

## The Impact of Female Pattern Hair Loss on Quality of Life

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### Abstract

**Background:** Female pattern hair loss (FPHL) is a non-scarring alopecia characterised by the progressive thinning of hair. Hair has an important role in determining one's self-esteem, confidence and attractiveness. Hence, hair loss can heavily affect patients' quality of life (QoL). This study aims to assess the impact FPHL has on QoL in order to help improve patient management.

**Methods:** Twenty-two patients presenting to an outpatient dermatology clinic in Wolverhampton, UK, took part in this study. The impact of FPHL on QoL was measured using two questionnaires: the women's androgenic alopecia quality of life questionnaire (Waa-QoL) and the dermatology life quality index (DLQI). Participants were screened for psychological co-morbidity using the hospital anxiety and depression scale (HADS). Statistical tests used were Spearman's rank correlation, Mann-Whitney U and Kruskal Wallis tests.

**Results:** FPHL had a large impact on QoL. Patients who were younger or had a longer duration of disease had a significantly lower QoL ( $p < 0.05$ ). Furthermore, patient with a diagnosed mental health illness had a significantly lower QoL than those without ( $p < 0.05$ ).

**Conclusions:** FPHL has a significant and detrimental effect on patients' QoL. This study identifies several factors that are associated with a worse QoL outcome. This recognises groups of patients which could be targeted for more intensive intervention. Recognising the large impact on QoL, FPHL patients may benefit from a more holistic management with psychological interventions and a greater emphasis on improving QoL.

**Keywords:** Hair Loss, Psychosocial Impact, Women's Hair

### Introduction

Female pattern hair loss (FPHL), also known as androgenic alopecia, is the most common form of hair loss in women<sup>1</sup>. It is a diffuse, non-scarring alopecia associated with progressive miniaturisation of hair follicles and progressive reduction in the number of hairs [1,2]. FPHL can be characterised by three distinct patterns. Ludwig pattern, the most common, has diffuse thinning of the centro-parietal region with the frontal hair line maintained [3]. The 'Christmas tree' pattern similarly has diffuse centro-parietal thinning but with frontal accentuation leading to a triangular pattern of hair loss [4]. Lastly, there can be recession of the fronto-temporal hairline, a pattern often seen in men [3,4].

The prevalence of FPHL has been measured in different countries and figures vary greatly [5-10]. However, in all countries the prevalence

increases with age: 3-12% in those aged below 30 to 12-56% in those aged over 69 [5-10]. Whilst there is a greater prevalence in older age groups, the greatest demand for treatment is in those aged 25-40 years old [1]. Hair proves to be an important factor in determining self-esteem and confidence which can affect quality of life (QoL) and social functioning [11]. Hair is also linked to femininity and physical attractiveness [11]. Studies have shown how hair loss creates a large psychological burden on women and negatively affects their health-related QoL when compared to women without hair loss [3,12,13]. The high prevalence of FPHL coupled with its large potential to impair QoL illustrates the importance of having a better understanding of this condition. Furthermore, whilst treatment can often delay progression of hair loss and in some cases reverse it, existing hair loss often remains and ultimately the alopecia can progress despite treatment [4]. Hence better understanding FPHL's impact on QoL will better help clinicians manage the psychosocial effects of existing and eventual hair loss.

Measuring the impact on QoL objectively can be a challenging. Interestingly, clinical assessment of disease severity by a dermatologist/ clinician often does not correlate with the impact on QoL [14]. Patients with clinically mild hair loss can report having severely impaired QoL whereas those with severe disease can report it having a trivial impact [14,15]. Hence, importance should be placed on the patient's own perception of their disease in determining its effect on QoL [14]. As a result, many questionnaires/ measuring tools have been developed in order to provide quantitative measures for impact on QoL. This helps to compare between patients as well as with the same patient at different points of time.

This study was designed to assess the impact of FPHL on QoL in patients presenting to a dermatology outpatient clinic in the UK. It also aimed to evaluate any correlation between impact on QoL and psychiatric co-morbidity, medical co-morbidity, age and duration of disease. By identifying potential groups whose QoL is affected more by FPHL, clinicians can target these patients for more intensive treatment with an emphasis on improving QoL. Furthermore, patients with FPHL were screened for symptoms of depression and anxiety to see if these symptoms are prevalent. If they are, it could be something clinicians routinely screen for.

