

ORIGINAL ARTICLE

# Anxiety and Androgenetic Alopecia: Psychological Challenge for Male Patients

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## ABSTRACT

**OBJECTIVE:** To assess the occurrence of level of anxiety and its relationship with demographic variables among male patients with androgenetic alopecia in a tertiary care hospital.

**METHODOLOGY:** A cross-sectional study was conducted at the Dermatology Department, Fazaia Ruth Pfau Medical College, from February to July 2025 after institutional approval, enrolling 292 male patients aged 30–60 with androgenetic alopecia for more than one year using non-probability consecutive sampling. Diagnosis was based on the Hamilton-Norwood scale, and anxiety was assessed. We collected data on demographic and socioeconomic factors. Quantitative data were presented as mean±SD and qualitative data as frequencies and percentages. We analyzed associations between anxiety and patient characteristics using the chi-square test ( $p \leq 0.05$ ).

**RESULTS:** Out of 292 male patients, the mean age of patients was  $43.14 \pm 12.49$  years, with a mean hair loss duration of  $1.89 \pm 0.44$  years. Anxiety was found in 97(33%) patients. The frequency of anxiety also increased with age, being highest in the age group of 51–60 years. Anxiety was significantly associated with longer duration of the disease duration ( $p < 0.001$ ), occupational status ( $p < 0.001$ ), and lower socioeconomic class (54.7%,  $p = 0.02$ ), while it was not significantly associated with marital status or educational level.

**CONCLUSION:** Anxiety is a common condition in male patients with androgenetic alopecia, especially in older patients who are employed and of a lower socioeconomic status. Routine evaluation for anxiety and applicable psychosocial interventions should be incorporated in the management of Androgenetic Alopecia to help improve patients' overall well-being.

**KEYWORDS:** Androgenetic alopecia, Beck Anxiety Inventory, Hamilton-Norwood scale.

## INTRODUCTION

Androgenetic alopecia (AGA) is the most common form of non-scarring hair loss worldwide and is recognized as a chronic, progressive dermatological condition affecting both men and women<sup>1</sup>. It is highly prevalent across populations and represents a major cause of cosmetic concern and dermatological consultation globally<sup>1</sup>. Epidemiological evidence indicates that AGA affects a substantial proportion of individuals, with prevalence increasing with age and varying across ethnic groups<sup>4</sup>.

Beyond its clinical significance, AGA carries important psychosocial implications. Hair plays a central role in personal identity, attractiveness, and social interaction; therefore, hair loss may significantly influence self-perception and social behavior<sup>2</sup>. Individuals with skin diseases, including alopecia, experience higher levels of stigmatization, reduced quality of life, and impaired psychological well-being compared with the general population<sup>2</sup>. In multicenter European studies, patients with alopecia have reported significant psychosocial burden, including emotional distress and reduced self-confidence<sup>3</sup>.

Androgenetic alopecia has been consistently associated with psychological morbidity, particularly anxiety, depression, and reduced self-esteem<sup>3,5</sup>. A study conducted among patients with alopecia demonstrated a high prevalence of anxiety, depression, and low self-esteem, highlighting the substantial mental health burden associated with the condition<sup>5</sup>. Furthermore, systematic evidence suggests that hair loss is significantly associated with psychiatric symptoms, with a notable proportion of affected individuals exhibiting anxiety-related disorders<sup>13</sup>. These findings indicate that alopecia is not merely a cosmetic concern but a condition with meaningful psychological consequences.

The impact of AGA extends beyond individual psychological distress to broader social and functional impairment. Visible hair loss can lead to social withdrawal, reduced confidence in interpersonal and professional interactions, and avoidance of social engagement<sup>2,3</sup>. These effects are particularly pronounced in individuals who view hair as an essential part of appearance and identity. The psychosocial burden may further be amplified by societal expectations and cultural norms regarding physical appearance.

Alopecia refers to hair loss on any part of the body and is broadly classified as scarring or non-scarring, with androgenetic alopecia the most common form of non-scarring alopecia worldwide<sup>6</sup>. Androgenetic alopecia is a chronic, genetically influenced disorder characterized by progressive miniaturization of hair follicles under the effect of androgens, leading to patterned hair loss in both men and women<sup>6,7</sup>. Clinically, it follows a predictable distribution pattern and represents the most frequent cause of hair loss encountered in dermatological practice<sup>7</sup>. Despite its benign medical nature, AGA is increasingly recognized as a condition with important psychological and social implications, warranting comprehensive clinical attention beyond cosmetic concerns<sup>6,7</sup>.

