

Self-Esteem Outcomes After Unshaven DHI Hair Transplant in Women with Hamilton-Norwood Pattern Hair Loss: A Retrospective Cohort Study

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Abstract

Background: Female pattern hair loss (FPHL) most often presents as diffuse thinning with a preserved frontal hairline, but a recognised subset of women present with a male-pattern (Hamilton-Norwood) distribution characterised by bitemporal recession and vertex thinning. Psychological outcomes following surgical hair restoration in this specific subgroup have not been previously reported.

Methods: This was a retrospective cohort study of adult women with Hamilton-Norwood stage II to V hair loss who underwent recipient-unshaved Direct Hair Implantation (DHI) at Vera Clinic, Istanbul, with treatment dates between January and December 2023. Of 90 women screened, 68 met inclusion criteria. The primary outcome was change in self-esteem, measured using the Rosenberg Self-Esteem Scale (RSES; 0 to 30, higher scores indicating greater self-esteem), administered at initial consultation and again at 12 months. As an exploratory analysis, change in RSES score was examined across Hamilton-Norwood stages using a two-way mixed-design analysis of variance.

Results: Mean RSES score increased from 18.9 (SD 4.3) at baseline to 23.8 (SD 3.8) at 12 months (mean difference +4.9, SD 5.6; 95% CI 3.6 to 6.2; $t=7.22$; $p<0.001$; Cohen's $d=0.88$). In exploratory analysis, improvement was greater at more advanced stages, ranging from +3.1 at stage II to +7.4 at stage V (time $\times$ stage interaction: $F(3,64)=3.82$, $p=0.014$).

Conclusions: In this single-centre retrospective cohort, women with Hamilton-Norwood pattern hair loss showed a significant increase in self-esteem from baseline to 12 months following recipient-unshaved DHI. Improvement appeared greater among patients with more advanced baseline hair loss, though this exploratory finding requires confirmation in larger, controlled studies.

Keywords: Alopecia; Hair Transplantation; Self Concept; Sex Factors; Retrospective Studies

Introduction

Female pattern hair loss (FPHL) classically presents as diffuse thinning of the crown and mid-scalp with preservation of the frontal hairline, a pattern first described using the Ludwig scale. Clinically, however, FPHL is now recognised to comprise three distinct subtypes: a diffuse, frontal-hairline-preserving Ludwig pattern; a frontal-breaching Olsen pattern; and a Hamilton-Norwood pattern, characterised by bitemporal recession and vertex thinning that resembles the distribution seen in men [1]. The Hamilton-Norwood subtype is staged using the same seven-stage scale applied to male-pattern baldness [1,2] and has been associated with earlier disease onset and polycystic ovary syndrome relative to the more prevalent Ludwig and Olsen subtypes [1].

Visible hair loss is widely reported to affect self-perception and psychological wellbeing, and surgical hair restoration is increasingly considered not only for its cosmetic effect but for its potential psychological benefit. Whether this benefit extends to women whose presentation follows a male-pattern distribution, a less common and comparatively understudied FPHL subtype, has not been established.

Direct Hair Implantation (DHI) combines graft extraction and implantation into a single step using a specialised implanter pen [3]. At this institution, DHI is most often performed using a recipient-unshaved protocol, in which the implantation area remains untrimmed while the donor area receives a small, concealed trim; this approach is used for most hair types. For patients with Afro-textured or tightly curled hair, an alternative FUE-based unshaven approach is used instead, as the C-shaped follicle structure is technically incompatible with the straight cannula of the implanter pen [4].

To our knowledge, no study to date has reported psychological outcomes following hair transplantation in women presenting with a Hamilton-Norwood distribution. The aim of this study was to determine change in self-esteem, measured using the Rosenberg Self-Esteem Scale, from baseline to 12 months after recipient-unshaved DHI in a retrospective cohort of women with Hamilton-Norwood stage II to V hair loss.

Methods

Study Design and Setting

This was a retrospective cohort study conducted at Vera Clinic, Istanbul, Turkey. Patients were enrolled based on treatment dates between January 1 and December 31, 2023, with follow-up extending through December 2024.

