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Economic evaluation of a tailored therapist-guided internet-based cognitive behavioral treatment (ICBT) for patients with psoriasis: a randomized controlled trial

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Dear editor, the high prevalence and physical, psychological, and economic burden of chronic skin conditions emphasize the need for cost-effective multidisciplinary treatment options.[1] Cognitive behavioral treatment (CBT) reduces physical and psychological symptoms in chronic skin conditions[2], and is increasingly offered online[3]. However, cost-effectiveness studies of Internet-based CBT (ICBT) for chronic skin conditions are lacking. In our previous randomized controlled trial (RCT), individually-tailored, therapist-guided ICBT improved physical functioning and decreased disease impact in psoriasis patients.[4] The current study examines the cost-effectiveness of this intervention.

This economic evaluation from a societal perspective was conducted alongside an open-label parallel-group RCT comparing the effects of care as usual (CAU; regular dermatological care) to additional ICBT aimed at reducing the impact of psoriasis on daily life (ICBT+CAU) in 131 psoriasis patients. Methodological details are described elsewhere.[4] The ICBT focused on itch, pain, fatigue, negative mood, and social relationships. Costs (self-reported healthcare and medication use, patient travel costs, loss of productivity costs in paid labour, and ICBT costs[4]) and effects (Quality-Adjusted Life Years [QALYs[4]]) were assessed at baseline, post-treatment, and 6-months follow-up. Baseline between-group cost differences were analysed with independent-samples *t*-tests. An incremental cost utility ratio (ICUR) was calculated by dividing between-group cost differences by the QALY differences for the of 12-months study period. Uncertainty surrounding the ICUR was based on bootstrapped samples (1000 replications).

No baseline between-group differences in sociodemographic and disease-related characteristics, and outcomes were found (*p*-values≥.10), except for a higher clinician-rated disease severity in the ICBT+CAU group (*p*=.03). The primary cost-utility analysis showed no between-group differences in effects (average QALY ICBT+CAU versus CAU=0.79 versus 0.78; mean QALY difference=-0.014; 2.5-97.5 percentile=-0.062-0.038) or costs (average costs ICBT+CAU versus CAU=€6,641 versus €5,346; mean difference=€1,295; 2.5-97.5 percentile=-€1,502-€4,176) at post-treatment and 6-months follow-up (*p*≥.45). The northwest quadrant of the cost-effectiveness plane (Figure 1a) contained the majority of ICURs (58%), suggesting larger societal costs and QALY losses after ICBT+CAU than CAU alone. Greater QALY improvements in the ICBT+CAU group, but at higher societal costs (northeast quadrant), had a 24% probability.

While the intervention was aimed at patients with moderate-to-high disease burden, the sample had relatively low disease burden.[4] To examine the impact of disease burden, four post-hoc subgroup analyses were performed on patients with high versus low (median split) baseline scores on 1) self-assessed disease severity; 2) clinician-assessed disease severity; 3) psychological distress; and 4) self-perceived disease impact. For patients with *high self-reported disease severity* and *high self-reported disease impact*, ICBT+CAU was generally associated with greater effects at lower societal costs than CAU (i.e., 60% and 78% ICURs in the southeast quadrant, respectively, compared to 0% and 0% in low-scoring patients; Figure 1b-e). The probability that ICBT is cost-effective for patients with *high self-reported disease severity and impact* at a Willingness to Pay of €20,000 per QALY gained[5] is 78% (mean

ICUR=-55.978; mean cost reduction =-€593; mean QALY increase=0.05) and 95% (mean ICUR=-94.371; mean cost reduction=-€2562; mean QALY increase=0.03), respectively. In contrast, for patients with *high clinician-assessed disease severity* and *high psychological distress*, ICBT+CAU was generally associated with lower effects at higher costs than CAU (86% and 78% of ICURs in the northwest quadrant, respectively, compared to 31% and 4% in low-scoring patients).

That ICBT+CAU was not cost-effective compared to CAU in the total group may be explained by between-group imbalance (i.e., higher disease severity, and descriptively higher baseline costs, systemic medication use, and greater labor market participation [i.e., more possible productivity losses] in the ICBT+CAU group). Moreover, the generic effect measure (EQ-5D) may not be specific enough to detect health-related quality of life (HRQoL) aspects in dermatological samples[6], combined with limited responsiveness and ceiling effects across conditions.[7,8]

The finding that ICBT+CAU was cost-effective for patients with high self-reported disease severity and impact clearly suggests the target audience of this intervention. As societal costs were lower in the ICBT+CAU than CAU group at 6-months follow-up, the intervention may be cost-effective even when society is not willing to pay anything for it. However, follow-up trials including patients with higher disease burden are needed to corroborate these findings. Strengths of this study include the RCT design, outpatient sample, and analysis of direct and indirect costs. Including a sensitive-to-change dermatology-specific HRQoL-measure might aid the assessment of clinically relevant improvement in future cost-effectiveness studies.

In conclusion, while ICBT was not considered cost-effective in comparison to CAU in the overall sample, subgroup analyses suggested cost-effectiveness for patients who experience high self-assessed disease severity and impact. Screening for these characteristics, and offering ICBT specifically to patients with elevated levels, may be cost-effective and clinically relevant.

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Figure 1. Cost-effectiveness planes for main cost-effectiveness analysis (a), and subgroups of high (b) versus low (c) self-assesed disease severity, and high (d) versus low (e) self-assessed disease impact. WTP = willingness to pay.