alergični, ko jeste na prostem?

– Nikoli me ne moti
– Skoraj nikoli me ne moti
– Včasih me moti
– Običajno me moti
– Pogosto me moti
– Skoraj vedno me moti
– Vedno me moti

14. Ali hodite na izlete v naravo? *Ne. Pojdite na vprašanje 15.*

Da. Kako pogosto vas moti dejstvo, da morate biti pozorni na žuželke, za katere ste alergični, ko ste na izletu v naravi?

– Nikoli me ne moti
– Skoraj nikoli me ne moti
– Včasih me moti
– Običajno me moti
– Pogosto me moti
– Skoraj vedno me moti

– Vedno me moti

15. Koliko vam dejstvo, da ste alergični za pik kožekrilca (ose, sršeni, čebele), manjša kakovost življenja? Označite z oceno med 0 in 10, kjer 0 pomeni, da vam alergija ne zmanjšuje kakovosti življenja in 10 pomeni, da je zaradi alergije vaše življenje povsem nekakovostno.

0 1 2 3 4 5 6 7 8 9 10

16. Kako velika se vam zdi verjetnost, da bi imeli hudo reakcijo ob ponovnem piku kožekrilca, za katerega ste alergični (osa, sršen, ali čebela)?

– Menim, da ni verjetnosti, da bi imel/a hudo reakcijo.
– Menim, da obstaja zelo majhna verjetnost, da bi imel/a hudo reakcijo.
– Menim, da obstaja majhna verjetnost, da bi imel/a hudo reakcijo.
– Menim, da obstaja zmerna verjetnost, da bi imel/a hudo reakcijo.
– Menim, da obstaja velika verjetnost, da bi imel/a hudo reakcijo.
– Menim, da obstaja zelo velika verjetnost, da bi imel/a hudo reakcijo.
– Menim, da bom imel/a vedno hudo reakcijo po piku kožekrilca.

17. Kako velika se vam zdi verjetnost, da umrete ob ponovnem piku kožekrilca, za katerega ste alergični (osa, sršen, ali čebela)?

– Menim, da ni možno, da bi umrl/a ob ponovnem piku kožekrilca.
– Menim, da skoraj ni možno, da bi umrl/a ob ponovnem piku kožekrilca.
– Menim, da je zelo majhna verjetnost, da bi umrl/a ob ponovnem piku kožekrilca.
– Menim, da je majhna verjetnost, da bi umrl/a ob ponovnem piku kožekrilca.
– Menim, da je zmerna verjetnost, da bi umrl/a ob ponovnem piku kožekrilca.
– Menim, da je velika verjetnost, da bi umrl/a ob ponovnem piku kožekrilca.
– Menim, da je zelo velika verjetnost, da bi umrl/a ob ponovnem piku kožekrilca.

Abbreviations

EoO	Expectation of Outcome
HRQL-S	Slovene version of Health-Related Quality of Life Questionnaire
HVA	Hymenoptera Venom Allergy
Mdn	Median
NORA	Network of Severe Allergic Reactions
p	*p*-Value
Q	Question
QoL	Quality of Life
r	Correlation coefficient
SR	Systemic Reaction
VIT	Venom Immunotherapy
VQLQ	Vespid Allergy Quality of Life Questionnaire

Acknowledgements
The authors sincerely acknowledge L. Oštir, M. Zrnić, K. Perko, J. Tršan, M. P. Rezelj, and K. Lojić for their contribution to the data collection process.

Authors' contributions
TM and MK conceived of the presented idea. TM collected and interpreted the patient data from the questionnaire. TM and JŠ made the statistic analysis. MK and MP were both major contributors to evaluating the results. MK supervised the findings of this work. All authors discussed the results and contributed to the final manuscript.

Funding
Not applicable.

Data availability
The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate
The study was approved by the National Medical Ethics Committee in Slovenia (74/02/17). All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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Received: 3 November 2023 Accepted: 16 April 2025
Published online: 23 April 2025

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