Can we predict suicide and non-fatal self-harm with the Beck Hopelessness Scale: a meta-analysis

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CRD summary
This review concluded that standard cut-off point on the Beck Hopelessness Scale was capable of identifying those at risk of future self-harm and identified a high-risk group for potential suicide, but the magnitude of the risk was lower than previously reported estimates. Limitations in the review mean that the pooled estimates and conclusions should be treated with caution.

Authors' objectives
To quantify the ability of the Beck hopelessness scale to predict suicide and non-fatal self-harm.

Searching
MEDLINE, CINAHL, EMBASE and PsycINFO were searched from inception to January 2006; search terms were reported. Reference lists of included studies were searched.

Study selection
Cohort studies that used the Beck hopelessness scale manual or original published description of the Beck hopelessness scale measure and that reported suicide or self harm (based on the definition of parasuicide developed for the World Health Organisation/European Study on Parasuicide) in at least 10 patients were eligible for inclusion. The studies were conducted in North America and western Europe; three were in UK. Follow-up ranged from one to 12 years. One study was conducted in adolescents and the others were in adults. The proportion of females ranged from 45% to 68%.

Further study details were not provided.

Two reviewers independently selected studies for the review.

Assessment of study quality
Two reviewers independently assessed study quality. Assessment criteria were not reported.

Data extraction
Data were extracted to construct 2x2 tables of test performance. A cut-off point of 9 on the Beck hopelessness scale was used to dichotomise the data. Sensitivity, specificity, positive and negative likelihood ratios and diagnostic odds ratios with 95% confidence intervals (CI) were calculated. Authors were contacted for missing data.

Two reviewers independently extracted data using a standardised form.

Methods of synthesis
Summary estimates of sensitivity, specificity, positive and negative likelihood ratios and diagnostic odds ratios with 95% CI were calculated using a DerSimonian and Laird random-effects model weighted by inverse variance. Heterogeneity was assessed using \( I^2 \) (75% was considered high heterogeneity). Summary receiver operating characteristic (SROC) curves were produced using the Moses-Shapiro-Littenberg model, from which the area under the curve with 95% CIs were calculated. Galbraith plots and meta-regression were used to investigate between-study heterogeneity. A priori factors included population, length of follow-up and baseline risk of self harm/suicide. Sensitivity analyses investigated the impact of the study in adolescents and a study that did not predict repetition of self harm. Publication bias was examined using funnel plots and Egger's weighted regression test.

Results of the review
Nineteen studies met the inclusion criteria and 10 studies provided sufficient data to be included in the meta-analysis (n=3,775 participants, range 61 to 1,958). Results of the quality assessment were not reported.
Suicide (four cohorts; n=2,559): Three studies reported rates of suicide of 6% to 8%; these recruited particularly high-risk groups for suicide. The fourth study reported a suicide rate of 0.9%. Pooled estimates for Beck hopelessness scale were: sensitivity 80% (95% CI 68 to 90, I^2=57%), specificity 42% (95% CI 41 to 44, I^2=76%), positive likelihood ratio 1.55 (95% CI 1.31 to 1.83, I^2=44%), negative likelihood ratio 0.45 (95% CI 0.20 to 1.03, I^2=49%), diagnostic odds ratio 3.39 (95% CI 1.29 to 8.88, I^2=37%) and the area under the curve was 0.70 (95% CI 0.59 to 0.85).

Self-harm (six cohorts; n=1,216): Pooled estimates for Beck hopelessness scale were: sensitivity 78% (95% CI 74 to 82, I^2=0%), specificity 42% (95% CI 38 to 45, I^2=90%), positive likelihood ratio 1.29 (95% CI 1.09 to 1.52, I^2=74%), negative likelihood ratio 0.58 (95% CI 0.47 to 0.71, I^2=0%), diagnostic odds ratio 2.27 (95% CI 1.53 to 3.37, I^2=35%) and area under the curve was 0.63 (95% CI 0.57 to 0.70). Three studies reported two to seven people had died by suicide during the follow-up period.

Results of sensitivity analyses and the meta-regression were reported. There was no evidence of publication bias.

Authors' conclusions
The standard cut-off point on the Beck hopelessness scale identified a high-risk group for potential suicide, but the magnitude of the risk was lower than previously reported estimates. The standard cut-off point was capable of identifying those at risk of future self-harm, but the low specificity rate meant it was unlikely to be of use in targeting treatment designed to lower the rate of repetition.

CRD commentary
The review addressed a clear review question supported by specified inclusion criteria. Studies where fewer than 10 patients experienced an outcome of interest were excluded, which would likely restrict inclusion to larger studies and/or those conducted in high-risk populations. This was particularly pertinent when clinical outcome was used as the reference standard. Several relevant sources were searched, but it was unclear whether language restrictions were applied and there was no specific search for unpublished studies. Each stage of the review process was conducted in duplicate, which reduced potential for error and bias. The authors stated that they assessed study quality, but the criteria were not specified and the results were not reported. There were insufficient study details for the reader to assess the quality of the included studies, so the reliability of the available evidence was unclear. The methods of synthesis used did not take into account between-study heterogeneity, which made the reliability and generalisability of the pooled results uncertain; more robust methods were available.

The limitations of the review mean the results should be treated with caution.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors suggested that the systematic review be repeated as and when further research emerged on the predictive properties of the Beck hopelessness scale. They also stated that a greater number of individual studies with a greater range of settings, populations and periods of follow-up would enable the causes of underlying heterogeneity of the performance characteristics to be explored in more detail using techniques such as meta-regression.

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