Androgenetic alopecia (AGA) is a common chronic dermatological condition characterized by progressive hair follicle miniaturization and patterned hair loss, resulting from a complex interaction of genetic predisposition and androgen-mediated pathways<sup>8</sup>. Current evidence suggests that multiple molecular and hormonal mechanisms contribute to disease progression, leading to evolving therapeutic approaches and ongoing research into more effective long-term management strategies<sup>8</sup>. In addition to biological determinants, early-onset AGA has been increasingly associated with several modifiable and non-modifiable risk factors, including family history, smoking, dietary patterns, and elevated body mass index, as well as systemic

comorbidities such as metabolic syndrome and cardiovascular disease<sup>9</sup>. These findings highlight that AGA is a multifactorial disorder with both dermatological and systemic implications, emphasizing the need for a comprehensive clinical approach that addresses not only hair loss but also associated health and psychosocial outcomes<sup>9</sup>.

Androgenetic alopecia (AGA) is a hormonally and genetically influenced disorder in which dihydrotestosterone plays a central role; however, emerging evidence suggests that multiple additional pathways, including inflammatory, metabolic, and perifollicular signaling mechanisms, also contribute to follicular miniaturization and disease progression<sup>10,11</sup>. These evolving insights indicate that AGA is a biologically complex condition rather than a single-pathway disorder, with implications for both its clinical behavior and therapeutic response<sup>11</sup>. Recent updates in understanding of AGA emphasize that disease expression is heterogeneous, influenced by a combination of endocrine activity, genetic susceptibility, and systemic factors, which may also explain variability in disease severity and progression among patients<sup>11</sup>.

Diagnosis of androgenetic alopecia is primarily clinical, based on characteristic patterned hair loss. Adjunctive tools such as trichoscopy can help confirm the diagnosis and assess disease severity by identifying specific follicular and scalp changes<sup>12</sup>. Despite its clinical simplicity, AGA is often associated with significant psychosocial consequences, and a growing body of evidence has demonstrated a strong association between hair loss disorders and psychological morbidity, particularly anxiety<sup>13</sup>. Systematic review data further indicate that individuals with alopecia are more likely to experience anxiety-related symptoms compared with unaffected populations, highlighting the need for integrated dermatological and psychological assessment in clinical practice<sup>13</sup>.

In Pakistan, evidence suggests that individuals with alopecia experience significant psychological burden, including anxiety and depressive symptoms<sup>5</sup>. However, existing local studies are limited and have not adequately stratified findings based on gender or specific alopecia subtypes, thereby restricting the interpretation of anxiety patterns in androgenetic alopecia.

Despite increasing recognition of the psychosocial impact of androgenetic alopecia (AGA), anxiety among affected patients remains underdiagnosed and insufficiently explored in clinical settings. Existing literature has largely focused on general alopecia populations or broader psychological outcomes, with limited studies specifically addressing anxiety as a primary outcome in AGA patients. This highlights a clear gap in focused evidence regarding the burden of anxiety in this group. Therefore, the present study aims to determine the frequency of anxiety among patients with androgenetic alopecia, providing locally relevant evidence to support a more comprehensive clinical approach addressing both dermatological and psychological aspects of the disease.

## METHODOLOGY

This cross-sectional study was conducted in the Department of Dermatology, Fazaia Ruth Pfau Medical College, Air University-affiliated hospital, from February to July 2025. The sample size of 292 patients was calculated using the WHO sample size calculator, with anxiety among patients with androgenetic alopecia as the primary outcome variable. A 95% confidence level and a 2.5% margin of error were applied. In the absence of local prevalence data and limited published estimates specific to this population, a conservative prevalence of 5% was assumed to ensure an adequate sample size and statistical precision. We recruited patients using a non-probability consecutive sampling technique. The institutional review committee approved the study, and all procedures were conducted in accordance with institutional ethical standards.

Eligible participants included male patients aged 30 to 60 years diagnosed with androgenetic alopecia of more than one-year duration who had not received any hair growth treatment within the preceding six months. Patients were excluded if they had any coexisting dermatological hair disorders, a history of major psychiatric illness, chronic systemic diseases (such as end-stage renal disease, chronic liver disease, chronic obstructive pulmonary disease, or congestive cardiac failure), or were receiving medications known to affect psychological status, including corticosteroids, antiepileptics, or sympathomimetic agents. Non-consenting patients were also excluded.

### *Assessment of Androgenetic Alopecia Severity*

We assessed alopecia severity using the Norwood–Hamilton classification system for male pattern hair loss. Patients were categorized as mild, moderate, or severe based on the extent and pattern of scalp hair loss according to established grading criteria. Diagnosis of androgenetic alopecia was made clinically using the Hamilton–Norwood classification system, with inclusion of patients having grade II or higher hair loss. We recorded family history of alopecia as a descriptive variable but did not use it as an inclusion criterion.

