Addendum: Adaptive Questionnaires

Executive Summary

Adaptive questionnaires are assessments that are tailored to the respondent and are often performed on a computer. Answers to previous questions in an adaptive questionnaire are used to determine future questions in the same assessment by a computer algorithm. In contrast, static questionnaires ask the same questions of all respondents, and therefore often require more questions to cover all possible assessment outcomes. Senate Bill 829 of the 2022 Missouri legislative session would allow adaptive questionnaires to be sufficient for the purpose of establishing a physician-patient relationship for the purposes of making an informed diagnosis and prescribing drugs.

Highlights

- Research suggests that adaptive questionnaires are effective for use in assessing health-related quality of life and mental health.

- Adaptive questionnaires can reduce the time spent on a questionnaire and improve precision in terms of health assessment and diagnosis when compared to static questionnaires.
  - For the assessment of certain mental health disorders such as major depressive disorder, adaptive questionnaires can reproduce the results of an hour-long diagnostic interview with a test that takes one minute to complete.

Limitations

- Scientific research on the application and effectiveness of adaptive testing is still ongoing.
  - Which health conditions are suitable for adaptive testing are currently under investigation.
  - It is not clear what the best way to implement adaptive questionnaires into diagnosis, treatment, and follow-up is.

Research Background

Adaptive Questionnaires

Adaptive questionnaires are a form of survey in which the questions asked are tailored to an individual and are often conducted using a computer. Relative to a static questionnaire, the questions on an adaptive questionnaire change depending on who is taking it. The questions asked on an adaptive questionnaire are determined by a respondent's answers to previous questions and determined by a computer algorithm (Figure 1).[1] For instance, if a respondent has
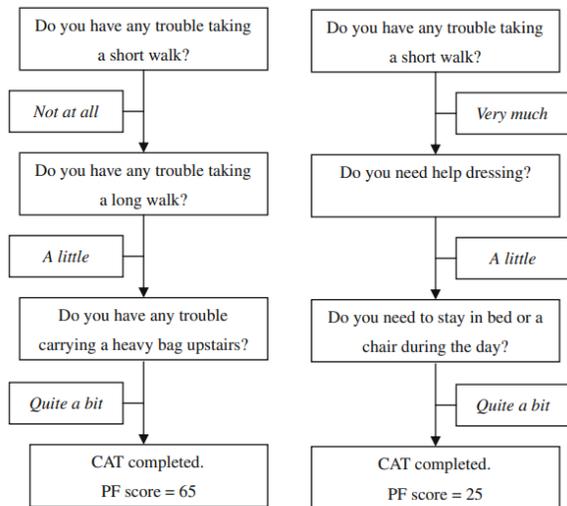
Figure 1. Two examples of how an adaptive questionnaire on physical functioning could proceed. Adapted from Petersen et. al.[3]

indicated that they have trouble walking long distances, a future question in the same assessment may ask about any trouble carrying heavy bags up stairs instead asking about a respondent's ability to run. A static questionnaire, in comparison, does not have the ability to adapt to a respondent's answers and may have a large list of questions that respondents are required to answer. Therefore adaptive questionnaires have the capability to reduce the total numbers of questions asked by only asking questions that provide useful information to help assess and diagnose the current health problem.[2, 3]

Scientific Research on the Use of Adaptive Questionnaires

Scientific research in the healthcare setting has primarily focused on the use of adaptive questionnaires for health-related quality of life and mental health screening. Research suggests that adaptive questionnaires increase measurement precision with regards to health assessments and diagnosis relative to static questionnaires while reducing the time required to complete the questionnaire.[4-6] For some mental health disorders, such as major depressive disorder, a computerized adaptive test has been developed to reproduce the results of an hour-long diagnostic interview in an adaptive test that takes less than one minute to complete.[5] This allows for large-scale screening and monitoring for mental health disorders.

Health-Related Quality of Life

Scientific research has investigated the use of adaptive questionnaires for the evaluation of health-related quality of life and physical function for several types of patients including those with rotator cuff disease, cancer patients, patients who have gone through cervical spine surgery, and those with multiple sclerosis.[2,3,7,8] In general, the studies show that adaptive questionnaires can increase precision with regards to discriminating patients with different physical abilities and reduce the number of questions needed compared to classical, static questionnaires.

Mental Health Diagnosis

Scientific studies have also investigated the use of adaptive questionnaires for the assessment of mental health disorders. Adaptive questionnaires have been investigated for their use in the screening of dementia, major depressive disorder, post-traumatic stress disorder, substance abuse, psychosis, and anxiety.[6,7,9,10] They have generally been found to be effective and have

shown improved precision for screening and diagnosing these mental health disorders compared to standard static questionnaires. The time saved by using an adaptive questionnaire with respect to a diagnostic interview has enabled the large-scale screening of mental health disorders in some situations. Adaptive questionnaires have been used recently to assess the entire entering class at UCLA (6,000 students) for depression, anxiety, and suicidality.[5] Additionally, Tennessee uses adaptive questionnaires to assess mental health disorders in their child welfare system.[5]

<u>Limitations</u>

The scientific literature has not made it clear which conditions adaptive testing is and is not suited to address. Similarly, it is not clear whether there is a scientific consensus regarding what the ideal implementation is in terms of diagnosis, treatment, and follow up.[9] Finally, the current adoption of adaptive testing in real world healthcare settings is unclear.

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