Participants

Inclusion criteria were: adult women (age ≥ 18 years); androgenetic alopecia with a Hamilton-Norwood pattern distribution, staged II to V; treatment with recipient-unshaved DHI as a single technique; and completion of a self-esteem assessment at both the initial consultation and the 12-month follow-up visit.

Exclusion criteria were: a documented diagnosis of body dysmorphic disorder; polycystic ovary syndrome with clinically significant hyperandrogenism; clinically significant thyroid dysfunction or iron-deficiency anaemia; combined-technique or revision procedures; active major psychiatric diagnosis or treatment during the study period; and incomplete 12-month follow-up.

Of 90 women screened, 68 met inclusion criteria and were retained for the analytic cohort (75.6% inclusion rate). Reasons for exclusion are summarised in the Results.

Variables

The primary outcome was change in self-esteem, measured using the Rosenberg Self-Esteem Scale (RSES), a validated 10-item instrument scored from 0 to 30, with higher scores indicating greater self-esteem [5]. Scores of 15 to 25 are commonly interpreted in the literature as within the normal range, with scores below 15 suggesting low self-esteem, though this interpretive convention is not part of Rosenberg's original 1965 scoring and does not derive from a single canonical source. The RSES was administered at the initial consultation and again at the 12-month follow-up visit. Baseline characteristics, reported descriptively, were age, Hamilton-Norwood stage, and graft count.

Denominators

All percentages and means in this study are patient-level statistics (N=68), unless otherwise specified.

Data Sources and Measurement

All procedures were performed using a recipient-unshaved DHI protocol, in which the implantation area remained untrimmed throughout. The RSES was self-administered on paper at the initial consultation, prior to any discussion of surgical planning, and again at the 12-month follow-up visit.

Bias

Selection bias is possible, as the analytic cohort excludes patients lost to follow-up, who may differ systematically from those retained. No control or comparator group was included in this study; as such, observed change in RSES score cannot be attributed to the surgical procedure alone and may reflect regression to the mean, the passage of time, or other unmeasured factors. Patients self-selected into recipient-unshaved DHI, which may limit generalisability to women treated with other techniques.

Statistical Methods

Change in RSES score from baseline to 12 months was assessed using a paired-samples t-test, with results reported as mean difference, standard deviation, 95% confidence interval, and p-value. Effect size for the primary outcome was calculated as Cohen's d for paired samples (mean difference divided by the standard

deviation of the difference). As an exploratory analysis, a two-way mixed-design analysis of variance (time $\times$ Hamilton-Norwood stage) was used to examine whether change in RSES score differed across stages. Analyses were performed in R version 4.3.1. A p-value <0.05 was considered statistically significant.

Ethics

Patients were informed about the purpose of the pre- and post-operative self-esteem assessment and provided written informed consent prior to completion. Participation was voluntary, and patients could decline without affecting their clinical care. As this study involved only routinely collected clinical assessments without additional interventions or procedures beyond standard care, prospective ethics committee approval was not required under institutional policy; a waiver applied to the retrospective use of anonymised chart data. This study adhered to the principles of the Declaration of Helsinki.

Results

Participants

Of 90 women screened, 22 were excluded: 11 for incomplete 12-month follow-up, 4 for thyroid dysfunction or iron-deficiency anaemia, 2 for combined-technique or revision procedures, 2 for polycystic ovary syndrome with hyperandrogenism, 2 for active major psychiatric diagnosis or treatment, and 1 for body dysmorphic disorder. The final analytic cohort comprised 68 patients (75.6% of those screened).

Baseline Characteristics

Mean age was 32.4 ± 6.9 years. Hamilton-Norwood stage distribution was: stage II, 23.5% (n=16); stage III, 32.4% (n=22); stage IV, 25.0% (n=17); stage V, 19.1% (n=13). Mean graft count was $2,840 \pm 680$ (Table 1).

Table 1. Baseline demographic and clinical characteristics.