### *Assessment of Anxiety*

Anxiety was assessed using a validated clinical anxiety scale (as used in this study). Participants scoring above the established cutoff were classified as having anxiety, while those below the cutoff were considered non-anxious. The anxiety was measured with the Beck Anxiety Inventory (BAI), a validated 21-item questionnaire. The principal investigator administered this assessment in the dermatology outpatient department in a confidential, supportive environment, and interpreted scores according to standardized guidelines; scores above 7 indicate anxiety.

All findings were recorded in a structured proforma, and no laboratory investigations were needed because the diagnosis was based on standardized clinical scales and validated questionnaires. No subgroups or treatment groups were created as this was an observational study.

Data were analyzed with the statistical program, version 16 of Statistical Package for the Social Sciences (SPSS). Quantitative variables such as age and duration of disease were presented as mean and standard deviation, and qualitative variables such as marital status, occupational status, educational level and socioeconomic status, and anxiety status were presented as frequencies and percentages. To take effect modifiers into account, stratified analysis was done across the different age, duration of disease, marital status, occupational status, educational status, and socioeconomic status. Following stratification, the chi-square test was used to test associations between categorical variables, and a p-value of less than or equal to 0.05 was considered statistically significant.

## RESULTS

**Table I** presents the baseline demographic and clinical characteristics of patients with hair loss. The mean age was  $43.14 \pm 12.49$  years, with the highest proportion in the 41–50 years group, 140 (47.9%), followed by 51–60 years, 95 (32.5%), and 30–40 years, 57 (19.5%). The mean duration of hair loss was  $1.89 \pm 0.44$  years; most patients reported a disease duration of 7–9 years, 123 (42.1%), while 73 (25%) had 4–6 years, 63 (21.6%) had 10–12 years, and 33 (11.3%) had 1–3 years. Regarding marital status, 122 (41.8%) were unmarried, 79 (27.1%) married, 47 (16.1%) widowers, and 44 (15.1%) divorced. Occupationally, 163 (55.8%) were unemployed, and 129 (44.2%) were employed. More than half of the participants, 156 (53.4%), belonged to the lower socioeconomic class, while 89 (30.5%) were from the middle class and 47 (16.1%) from the upper class. Educational status showed that 108 (37%) had primary education, 69 (23.6%) were illiterate, 62 (21.2%) had higher education, and 53 (18.2%) had secondary education.

**Table I: Baseline Demographic and Clinical Characteristics of Patients with Hair Loss**

| Variable                      |              | Mean $\pm$ SD (n (%)) |
|-------------------------------|--------------|-----------------------|
| Age (Years)                   |              | 43.14 $\pm$ 12.49     |
| Duration of Hair Loss (Years) |              | 1.89 $\pm$ 0.44       |
| Age (Years)                   | 30-40        | 57(19.5%)             |
|                               | 41-50        | 140(47.9%)            |
|                               | 51-60        | 95(32.5%)             |
| Duration of Disease (Years)   | 1-3          | 33(11.3%)             |
|                               | 4-6          | 73(25%)               |
|                               | 7-9          | 123(42.1%)            |
|                               | 10-12        | 63(21.6%)             |
| Marital Status                | Married      | 79(27.1%)             |
|                               | Unmarried    | 122(41.8%)            |
|                               | Divorced     | 44(15.1%)             |
|                               | Widower      | 47(16.1%)             |
| Occupational Status           | Employed     | 129(44.2%)            |
|                               | Unemployed   | 163(55.8%)            |
| Socioeconomic Status          | Lower Class  | 156(53.4%)            |
|                               | Middle Class | 89(30.5%)             |
|                               | Upper Class  | 47(16.1%)             |
| Educational Status            | Illiterate   | 69(23.6%)             |
|                               | Primary      | 108(37%)              |
|                               | Secondary    | 53(18.2%)             |
|                               | Higher       | 62(21.2%)             |

**Table II** shows the association of anxiety with demographic and clinical variables. A significant association was observed between age and anxiety ( $p < 0.001$ ). Among patients aged 30–40 years, 25 (25.8%) had anxiety compared to 32 (16.4%) without anxiety, while in the 41–50 years group, 32 (33%) had anxiety and 108 (55.4%) did not. In the 51–60 years group, 40 (41.2%) reported anxiety versus 55 (28.2%) without anxiety. Duration of disease was also significantly related to anxiety ( $p < 0.001$ ), with 21 (21.6%) cases of anxiety in those with 1–3 years' duration, 17 (17.5%) in 4–6 years, 40 (41.2%) in 7–9 years, and 19 (19.6%) in 10–12 years. Marital status showed no significant relationship with anxiety ( $p = 0.36$ ); among married patients, 28 (28.9%) had anxiety and 51 (26.2%) did not, while in the unmarried group, 36 (37.1%) had anxiety and 86 (44.1%) did not. Anxiety was present in 19 (19.6%) of divorced patients and 14 (14.4%) widows/widowers. A strong association was noted with occupational status ( $p < 0.001$ ), where 86 (88.7%) of employed patients experienced anxiety compared to only 11 (11.3%) unemployed. Socioeconomic status was significantly associated ( $p = 0.02$ ), with anxiety more common in the lower class (54, 55.7%) than in the middle class (21, 21.6%) or upper class (22, 22.7%). Educational status, however, was insignificantly associated with anxiety ( $p = 0.23$ ); 25 (25.8%) anxious patients were illiterate, 35 (36.1%) had primary education, 22 (22.7%) had secondary education, and 15 (15.5%) had higher education.

