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Overlap of Depressive Symptoms with Health-Related Quality-of-Life Measures

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Abstract

Because depressive symptoms are a part of health-related quality-of-life (HRQOL) measures, measures of depression will be empirically associated with HRQOL. We discuss examples of published research where authors ignored or did not fully account for overlap between depressive symptom and HRQOL measures. Future researchers need to recognize when their models include conceptually similar variables on the same side or both sides of the equation. This awareness will lead to more accurate conclusions about the prognostic value of depression and other HRQOL measures for health care utilization, mortality, and other outcomes. It will also result in fewer incorrect claims about the effect of depression on HRQOL.

Key Points

Failure to recognize overlap between stand-alone depressive symptom measures and health-related quality-of-life (HRQOL) instruments leads to tautological inferences about the “impact” of depression on HRQOL.

Overlap can also result in inaccurate conclusions about the prognostic value of these measures for health care utilization, mortality, and other outcomes.

The fact that depressive symptoms are part of preference-based measures used to estimate utilities in cost-utility evaluations needs to be explicit.

1 Introduction

Health-related quality of life (HRQOL) is a subset of quality of life that refers to functioning and well-being in physical, mental, and social health aspects of life. HRQOL includes functioning such as ability to carry out a range of activities

of daily living such as bathing or dressing (physical functioning). It also includes whether the person can climb stairs, walk, or run. Other aspects of functioning include the extent to which one can interact with family, friends, and others (social functioning). HRQOL also refers to internal, subjective perceptions such as vitality, pain, anxiety, depressive symptoms, and general health perceptions. HRQOL instruments can yield scores for multiple domains (profile measures) and/or a single preference-based summary score anchored by dead (0) and “perfect health” (1).

HRQOL instruments should be designed using a formal process starting with input from patients and health care providers who have relevant experience [1]. This should be followed by a conceptual model specifying the items representing the underlying domains. Subsequent studies need to be done to ensure that items are only retained if they correlate sufficiently with the constructs they represent [2, 3] and are not redundant or “locally dependent” (i.e., substantially correlated with one another after controlling for the underlying common factor) [4]. HRQOL instruments are defined by their content and include questions assessing symptoms like pain and fatigue [5]. Almost invariably one of the constructs will be emotional distress and include items assessing depressive symptoms. Because depressive symptoms are a part of HRQOL measures, measures of depression will be empirically associated with HRQOL.

There may be good reasons to include depression measures such as the Center for Epidemiologic Studies Depression Scale (CESD) or the Beck Depressive Inventory along with an HRQOL instrument that assesses depressive

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symptoms or other aspects of mental health. For example, a researcher may want to compare scores in their sample with those from prior studies with the depression measure. But conceptual and empirical overlap between measures needs to be considered in analyses. If the set of depressive symptom items is D , and the other (non-depression) items on an HRQOL instrument are represented by X , it is obvious that $\text{corr}(D, D + X) > 0$, since D occurs twice. This is true even if $\text{corr}(D, X) = 0$. That is, a depression measure (D) will be correlated with an HRQOL measure that includes D items and other items (X).

Katschnig and Angermeyer [6] stated that “Different measurement inventories may contain identical or very similar items, but nevertheless be labelled differently (in one instance a ‘depression rating scale’ in the other a ‘well-being scale’” (p. 146). Similarly, Berlim and Fleck [7] noted that “there is evidence that depression and quality of life are constructs with areas of intersection.” But several published articles report analyses in which “depression” and HRQOL measures have been included without acknowledging conceptual and empirical overlap.

2 Depressive Symptoms and HRQOL Profile Measures

For example, Okunrintemi et al. [8] found that those who scored between 4 and 6 (“high risk” for depression) versus between 0 and 3 (“low risk” for depression) on the two-item Patient Health Questionnaire (PHQ) had worse SF-12 Physical Component Summary (PCS) and Mental Component Summary (MCS) scores. But it is not surprising that depressive symptoms were associated with mental health (SF-12 MCS) scores because both reflect mental health.

Olson et al. [9] assessed depressive symptoms using the Geriatric Depression Scale (GDS) and HRQOL with the Functional Assessment of Human Immunodeficiency Virus Infection (FAHI) quality-of-life instrument. They reported that depressive symptoms “accounted for 31.4% of variance in overall HRQOL, and higher scores on depressive symptoms were associated with lower scores on overall HRQOL” (p. 3317). But the FAHI and GDS have several similar items, as shown in Table 1. Note that some GDS items assess energy/fatigue, anxiety, life satisfaction, and cognitive distress. Hence, reporting significant associations between depressive symptoms (GDS) and HRQOL (FAHI) is circular.

In addition to suggesting the “important role of mental health, specifically depressive symptoms” in HRQOL [9], these investigators opined that the influence of mental health on physical health “suggests that mental health treatment may reduce overall costs of health care services.” While that speculation may be true, a longitudinal study showed “negative (suppression) effects of mental health on physical health” [10] that became nonsignificant when the model was revised by adding the direct effects of measured variable residuals (the unique variance of measured variables not accounted for by the common factor) on the physical and mental health latent variables. Hence, this empirical study did not support the causal effect of mental health on physical health implied by Olsen et al. [9].