Characteristic	Value (N=68)
Age, years (mean $\pm$ SD)	32.4 ± 6.9
Hamilton-Norwood II, n (%)	16 (23.5)
Hamilton-Norwood III, n (%)	22 (32.4)
Hamilton-Norwood IV, n (%)	17 (25.0)
Hamilton-Norwood V, n (%)	13 (19.1)
Graft count (mean $\pm$ SD)	$2,840 \pm 680$

Primary Outcome

Mean RSES score increased from 18.9 (SD 4.3) at baseline to 23.8 (SD 3.8) at 12 months (mean difference +4.9, SD 5.6; 95% CI 3.6 to 6.2; $t=7.22$; $p<0.001$; Cohen's $d=0.88$; Table 2).

Table 2. RSES score at baseline and 12 months (N=68).

Outcome	Baseline	12 months	Mean difference (95% CI)	p-value
RSES score (0-30, mean $\pm$ SD)	18.9 $\pm$ 4.3	23.8 $\pm$ 3.8	+4.9 (3.6 to 6.2)	<0.001

Exploratory Analysis: Change by Hamilton-Norwood Stage

As an exploratory analysis, change in RSES score was examined across Hamilton-Norwood stages (Table 3, Figure 1). Mean improvement increased with stage severity, from +3.1 at stage II to +7.4 at stage V. A two-way mixed-design ANOVA indicated a significant time $\times$ stage interaction ($F(3,64)=3.82$, $p=0.014$), suggesting that the magnitude of self-esteem improvement may differ by baseline disease severity. Given the modest subgroup sizes, this finding should be interpreted as exploratory rather than confirmatory.

Table 3. RSES score by Hamilton-Norwood stage, baseline and 12 months.

Stage	n	Baseline (mean $\pm$ SD)	12 months (mean $\pm$ SD)	Mean difference
II	16	20.4 $\pm$ 4.0	23.5 $\pm$ 3.6	+3.1
III	22	19.4 $\pm$ 4.1	23.6 $\pm$ 3.7	+4.2
IV	17	18.3 $\pm$ 4.4	23.9 $\pm$ 3.9	+5.6
V	13	16.9 $\pm$ 4.6	24.3 $\pm$ 4.0	+7.4

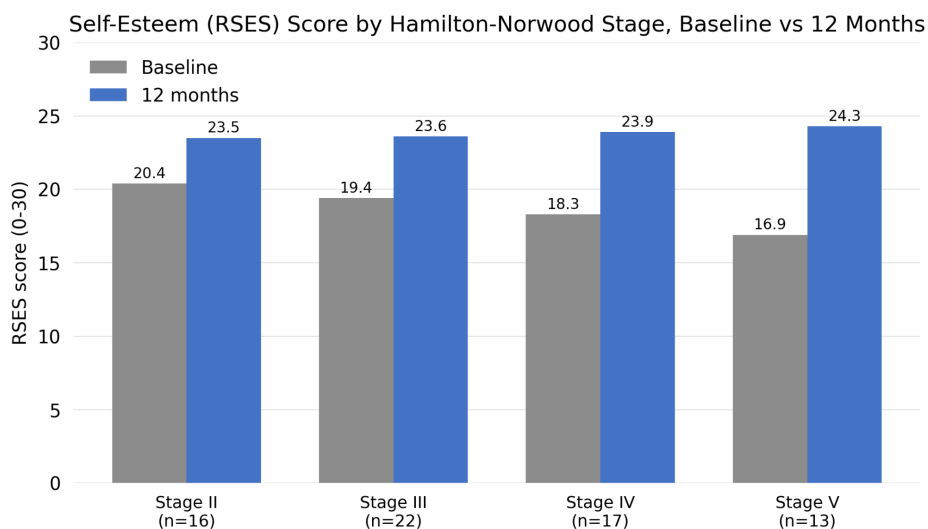


Figure 1. Self-esteem (RSES) score by Hamilton-Norwood stage, baseline versus 12 months.

Discussion

In this retrospective cohort of women with Hamilton-Norwood pattern hair loss, self-esteem, measured using the RSES, increased significantly from baseline to 12 months following recipient-unshaved DHI.