### Materials and Methods

This was a single-centre questionnaire-based study carried out in a dermatology outpatient clinic at New Cross hospital, Wolverhampton, United Kingdom. Patients with diagnosed FPHL were approached by their dermatologist, given an approved patient information leaflet and asked if they wished to take part in the study. Patients under 18 or who lacked capacity were not asked to be part of this study. Participants were then asked to fill out four questionnaires in private. These were: a generic questionnaire asking for age, duration of disease and co-morbidities; the women's androgenic alopecia quality of life questionnaire (Waa-QoL); the dermatology life quality index (DLQI); and the hospital anxiety and depression scale (HADS). All completed questionnaires were completely anonymised.

The Waa-QoL is a 16-item questionnaire developed by Dolte et al. to determine health-related QoL in patients with FPHL [16]. It was created by asking a cohort of 120 women their perceptions on the negative effects of hair loss. It remains the only questionnaire that is specifically designed for FPHL. It has been found to have excellent internal consistency, content validity and test-retest reliability [13,16]. Its questions cover subjects such as, social interactions, self-confidence and attractiveness. Each question asks how the participant has felt in the past week and gives a seven-point Likert scale ranging from 'not at all' (0 points) to extremely (6 points). This gives a total score ranging from 0 (best QoL) to 96 (worst QoL).

The DLQI is one of the most commonly and widely used dermatological QoL questionnaires in both research and clinical practice [17,18]. It consists of ten questions asking participants how much their skin has affected their life over the past week. It is a generic questionnaire that can be applied to nearly all skin conditions. Hence, for the purposes of this study the questions were reworded slightly to refer to hair loss rather than skin. It asks various questions such as how daily activities (e.g. work, studying

and hobbies) have been affected by skin [17,18]. Answers are given a score from 0 (not at all) to 3 (very much). Scores are added and the final score is placed into a banding to give an interpretation of the effect on QoL. For example, scores of 0-1 suggest no effect on QoL, whereas scores of 21-30 suggest an extremely large effect on QoL [19].

The HADS is a 14-item scale assessing levels of depression and anxiety a patient may be experiencing within the last week. It has seven questions relating to anxiety and seven to depression [20]. Answers are given a numerical value ranging from 0 (no symptoms) to 3 (severe symptoms). Scores are generated for each category with 8 and above indicating an abnormal result [21]. Scores of 8-10 are considered borderline although the cut-off of 8 still gives good specificity and sensitivity for both anxiety and depression [21]. In this study it is being used to screen for any psychiatric co-morbidity in patients with FPHL.

Questionnaire results were inputted into a spreadsheet and overall scores were calculated. Primary outcomes measured were the Waa-QoL and DLQI scores. Secondary outcomes included age, duration of disease, HADS score and co-morbidities. Data was analysed using IBM SPSS Statistics software (SPSS Inc, Chicago, IL, USA). Data was summarised as either mean or median. Non-parametric testing was done considering the small sample size and use of ordinal data. The Mann-Whitney U test and Kruskal-Wallis test were used to compare scores and Spearman's rank test to assess for correlation. A p value of <0.05 was considered statistically significant.

### Results

Twenty-two patients took part in the study. The average age was 38 years old, ranging from 25 to 65 years old. The average duration that patients had FPHL was 5.5 years, ranging from 1 to 10 years.

#### Women's Androgenic Alopecia Quality of Life Questionnaire

The median Waa-QoL score from participants was 74.5 out of a maximum 96. Scores ranged from 35 to 94. The questions that yielded the highest scores, which over 80% of participants stated affected them extremely or very much, were regarding: patients being concerned that their hair loss would continue, and patients' hair loss negatively affecting how they style their hair. Patients feeling self-conscious about other people looking at their hair also scored highly. The question which scored the lowest, which the majority of patients stated affected somewhat to not at all, was regarding patients having difficulty interacting with the opposite sex because of their hair loss.

Impact on QoL of FPHL as per Waa-QoL score did not correlate significantly with age (Spearman's Rank correlation co-efficient -0.28,  $p>0.05$ ). However, mean scores did appear to vary between age groups (Table 1), suggesting higher scores amongst younger patients. The duration of time that participants had been suffering from FPHL was found to significantly correlate with Waa-QoL (Spearman's rank correlation coefficient 0.53,  $p<0.05$ ). Patients who had FPHL longer tended to have a worse QoL.

