

Effectiveness of a 5A Model-based Intervention on Haemoglobin and Quality of Life in Young Adults with Mild-to-Moderate Anaemia: A Single-arm Pilot Study from Haryana, India

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ABSTRACT

Introduction: Anaemia remains highly prevalent among young adults in India, particularly among female students in higher-education settings. Behavioural frameworks such as the Modified WHO 5A Model (Agree, Assess, Advise, Assist, Arrange) have been used in chronic disease management, but their utility for anemia prevention has not been formally tested in the Indian context.

Aim: To evaluate the effectiveness of a 5A Model-based behavioural intervention, provided iron supplementation for moderate cases, on Haemoglobin (Hb) levels and Quality of Life (QOL) among young adults with mild-to-moderate anaemia.

Materials and Methods: A single-arm, pilot study using a one-group pretest-posttest design was conducted among 53 anemic young adults aged 19–24 years in Ambala, Haryana, between April and June 2024. Eligible participants were screened from a larger pool (n=116 with valid haemoglobin estimation) and selected by purposive sampling. The 36-day intervention package included structured health education, iron- and vitamin C-rich diet promotion delivered as directly observed mid-morning meals during the 11:00–11:20 AM institutional break, deworming, iron supplementation for participants with moderate anaemia, and behavioural reinforcement via WhatsApp messages and phone calls (STAR strategy). Hb was measured using a digital haemoglobinometer (TrueHb). QOL was assessed using a 19-item structured questionnaire (Cronbach's $\alpha=0.92$). Compliance was tracked daily across all 31 days of the Assist phase for diet and across the planned 15 days of iron-folic acid supplementation. Data were analysed with paired t-tests, Wilcoxon signed-rank tests, McNemar's exact test, and Pearson and Spearman correlations. Cohen's d and 95% Confidence

Intervals (CI) were reported. A pre-specified subgroup analysis was performed by baseline severity.

Results: Mean diet adherence was $66.2 \pm 20.1\%$ (median 70.0%) and mean iron supplementation adherence was $95.7 \pm 16.5\%$ (median 100%). Mean Hb increased from 10.81 ± 0.89 g/dL to 11.82 ± 0.88 g/dL (mean difference 1.01 g/dL; 95% CI 0.75–1.28; paired t=7.69, $p<0.001$; Wilcoxon $p<0.001$; Coen's $d=1.06$). Mean QOL score increased from 57.02 ± 12.32 to 74.58 ± 8.64 (mean difference 17.57; 95% CI 13.86–21.28; $p<0.001$; $d=1.31$). Subgroup analysis showed a smaller, behavior-attributable Hb gain in mild cases ($\Delta=0.58$ g/dL, $d=0.64$) and a substantially larger gain in moderate cases who received iron supplementation ($\Delta=1.53$ g/dL, $d=2.07$; between-group $p<0.001$). Anemia status improved in 19 of 53 participants (35.8%; McNemar exact $p<0.001$). Change in Hb was not correlated with change in QOL ($r=0.14$, $p=0.30$).

Conclusion: A 5A Model-based behavioural intervention delivered through direct observation of mid-morning meals was associated with measurable improvements in Hb and QOL among young adults with mild-to-moderate anaemia. The behavioural component alone produced modest Hb gains in mild anaemia; the larger gains in moderate anemia primarily reflect concurrent iron supplementation. The improvement in QOL appears to be independent of haemoglobin change, suggesting it was driven by other components such as education and peer support. A single institutional setting; randomised, multi-centre evaluation is warranted to validate these findings.

Keywords: Anemia prevention, Behavioural intervention, Directly observed therapy.

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