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## Health-related quality of life in Hymenoptera venom allergy: validation of the Italian version of the vespid allergy quality of life questionnaire (VQLQ-i)

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### KEY WORDS

*Hymenoptera venom allergy; Health Related Quality of Life; HRQoL; Vespid Allergy Quality of Life Questionnaire; VQLQ.*

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### Doi

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To the Editor,

Hymenoptera venom allergy (HVA), characterized by hypersensitivity reactions to stings from insects such as bees and wasps,

poses a significant health concern worldwide. Besides the pathophysiological aspects of HVA, there is a growing recognition of its significant impact on Health-Related Quality of Life (HRQoL), comparable to other chronic conditions including allergic diseases

(1, 2). In addition to generic questionnaires, the Vespid Quality of Life Questionnaire (VQLQ) has been developed as a disease-specific instrument to assess the multidimensional impact of HVA on HRQoL (3), and it has been already validated in several languages (3-9).

The objective of this multicenter, cohort, single-nation study is the cross-cultural validation of the VQLQ in Italian language (VQLQ-i) in patients allergic to Yellow Jacket (YJ).

Seven Italian allergy centers consecutively recruited adult patients with HVA to YJ, diagnosed after systemic reactions, before and during Venom Immunotherapy (VIT), and without relevant psychiatric comorbidities. Psychometric testing for cross-cultural validation was performed according to the GALZEN taskforce position paper (10), after translation from English to Italian language and *vice versa* by four independent translators and cogni-

tive review performed on 10 Italian patients with HVA. The construct validity was verified with the correlation (Pearson's correlation, *r*) between total and single-item scores of VQLQ-i *versus* the Expectation of Outcome questionnaire (EoO). Cronbach's alpha coefficient was used to examine the internal consistency. The mean difference of VQLQ-i score between patients off-VIT and on-VIT was used to test the responsiveness (t-test). All the statistical analyses were performed with STATA v.18 (StataCorp LLC, Texas, USA). The study was approved by the Ethics Committees (210/2019) of the local sites, and written informed consents were obtained from patients.

A total of 127 patients (34 off VIT and 93 on VIT) were consecutively enrolled. Their characteristics are shown in **table I**. The mean age was  $54.3 \pm 12.6$  years, and 70% were males. At least one re-sting was reported by 25% of the subjects, after VIT ini-

**Table I** – Comparison of VQLQ validation studies in different languages.

	Dutch VQLQ (3)*	Dutch VQLQ (4) <sup>o</sup>	US English VQLQ (3)	Polish VQLQ (9)	German VQLQ (5)	Spanish HRQLHA (8)	Turkish VQLQ (6) <sup>§</sup> (vespid)	Turkish VQLQ (6) <sup>§</sup> (bee)	Portuguese VQLQ (7)	Italian VQLQ
Patients	58 adults	74 adults	50 adults	78 adolescents	79 adults	116 adol, adults	65 adults	81 adults	49 adults	127 adults
Insect	YJ	YJ	YJ	YJ, bee	Wasp	YJ, Pol, bee	YJ	Bee	Wasp, bee	YJ
M I	12%	7%	6%	0%	16.5%		8%	11%	14%	8%
M II	26%	28%	32%	10%	23%	32%	39%	26%	16%	23%
M III	40%	29%	42%	63%	16.5%		23%	30%	37%	23%
M IV	22%	36%	20%	30%	44%	68%	31%	33%	33%	46%
VIT duration (y)	1- 3	1	n/r	2.6	n/r	3	3	3	n/r	2.3 ± 2.2
Mean VQLQ										
Off VIT	n/r	4.31	n/a	n/a	n/a	n/a	4.7 - 5.27	5.12 - 4.84	n/r	4.03 ± 1.55
On VIT	n/r	4.61	n/r	n/r	n/r	3.48	2.81 - 2.50	2.80	n/r	4.93 ± 1.20
$\alpha$	0.96	n/r	0.88	0.91	0.95	0.95	0.97	0.96	0.85	0.97
<i>r</i>	<b>0.69</b>	<b>0.59 - 0.72</b>	<b>0.56</b>	n/r	<b>0.67</b>	0.5	<b>0.55 - 0.64</b>	<b>0.47 - 0.78</b>	<b>0.71 - 0.74</b>	<b>0.60</b>

$\alpha$ : Cronbach's alpha coefficient for internal consistency assessment; HRQLHA: Health-related Quality of Life Questionnaire for Hymenoptera Venom-Allergic Patients; M: Mueller score of severity of the index reaction; n/a: not applicable; n/r.: not reported; Pol: Polistes species; r: Pearson's or Spearman (*in italic*) correlation coefficient for construct validity between the mean scores of VQLQ and EoO (**in bold** if statistically significant:  $p < 0.05$ ); US: United States; VIT: venom immunotherapy; VQLQ: Vespid Quality of Life Questionnaire; y: years; YJ: Yellow Jacket. \*First Dutch validation study. <sup>o</sup>Randomized controlled study for cross-sectional and longitudinal Dutch validation; <sup>§</sup>Reversed VQLQ score compared with the other studies (*i.e.* the higher the VQLQ: the worst the HRQoL); Beekeepers are excluded from the analyses.

tiation, without any reaction. The final version of the VQLQ-i (**figure 1Suppl**) showed high internal consistency (Cronbach's alpha = 0.97), significant construct validity (r between mean scores of VQLQ-i and EoO = 0.60, 95%CI 0.48 - 0.69,  $p < 0.001$ ), and significant responsiveness (VQLQ-i improvement after VIT initiation = +0.90, 95%CI 0.93-1.41,  $p \leq 0.001$ ).

