

# SYSTEMATIC REVIEW

## NEUROPATHIC PAIN AND PSYCHOMETRIC PROPERTIES OF EQ-5D

<b>Version Number</b>	<b>1.1</b>
Date of version	10 May 2021
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Classification	Restricted
Intended recipient	Doctor accessing ALETTA 1.0 information

There is a wealth of literature on the psychometric performance of the EQ-5D in pain. There are also multiple studies investigating the impact of pain on HRQoL, which may include the use of the EQ-5D as a patient reported outcome measure. These studies can be considered rudimentary validations of the EQ-5D which use the trait patient/ general population. Whilst this trait is ultimately not appropriate for the psychometric assessment of measures characteristics, it is common to see studies reporting it. This evidence is not reported here, but may be summarized in future, if necessary.

Neuropathic pain is a type of pain caused by a primary disease affecting the nervous system, or by a damage/ injury. In that, delimiting the area of analysis for the assessment of the psychometric performance of the EQ-5D in neuropathic pain is not easy, as studies investigating a primary condition which does not mention pain may still provide relevant evidence for the performance of the generic preference-based measure (GPBM). Given this review is intended as a scooping of the literature, strict eligibility criteria for the primary conditions examined were not imposed. It would be advisable to consider refining the eligibility for future reviews. This review cannot be considered comprehensive or definitive, and only gives an initial indication of whether the EQ-5D could be valid in neuropathic pain. More detailed analysis are suggested.

## Methods

A search strategy was developed to identify studies on the validity and responsiveness of the EQ-5D for adults affected by neuropathic pain. The search strategy combined free text and controlled vocabulary words, including “psychometric characteristic”, “EQ-5D” and “neuropathic pain”, all with spelling variations, acronyms and related terms. The search strategy was as follows:

1. (validity) OR (responsiveness) OR (psychometric characteristic\$) OR (psychometric aspect\$) OR (psychometric propert\$)  
AND
2. (euroqol) OR (euro qol) OR (eq5d) OR (eq 5d) OR (eq-5d) OR (euro adj qol) OR (eur adj qual) OR (eq adj 5d[tw])  
AND
3. (neuropathic pain)

One online medical library, Pubmed, was investigated. In addition, a targeted search was performed in Google Scholar to identify possible grey literature, or additional literature of interest.

Identified citations (both published and grey literature) were assessed against the following set of pre-defined eligibility criteria. Reports were eligible for inclusion if they were primary studies or reviews of the literature, they examined construct validity or responsiveness of the EQ-5D, their main focus was on an adult population (defined as 18 years or older) and they regarded neuropathic pain as a primary health condition, or as a secondary health condition originating from another health condition. Studies were excluded if they examined psychometric characteristics other than construct validity or responsiveness (e.g. reliability or face validity), if they represented translations of a GPBM or if they were not in English.

## Results

A total of 146 potentially relevant articles were identified. Title, abstract and full text screening removed 135, 5, and 2 article. The remaining four articles (1–4) were considered relevant as they investigated the psychometric performance of the EQ-5D in neuropathic pain or they investigated the psychometric performance of an instrument in comparison to the EQ-5D. Each of the studies is summarized below.

Very strong evidence in support of the EQ-5D (3L) for use in neuropathic patient populations comes from a review of the literature of Janssen and colleagues (2). This review investigated the psychometric characteristics of the EQ-5D in patients affected by type 2 diabetes mellitus. Numerous of the studies summarised in this systematic review report that the EQ-5D was able to distinguish between groups with neuropathic diabetic pain and the general population, and groups with neuropathic diabetic pain and other diabetes related health complications e.g. retinopathy, macrovascular complications etc. The EQ-5D was also found to correlate moderately to strongly with the Brief Pain Inventory for Diabetic Peripheral Neuropathy (BPI-DPN) and the self-administered Neuropathic Total Symptom Score (NTSS-6-SA), among the others.

Strong evidence in support of the EQ-5D validity was found in a primary study of Otto and colleagues (4). The primary aim of the study was to validate a specific self-questionnaire for symptom assessment and their influence on quality of life and functionality of chronic low back pain patients. Among the chronic low back pain patients, neuropathic pain patients were also recruited. The Q-SAP Back sum- and sub-scores showed correlations that were large and statistically significant with the EQ-5D. These were the highest correlations compared to the other comparator measures, demonstrating good convergent validity of the 3L version of the EQ-5D i.e.  $r=0.542$ . These results underline the multiple influencing factors contributing to the clinical symptomatology of back pain. Factor analysis demonstrated the ability of the EQ-5D to distinguish between nociceptive and neuropathic pain factors alongside with other measures. All in all, this provides good evidence of the validity of the instrument.

Limited evidence on the validity of the EQ-5D in neuropathic pain patients can be inferred from a study of Mick and colleagues (3), where it was found that the longer the duration and higher the intensity of pain the greater the impact on QoL for all EQ-5D dimensions and the VAS score.

Limited evidence on the psychometric performance of the EQ-5D can be obtained from a study of Vernon and colleagues (1), where it was investigated the psychometric performance of the Daily Sleep Interference Scale with other instruments, including the EQ-5D in Diabetic Peripheral Neuropathy patients. A subgroup of such patients was affected by neuropathic pain. The study reports moderate to low correlations between the EQ-5D and the subdomain scales of the Daily Sleep Interference Scale, as expected. Further analysis would be suggested as the quality of this evidence seems limited for assessing the characteristics of interest.

### Conclusions

The scoping review screened 146 records potentially relevant to assess the psychometric performance of the EQ-5D in neuropathic pain. 4 of these records were included in the current review. All available evidence suggests the EQ-5D is valid and responsive in neuropathic pain. This evidence is based on assessments of the 3L version of the EQ-5D. It is reasonable to assume the psychometric performance of the 5L may be generally better than the 3L one. Whilst encouraging, this evidence should be considered carefully, as the review is not extensive. Moreover, systematic review methods may lead to the identification of other studies which may provide further evidence in support or against these initial findings.

### Version control

Version Number	Author	Date	Change description
1	Aureliano Finch	10 May 2021	First version
1.1	Ernesto Diringuer	23 May 2021	Update to documentation management framework