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“Just to be sure”: Intolerance of Uncertainty influences investigative and prescriptive behaviors of health professionals

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Clinical reasoning, which refers to the application of critical thinking in the medical field, is currently extensively studied to determine how to make proper diagnoses. Various studies show that **a high level of intolerance of uncertainty (IU) has deleterious effects on problem-solving abilities and information processing**, which can lead to inaction and avoidance of ambiguous situations (Begin et al., 2022).

However, **studies on healthcare professionals' (HCPs) reactions to uncertainty and their impact on clinical reasoning are still rare** and no reliable and valid version of Carleton’s IUS-12 Scale exists for measuring this parameter in HCPs in France.

We conducted **a review summarizing the various consequences of IU on clinical reasoning** and **a validation study on the Intolerance of Uncertainty Scale-12 (IUS-12) in French**, and **a version of the IUS-12 adapted for healthcare professionals (IUS-12-H)**. As the IUS-12 has shown good psychometric qualities in English and that the IUS-12-H is partly based on the IUS-12 (Carleton et al., 2007), **we hypothesized that both our French versions of the IUS-12 and the IUS-12-H would show good psychometric qualities and would correlate with each other**.

The review revealed that **two behavior categories were affected: investigative and prescriptive behaviors**. Regarding **the investigation process**, **mismanagement of uncertainty appeared to lead to reasoning bias**, potentially resulting in diagnostic errors. IU was associated with withholding information, more referrals to peers, and less use of new medical interventions. Regarding **prescription behaviors**, **IU among health professionals could lead to overprescribing unnecessary or dangerous tests**. IU was also associated with more antibiotic prescriptions for conditions where antibiotics are to be used carefully. IU could also influence abortion recommendations.

After the completion of our data collection phase, exploratory factor analyses showed that **both scales had a two-factor structure** as in the seminal article of Carleton et al. (2007). **The cumulative explanatory variances were acceptable** (0.53 for the IUS-12, 0.51 for the IUS-11-H). **The factors of both scales were significantly positively correlated** (respectively, r = 0.61, r = 0.41, r = 0.41, r = 0.62) **and positively correlated with scales involving related constructs** (*e.g.*, Physicians' Reaction to Uncertainty Scale). **The factors of both scales were significantly positively correlated and positively correlated with scales involving related constructs.**

We conducted a **digital scoping review** by screening Google Scholar, Medline, PsycINFO and PBSC using English keywords identified using classification (*e.g.*, MeSH, TermSciences terminology database).
We used the following search equation:
(« clinical reasoning » OR diagnostic OR « intolerance of uncertainty ») AND (review OR definition OR introduction OR process* OR « decision making » OR uncertainty) OR (« clinical reasoning » AND diagnostic).

933 healthcare professionals (recruited using emails and social networks as Linkedin) completed our validation study.
After excluding the responses of 417 participants who did not meet our inclusion criteria, the final sample was composed of **516 participants** (*M*age = 36.72, *ET*age = 12.22, 197 women, 120 men, 2 others and 197 who did not specify their gender).
Participants completed the **IUS-12 and IUS-12-H**, as well as **additional scales intended to allow for convergent and divergent validity analyses**. The survey ended with **socio-demographic questions** (*i.e.*, age, gender, discipline practiced and for how many years).

IU's influence is primarily observed on investigative and prescribing behaviors. More studies are still needed to understand the impact of IU on clinical reasoning itself fully. Selected articles reported practical consequences, without mentioning cognitive impacts in detail. Future studies should focus more on the real-time psychological impact of IU on the different phases of clinical reasoning.

The IUS-12 and the IUS-12-H could be used to assess the IU level of HCPs, especially French ones. Our psychometric analyses on the responses of 516 HCPs suggest that **both scales are psychometrically valid and can be used to measure IU (with the IUS-12) and IU in the medical context among HCPs (with the IUS-12-H).**

IUS-12-H can be used in training courses involving HCPs with very different backgrounds and occupations. This scale also offers the possibility of identifying HCPs with a high level of IU requiring remediation. However, a framework for interpreting the score is needed and future studies will have to determine at what threshold of "score change" one can consider that there has been a change in the IU of HCPs.

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