**Table 1:** Table showing median Women’s Androgenic Alopecia Quality of Life Questionnaire and Dermatology life quality index scores dependent on age, psychiatric comorbidity and hospital anxiety and depression scale- depression score. Associated p values were generated using Kruskal-Wallis test. \*indicates a statistically significant result ( $p < 0.05$ )

Variable	Waa-QoL	DLQI
<b>Age (years)</b>		
18 – 27	86	16.5
28 – 37	75	10
38 – 47	71.5	6.5
>47	79	9
p value	0.101	0.037*
<b>Psychiatric Comorbidity</b>		
Absent	73.5	8
Present	91	18
p value	0.009*	0.017*
<b>HADS - Depression</b>		
Normal	73	9
Abnormal	88	16
p value	0.029*	0.142

Two participants (9%) had a diagnosed mental health illness; one patient had general anxiety disorder and the other had social anxiety disorder. Three patients (14%) had diagnosed medical comorbidity. This consisted of two patients with hypertension and one patient with hyperthyroidism, coeliac disease and arthritis. Waa-QoL was shown to be significantly higher amongst patients with psychiatric co-morbidity compared to those without (Mann Whitney U,  $p < 0.05$ ). Median scores were 91 and 73.5 respectively (Table 1). Contrastingly, the Waa-QoL did not significantly vary between patients with and without medical comorbidities (Mann-Whitney U,  $p > 0.05$ ). Median scores were 77 and 74 respectively.

Four (18%) abnormal cases were identified via the HADS. One patient met the abnormal cut off for both anxiety and depression. One patient had an abnormal HADS-anxiety score only and two patients had an abnormal HADS-depression score only. Two of these patients already had a mental health diagnosis. However, notably 2 (9%) did not have any prior diagnosis. This indicates 9% of patients in this study possibly having an undiagnosed mental health condition. Patients with an abnormal HADS-anxiety score did not have a significantly different Waa-QoL score compared to those with normal scores (Mann-Whitney U,  $p > 0.05$ ). However, patients with an abnormal HADS- depression score were found to have a significantly higher Waa-QoL than those without (Table 1) (Mann-Whitney U,  $p > 0.05$ ). Median scores were 88 and 73 respectively.

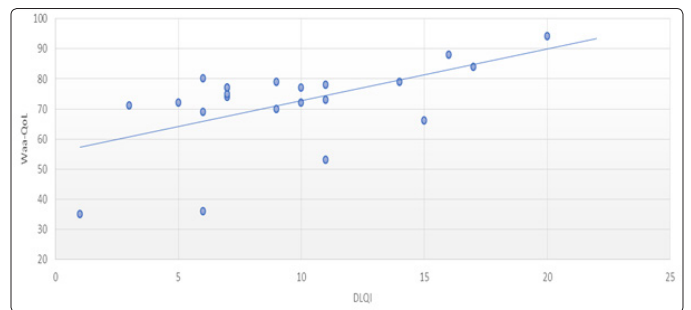
### Dermatology Life Quality Index

The median DLQI score was 9. This corresponded to a moderate effect on patients’ quality of life. Scores ranged from 1 to 20. The highest scoring question in the DLQI was, “how embarrassed, frustrated or self-conscious have you been because of your hair loss”. Over 90% of participants rated this ‘a lot’ or ‘very much.’ The lowest scoring questions referred to how FPHL affects participant’s ability to work/ study and FPHL causing any sexual difficulties. The

majority of participants responded ‘not at all’ to these questions.

Although the WaaQoL did not correlate with age, DLQI scores did. It was found to negatively correlate, with younger patients having a higher DLQI score (Spearman’s rank correlation coefficient  $-0.46$ ,  $p < 0.05$ ). Median scores also varied amongst age groups (Table 1). DLQI score did not correlate with duration of disease (Spearman’s rank correlation coefficient  $0.33$ ,  $p > 0.05$ ).

Coinciding with the Waa-QoL, there was a significantly higher DLQI between patients with a psychiatric illness (median DLQI 18) compared to those without (median DLQI 8) (Mann Whitney U,  $p < 0.05$ ). There was no significant difference in DLQI score based on medical co-morbidity, abnormal HADS-anxiety score or an abnormal HADS-depression score (Mann Whitney U,  $p > 0.05$ ). DLQI score and Waa-QoL score positively correlated with one another (Spearman’s Rank coefficient  $0.51$ ,  $P < 0.05$ ) (Fig. 1).



