

## Letter to the Editor

**Evaluation of 2 interactive voice-response telephone versions of health-related quality-of-life questionnaires***To the Editor:*

The Standardised Asthma Quality of Life Questionnaire [AQLQ(S)]<sup>1</sup> and the Mini Rhinoconjunctivitis Quality of Life Questionnaire (MiniRQLQ)<sup>2</sup> measure functional problems that patients with these conditions experience in their daily lives. They were developed and validated in paper format. Electronic methods of data collection, including interactive voice-response (IVR) telephone calls, are being used increasingly. We tested the validity of 2 different IVR systems by comparing them with paper questionnaires (the gold standard).

The questionnaires were adapted by 2 well-established and experienced IVR companies [AQLQ(S) in Europe and MiniRQLQ in the United States] who worked closely with the developer (EFJ) on the scripts. All questions have a choice of 7 responses (number and verbal descriptor). These are too complicated to present by telephone and were given to patients on a card before the telephone call. Both systems were pretested in patients for ease of use and accuracy of understanding (cognitive debriefing).

For the AQLQ(S) validation study, adults (age range, 17-65 years) with moderate-to-severe symptomatic asthma were enrolled at the screening visit of a clinical trial (Germany and Italy). They completed the paper version in the morning at the clinic and the IVR call the same evening (usually at home). For the MiniRQLQ study, English-speaking adults (age range, 18-64 years) with a wide range of rhinoconjunctivitis symptoms were enrolled from patients attending the Allergy Clinic at Kaiser Permanente in San Diego, California. They completed the IVR version at home during the 24 hours before completing the paper version in the clinic. Patients who reported that their symptoms had not changed between completions were included in the analysis. Both studies were approved by local institutional review boards (ethics committees), and all participants signed an informed consent form.

Concordance (agreement plus bias) between paper and IVR scores was examined with an intraclass correlation coefficient (ICC). Bias (consistent difference in one direction) between the 2 methods was examined by using a paired *t* test. We defined *a priori* that validity of the IVR versions would be shown if concordance for the overall score was greater than 0.95 (ICC). This value is slightly lower than the test-retest reproducibility of the paper versions of these questionnaires completed 1 week apart<sup>1,2</sup> and in keeping with the concordance observed in previous validation studies of electronic versions of these questionnaires.<sup>3,4</sup>

AQLQ(S) scores are shown in Table I. The ICC for the overall score of 0.94 did not quite meet the *a priori* defined level of concordance. Of greater concern was bias, with patients tending to record a worse quality of life (lower score) using paper questionnaires compared with IVR questionnaires. Although the overall score did not quite reach significance ( $P = .08$ ), the emotional function and environmental stimuli domains both did ( $P = .007$  and  $P \leq .001$ , respectively). The MiniRQLQ scores are shown in Table II. Not only did the overall concordance

**TABLE I.** Comparison between IVR and paper versions of the AQLQ(S) ( $n = 54$ )

|                 | IVR,<br>mean $\pm$<br>SD | Paper,<br>mean $\pm$<br>SD | Difference | Paired<br><i>t</i> test,<br><i>P</i> value | Intraclass<br>correlation<br>coefficient |
|-----------------|--------------------------|----------------------------|------------|--------------------------------------------|------------------------------------------|
| AQLQ(S) overall | 4.18<br>1.27             | 4.07<br>1.36               | 0.11       | .08                                        | 0.94                                     |
| Symptoms        | 4.02<br>1.44             | 3.95<br>1.48               | 0.07       | .43                                        | 0.90                                     |
| Activities      | 4.24<br>1.35             | 4.27<br>1.48               | -0.03      | .65                                        | 0.92                                     |
| Emotions        | 4.27<br>1.47             | 4.02<br>1.53               | 0.25       | .007                                       | 0.89                                     |
| Environment     | 4.39<br>1.33             | 3.95<br>1.37               | 0.44       | <.001                                      | 0.76                                     |

Higher scores represent better quality of life.

**TABLE II.** Comparison between IVR and paper versions of the MiniRQLQ ( $n = 44$ )

|                    | IVR,<br>mean $\pm$<br>SD | Paper,<br>mean $\pm$<br>SD | Difference | Paired<br><i>t</i> test,<br><i>P</i> value | Intraclass<br>correlation<br>coefficient |
|--------------------|--------------------------|----------------------------|------------|--------------------------------------------|------------------------------------------|
| MiniRQLQ overall   | 2.9<br>1.1               | 2.7<br>1.2                 | 0.2        | .01                                        | 0.92                                     |
| Activities         | 3.2<br>1.3               | 2.9<br>1.1                 | 0.3        | .03                                        | 0.75                                     |
| Practical problems | 3.7<br>1.4               | 3.1<br>1.6                 | 0.6        | <.0001                                     | 0.81                                     |
| Nose symptoms      | 3.3<br>1.4               | 3.3<br>1.6                 | 0.0        | .73                                        | 0.82                                     |
| Eye symptoms       | 2.0<br>1.4               | 2.0<br>1.6                 | 0.0        | .77                                        | 0.89                                     |
| Other symptoms     | 2.7<br>1.3               | 2.5<br>1.5                 | 0.2        | .08                                        | 0.86                                     |

Higher scores represent poorer quality of life.

(ICC = 0.92) fail to reach the required concordance, there was significant bias, with patients scoring a worse quality of life (higher score) on IVR questionnaires than on paper questionnaires ( $P = .01$ ).

These were the first IVR versions of either questionnaire, and the results suggest that even with careful scripting and cognitive debriefing, there was inadequate concordance between paper and IVR versions to support the validity of these IVR versions. The biases suggest that patients respond differently to paper and IVR questionnaires, but the reason for this is unclear. In both studies the version completed first showed a poorer quality-of-life score, but this is unlikely to be due to a learning effect because numerous test-retest studies on paper questionnaires have shown that this does not occur. In addition, differences only occurred in some domains. With the paper versions being completed in the clinic and the IVR versions being completed at home, it is possible that location might have influenced the results. However, the differences were in opposite directions in the 2 studies, and studies of postal completion have shown that location does not influence results.<sup>5</sup> The 2 IVR systems produced biases in opposite directions, suggesting that the differences might either be cultural (United States vs Europe) or that each IVR system produced its

own bias. Further studies are needed to identify the reason or reasons for poor concordance.

The order of completion was not randomized for practical reasons. Therefore when patients completed the IVR version of the AQLQ(S), they were already familiar with the questionnaire. Therefore concordance might have been enhanced by this prior knowledge, and this might explain why poorer concordance was observed for the MiniRQLQ system. With a large-screen electronic version of the AQLQ, concordance between paper and electronic questionnaires was high (ICC = 0.99), and for the RQLQ(S) on a personal digital assistant (PDA), the ICC was 0.95, with no bias.<sup>3,4</sup> However, not all PDA versions reach this acceptable level of concordance for validity. (E. F. Juniper, unpublished data, May 2008).

The results of this study underline the importance of testing IVR versions of questionnaires. They also show that it is important to use only one method of data collection when following patients over time, both in clinical practice and research.

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