Earlier institutional work in this domain has generally characterised female patients using the Ludwig scale, reflecting the more commonly described diffuse presentation of FPHL. The present findings suggest that a subset of female patients may instead present with a Hamilton-Norwood distribution, a

distinction not always captured in classification approaches centred on the diffuse pattern. The present cohort should accordingly be considered a distinct FPHL subtype from those more commonly described in institutional and published literature, and findings should not be assumed to generalise across presentations.

The Hamilton-Norwood subtype has previously been associated with earlier disease onset and polycystic ovary syndrome relative to other FPHL subtypes [1]. Although patients with clinically significant hyperandrogenism were excluded from the present cohort, subclinical hormonal differences between subtypes cannot be entirely ruled out as a contributing factor to the population studied here.

The exploratory finding of greater self-esteem improvement among patients with more advanced hair loss may reflect a correspondingly lower psychosocial baseline and therefore greater relative benefit from visible hair restoration. However, because baseline RSES scores were inversely related to stage severity, the observed stage-gradient in improvement is also consistent with, and cannot be statistically distinguished from, regression to the mean; this alternative explanation is at least as plausible as a genuine severity-dependent treatment effect. Combined with the small subgroup sizes and wide confidence intervals, this finding should be considered hypothesis-generating rather than confirmatory.

This study has several limitations. It was conducted at a single centre without a control or comparator group, and no causal claim regarding the surgical procedure's contribution to observed change in self-esteem can be made; observed improvement may partly reflect regression to the mean, the passage of time, or unmeasured factors unrelated to surgery. Patients self-selected into recipient-unshaved DHI, which may limit generalisability. Because clinically significant hyperandrogenic PCOS was an exclusion criterion, and this subtype has been specifically associated with PCOS in prior epidemiological work [1], the present cohort may under-represent more hormonally complex presentations within the Hamilton-Norwood subtype. The RSES was self-reported without an independent observer-rated component. This study focused specifically on women presenting with a male-pattern (Hamilton-Norwood) distribution, a recognised but less common FPHL subtype; findings may not generalise to women with the more prevalent diffuse, Ludwig-type presentation, for whom surgical candidacy is often further limited by donor-area instability. This population should also be distinguished from women presenting with diffuse thinning due to telogen effluvium, a distinct and often reversible condition disproportionately affecting women, which resolves without surgical intervention once the underlying trigger is addressed and was not part of the population under study.

These findings suggest that hair restoration may be associated with meaningful psychological benefit among women with Hamilton-Norwood pattern hair loss, a subgroup that has received limited attention in the existing literature. Prospective, controlled studies are needed to establish whether this association reflects a genuine treatment effect.

Conclusions

In this single-centre retrospective cohort of 68 women with Hamilton-Norwood pattern hair loss, mean self-esteem, measured using the RSES, increased from 18.9 to 23.8 over 12 months following

recipient-unshaved DHI, a mean difference of 4.9 points (95% CI 3.6 to 6.2) corresponding to a moderate-to-large effect size. This shift moved the cohort's average score from the lower portion of the normal RSES range into its upper portion, without exceeding it. In exploratory analysis, improvement was numerically greater among patients with more advanced baseline hair loss, though this pattern is also consistent with regression to the mean and cannot be distinguished from a genuine severity-dependent effect with the present data. Taken together, these findings suggest that recipient-unshaved DHI may be associated with a meaningful improvement in self-esteem among women with Hamilton-Norwood pattern hair loss, a subgroup that has received limited attention in the existing literature; given the retrospective, single-centre, uncontrolled design, prospective studies with a comparator group are needed before this association can be interpreted as a treatment effect.

Declarations

Conflict of Interest:

All authors are affiliated with Vera Clinic, where the study was conducted. The clinic provided patient records, consultation facilities, and follow-up infrastructure. The authors declare no other competing interests. Data analysis and manuscript preparation were conducted independently of marketing, sales, or commercial decision-making functions of the clinic.

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Data Availability:

De-identified data supporting the findings of this study are available from the corresponding author upon reasonable request.

Author Contributions:

Vera Clinic Academy conceived the study, supervised data collection, performed data extraction and statistical analysis, and drafted the manuscript.

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