Depression (Mini-International Neuropsychiatric Interview) and quality-of-life (Control, Autonomy, Self-realization, and Pleasure Questionnaire) measures were considered as predictors of mortality among hemodialysis patients [11]. Both independent variables had similar hazard ratios when included separately in Cox proportional hazards models predicting mortality. But the authors concluded that quality of life was more important than depression because it was

Table 1 Similar items in the Geriatric Depression Scale (GDS) and the Functional Assessment of Human Immunodeficiency Virus Infection (FAHI) quality-of-life instrument

GDS	FAHI
Do you feel full of energy?	I have a lack of energy
Do you feel happy most of the time?	I feel sad
Do you often get restless and fidgety?	I feel nervous
Are you hopeful about the future?	I am concerned about what the future holds for me
Do you frequently worry about the future?	Are you afraid that something bad is going to happen to you?
Do you find life very exciting?	I am able to enjoy life
Have you dropped many of your activities and interests?	I am enjoying the things I usually do for fun
Are you basically satisfied with your life?	I am content with the quality of my life right now
Do you feel that your situation is hopeless?	I am hopeful about the future
Is your mind as clear as it used to be?	My thinking is clear
Do you feel you have trouble concentrating?	I have trouble concentrating
Do you feel you have more problems with your memory than most?	I have trouble remembering

significant in the model that included both independent variables. The authors did not acknowledge the overlap between the variables even though they reported a significant association between them in a separate article [12].

Wang et al. [13] analyzed cross-sectional data from a sample of 420 elderly in rural China and found a significant correlation of -0.32 between depressive symptoms (PHQ) and the World Health Organization Quality of Life Assessment (WHO-QOL-BREF). Based on a path analysis, these authors concluded that depressive symptoms mediated the association between social support and quality of life. They mentioned that the WHO-QOL-BREF includes items assessing psychological health, but failed to acknowledge the conceptual overlap with depressive symptoms.

Evans et al. [14] noted in the background section of their paper that some have suggested that poorer quality of life is akin to depression, but they reported significant associations of self-reported depressive symptoms with measures of overall quality of life, general health, and mental health. And other authors stated that their results could have been “influenced by the collinearity between scales, considering that questions to assess depression (e.g., the ‘downhearted and blue’ and the ‘so down in the dumps’ questions ... are included for certain HRQOL scales” [15], but they nonetheless concluded that the Kidney-Disease Quality of Life Short Form scores were worse for those with more depressive symptoms.

3 Depressive Symptoms and Preference-Based Measures

Perhaps of most relevance to pharmacoeconomic studies, Engel et al. [16] examined associations of the Depression Anxiety Stress Scale (DASS-21) and the Kessler Psychological Distress Scale (K10) with several multi-attribute utility (preference-based) measures (SF-6D, AQoL-8D, 15D, EQ-5D-5L, and Health Utilities Index 3 [HUI-3]) and concluded that the AQoL-8D was the most sensitive to (correlated with) the DASS-21 and K10. These authors acknowledged the overlap, but implied that depression causes HRQOL to be worse by stating that depression impacted “mental health as measured by the SF-36v2 (nervous, down in the dumps, peaceful, downhearted, and happy)” [16].

Data from the first National Health and Nutrition Examination Survey Epidemiological Follow-up Study were used to estimate cross-sectional associations between a preference-based measure and depression defined by the CESD [17]. The preference measure was a modified version of the HUI and was limited to physical functioning, role functioning, and difficulty seeing and/or hearing, or pain associated

with medical problems. While the absence of mental health in the preference measure can be criticized, their analysis did not have the depression measure overlap problem of Engel et al. [16].

Jia and Lubetkin [18] looked at the association of depressive symptom severity (PHQ-9) with estimated EQ-5D-3L scores. Unsurprisingly, they found a monotonic association such that the difference in quality-adjusted life years between those with no or minimal depressive symptoms and those with mild, moderate, and severe depression severity were 6.2, 9.3, and 10.7, respectively. Another study found that depressive symptoms had the largest unique association with the SF-6D preference-based score of 23 self-reported “chronic conditions,” but acknowledged that this strong negative association was expected because the SF-6D includes mental health items [19]. Importantly, these authors also examined a parallel model that excluded depressive symptoms.

4 Summary and Recommendations

Associations between depressive disorder and impaired functioning and well-being were documented a quarter of a century ago [20], and similar results have been reported recently for severe mental illnesses [21]. But failure to recognize overlap between stand-alone depressive symptom measures and HRQOL instruments leads to tautological inferences about the “impact” of depression on HRQOL. The fact that depressive symptoms are part of the utility estimate in cost-utility models needs to be explicit.

Overlap can also result in inaccurate conclusions about the prognostic value of these measures for health care utilization, mortality, and other outcomes. It is essential to acknowledge the overlap between depression and HRQOL to interpret associations between them and avoid incorrect causal inferences. The collinearity between depression and HRQOL measures decreases the possibility that both will have unique associations with other variables. If depression and HRQOL measures are included in a multivariate model predicting, for example, mortality, then it is unlikely that they will exhibit significant unique association with the dependent variable. Investigators need to recognize that depression measures are indicators of HRQOL rather than distinct variables.

The studies summarized in this commentary are only the tip of the iceberg [22–27]. Future research needs to consider the overlap of measures of depressive symptoms with HRQOL. This will make it possible to limit the number of publications that incorrectly specify models with conceptually similar variables on one side or both sides of the equation.

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Authors' contributions RH created the first draft, and PF edited that and subsequent drafts.

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