**Figure 1:** Scatter plot showing positive correction between dermatology life quality index (DLQI) and Women’s Androgenic Alopecia Quality of Life Questionnaire (Waa-QoL) scores. Trendline represents locally estimated scatterplot smoothing

### Discussion

The primary objective of this study was to assess the impact FPHL has on patients’ QoL. The results from the Waa-QoL questionnaire clearly show that FPHL has a large impact on QoL. The median score for each question from all participants grouped together was 5 out of 6, corresponding to being affected ‘very much’ on the questionnaire. The median total score was 74.5. Only a few other studies have used the Waa-QoL. One study carried out in Brazil and another carried out in Australia had median scores of 58 and 46.5 respectively amongst their cohorts [13,22]. Comparatively the cohort in this study reported far worse QoL in relation to their hair loss. Reasons for this could potentially be patients seen in secondary care within the UK may have more severe disease as it would have not responded to management in primary care. Although the DLQI only suggested a moderate impact on quality of life, it is a generic questionnaire targeted at general skin disorders. It consists of questions regarding burning, pain and how work has been affected. Hair loss is unlikely to affect these areas as much. More studies would need to be carried out to determine how much QoL is affected in the UK and if it is significantly more than other countries.

Questions which scored the highest amongst participants were regarding patients feeling fearful of their hair loss continuing, having difficulty styling their hair and feeling self-conscious about people looking at their hair. These questions, particularly the first two have also scored the highest in previous studies, indicating it is something commonly found in different cohorts [13,22]. As these factors are shown to severely impact women’s QoL, they can be

targeted by clinicians when managing patients. For example, there could be emphasis on explaining to patients the prognosis of FPHL and how likely it is for it to progress to help reduce fears of disease progression. This could be backed up with statistics and patients can be given information to take with them. Furthermore, information and advice on how to style hair with FPHL could be made available. This information could be sought from hair stylists and specialists. Patients who feel excessively self-conscious about their hair may benefit from some counselling, which could be made more readily available. These are just simple ideas that might ease the burden on women's QoL from FPHL. The efficacy of these management plans would need to be tested in further studies.

Secondary outcomes of the study looked at factors which may be associated with QoL. This included age, duration of disease, psychiatric co-morbidity and depressive symptoms. The average age of this cohort was 38. This is relatively young considering the biggest age group of patients are those over 65 [5-10]. It supports evidence that shows younger patients have the biggest demand for treatment [1]. A lower age was associated with a higher impact on QoL. This is concordant with previous literature which shows the same correlation [3]. This could be because hair is often associated with youth, health and attractiveness and so losing it might affect younger patients more where these play a bigger roll. Furthermore, as it is more prevalent amongst older people it may not affect them as much. Although this result was only significant using the DLQI and not the Waa-QoL, this is likely due to an outlier. The oldest patient had the highest Waa-QoL score. However, she also had psychological co-morbidity and the highest HADS-depression score which, coupled with the study's limited sample size, likely confounded the results. Overall, younger patients with FPHL could potentially be targeted for more intensive treatment involving more psychological support to improve QoL.

A longer duration of disease was associated with a lower QoL. Fewer studies looked at this variable but those that did had a mixed picture with some finding a significant association and some not [1,3,8]. As FPHL is a chronic and progressive illness, patients who have had it for longer are more likely to have advanced disease which could explain the bigger impact on QoL. Furthermore, the stress of living with FPHL would have built up for longer. Patients who have had FPHL for a prolonged period could start having their QoL addressed more alongside their medical management.

The overall prevalence of mental health conditions (9%), which were all anxiety-related, in this cohort did not appear to be different from the general population [23]. This does not fit in with previous literature which has found higher rates of personality disorders and social anxiety amongst patients with FPHL [3]. Patients with co-existing mental health conditions had a worse QoL than those without. This is something seen in previous literature [3]. With FPHL often making women feel self-conscious and fearful of disease progression, having a mental health condition, particularly anxiety-related, could aggravate these feeling and affect QoL. This could warrant targeting patients with mental health illness and FPHL more intensely.

Lastly, higher HADS-depression scores were associated with a lower quality of life. Whether a lower QoL led to patients having depressive symptoms or patients with depressive symptoms being more likely to report a worse QoL is unknown and requires further

investigation. Nine percent of participants had an abnormal anxiety and/or depression score and did not have a known mental health illness. Anxiety and depressive symptoms could be something screened for in patients with FPHL, particularly those with higher QoL scores. However, the prevalence of undiagnosed co-morbidity has not been shown to be any higher than the general population in this study [23]. Therefore, screening patients with FPHL may not be warranted.

In conclusion, this study has highlighted the impact FPHL has on QoL. It identifies several factors which affect QoL and which can be targeted by clinicians for more intensive management. It makes several suggests of ways to help manage QoL. These, along with other methods, will need to be studied and trailed to measure their efficacy before they can be implemented.

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