We translated the VQLQ to Italian language and validated the obtained questionnaire (VQLQ-i) with good levels of internal and external consistency. Our study is in line with the results and VQLQ scores of the other validation studies, when reported (**table I**) (3-6, 8), even if comparability with the single studies is hampered by the great heterogeneity of methods and populations. Specifically, some of them do not provide the obtained VQLQ score (*i.e.*, English (3), Polish (9), German (5), and Portuguese (7) VQLQ); the Spanish (8), Polish (9), and Portuguese (7) studies include bee-allergic patients and/or adolescents too; the Turkish study (6) is not comparable due to the use of a reverse VQLQ score (*i.e.*, the higher the VQLQ, the worst the HRQoL). Furthermore, cultural differences might have an impact on the variance observed among results from different countries. Compared to the other validation studies of the VQLQ in adults with vespid venom allergy, our study enrolled the highest number of patients, with a well-represented range of reaction severity (from M1 to M4) and re-stung patients.

In conclusion, VQLQ is the only disease-specific tool to investigate the HRQoL in adult patients with YJ venom allergy that is currently validated across a significant number of countries and languages. This simple and quick tool can be easily implemented in clinical practice, and the Italian version is now available.

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None.

### Contributions

MarMau, MBB: conceptualization. MarMau: project administration. MarMau, DB, PB, MCB, FE, LG, SL, FO, VP, DP, ER, FR, MBB: investigation. IB, MatMar: methodology. MatMar: formal analysis. MarMau, IB, MatMar, MBB: writing - original draft. All authors: writing - review & editing.

### Conflict of interests

The authors declare that they have no conflict of interests related to the work.

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### References

- Höfer V, Martini M, Dölle-Bierke S, Worm M, Bilò MB. Health-related quality of life in food and venom induced anaphylaxis and role of influencing factors. *Clin Exp Allergy*. 2023;53(3):295-306. doi: 10.1111/cea.14268.
- Martini M, Di Taranto M, Höfer V, Worm M, Bilò MB. Health-Related Quality of Life and Mental Health in Drug Hypersensitivity Reactions and Drug-Induced Anaphylaxis: A Systematic Review and Meta-Analysis. *J Allergy Clin Immunol Pract*. 2023;11(6):1876-1890. doi: 10.1016/j.jaip.2023.03.012.
- Oude Elberink JN, de Monchy JG, Golden DB, Brouwer JL, Guyatt GH, Dubois AE. Development and validation of a health-related quality-of-life questionnaire in patients with yellow jacket allergy. *J Allergy Clin Immunol*. 2002;109(1):162-70. doi: 10.1067/mai.2002.120552.
- Oude Elberink JNG, De Monchy JGR, Van Der Heide S, Guyatt GH, Dubois AEJ. Venom immunotherapy improves health-related quality of life in patients allergic to yellow jacket venom. *J Allergy Clin Immunol*. 2002;110(1):174-82. doi: 10.1067/mai.2002.125827.
- Fischer J, Feidt A, Giel KE, Martens U, Zipfel S, Biedermann T, et al. Quality-of-life in wasp venom allergy - validation of the German version of the "Vespid Allergy Quality of Life Questionnaire" (VQLQ-d). *J Dtsch Dermatol Ges*. 2011;9(5):379-85. English, German. doi: 10.1111/j.1610-0387.2011.07622.x.
- Sin BA, Öztuna D, Gelincik A, Gürlek F, Baysan A, Sin AZ, et al. Quality-of-life in insect venom allergy: validation of the Turkish version of the "Vespid Allergy Quality of Life Questionnaire" (VQLQ-T). *Springerplus*. 2016;5(1):583. doi: 10.1186/s40064-016-2246-x.
- Silva D, Pereira AM, Santos N, Amaral L, Delgado L, Elberink HNGO, et al. The vespid allergy quality of life questionnaire-cultural adaptation and translation to Portuguese. *Eur Ann Allergy Clin Immunol*. 2017;49(3):114-21.
- Armisen M, Guspi R, Alfaya T, Cruz S, Fernández S, Domínguez-Noche C, et al. Cross-Sectional Validation of a Quality of Life Questionnaire in Spanish for Patients Allergic to Hymenoptera Venom. *J Investig Allergol Clin Immunol*. 2015;25(3):176-82.
- Brzyski P, Cichočka-Jarosz E, Tobiasz-Adamczyk B, Lange J, Świebicka E, Lis G, et al. Adaptacja kwestionariuszy jakości życia dla dzieci z alergią na jad owadów oraz dla ich rodziców [Adaptation of Vespid Allergy Quality of Life Questionnaire for Polish children with venom allergy and for their parents]. *Przegl Lek*. 2010;67(12):1237-42. Polish.
- Baiardini I, Bousquet PJ, Brzoza Z, Canonica GW, Compalati E, Fiocchi A, et al. Recommendations for assessing Patient-Reported Outcomes and Health-Related quality of life in clinical trials on allergy: a GA2LEN taskforce position paper. *Allergy*. 2010;65(3):290-5. doi: 10.1111/J.1398-9995.2009.02263.X.