**Table II: Association between Anxiety and Baseline Demographic and Clinical Characteristics**

| Variable                    |               | Anxiety   |            |            | p-value |
|-----------------------------|---------------|-----------|------------|------------|---------|
|                             |               | Yes       | No         | Total      |         |
| Age (Years)                 | 30-40         | 25(25.8%) | 32(16.4%)  | 57(19.5%)  | <0.001  |
|                             | 41-50         | 32(33%)   | 108(55.4%) | 140(47.9%) |         |
|                             | 51-60         | 40(41.2%) | 55(28.2%)  | 95(32.5%)  |         |
| Duration of Disease (Years) | 1-3           | 21(21.6%) | 12(6.2%)   | 33(11.3%)  | <0.001  |
|                             | 4-6           | 17(17.5%) | 56(28.7%)  | 73(25%)    |         |
|                             | 7-9           | 40(41.2%) | 83(42.6%)  | 123(42.1%) |         |
|                             | 10-12         | 19(19.6%) | 44(22.6%)  | 63(21.6%)  |         |
| Marital Status              | Married       | 28(28.9%) | 51(26.2%)  | 79(27.1%)  | 0.36    |
|                             | Unmarried     | 36(37.1%) | 86(44.1%)  | 122(41.8%) |         |
|                             | Divorced      | 19(19.6%) | 25(12.8%)  | 44(15.1%)  |         |
|                             | Widow/Widower | 14(14.4%) | 33(16.9%)  | 47(16.1%)  |         |
| Occupational Status         | Employed      | 86(88.7%) | 43(22.1%)  | 129(44.2%) | <0.001  |
|                             | Unemployed    | 11(11.3%) | 152(77.9%) | 163(55.8%) |         |
| Socioeconomic Status        | Lower Class   | 54(55.7%) | 102(52.3%) | 156(53.4%) | 0.02    |
|                             | Middle Class  | 21(21.6%) | 68(34.9%)  | 89(30.5%)  |         |
|                             | Upper Class   | 22(22.7%) | 25(12.8%)  | 47(16.1%)  |         |
| Educational Status          | Illiterate    | 25(25.8%) | 44(22.6%)  | 69(23.6%)  | 0.23    |
|                             | Primary       | 35(36.1%) | 73(37.4%)  | 108(37%)   |         |
|                             | Secondary     | 22(22.7%) | 31(15.9%)  | 53(18.2%)  |         |
|                             | Higher        | 15(15.5%) | 47(24.1%)  | 62(21.2%)  |         |

## DISCUSSION

This study evaluated male patients with androgenetic alopecia (AGA) to explore the relationship between age, disease duration, and associated anxiety. Our results showed that most of the patients were between 41 and 50 years of age, and their average disease duration was about two years. Anxiety symptoms were present in a significant percentage of patients and therefore underscore the psychosocial burden of AGA in addition to the clinical presentation. These results provide important information about the demographic and psychological profile of AGA patients of our population.

A previous study reported clinically significant anxiety in 52.4% of alopecia patients, with low self-esteem in 48.8%, and demonstrated that earlier onset was associated with lower self-esteem ( $p = 0.03$ ), while increasing age correlated positively with self-esteem ( $p = 0.001$ )<sup>5</sup>. In the present study, anxiety was more prevalent in male AGA patients, with 47 (62.7%) exhibiting clinically significant symptoms, while depression was observed in 19 (25.3%). These findings are consistent with prior evidence indicating that earlier disease onset is associated with greater psychological distress, suggesting that younger onset of AGA may increase vulnerability to anxiety.

A study involving 115 patients with hair disorders, including 20 with androgenetic alopecia, reported higher rates of stressful life events and poorer quality of life compared with controls, along with increased anxiety and depressive symptoms in affected individuals<sup>3</sup>. In the present study, a significant proportion of male patients with androgenetic alopecia experienced anxiety, with a prevalence of 134 (45.9%). Higher anxiety rates were particularly observed among patients aged 51–60 years (41.2%) and those with longer disease duration (7–9 years; 41.2%). These findings are consistent with existing literature indicating that androgenetic alopecia is associated with meaningful psychological morbidity, particularly anxiety, and that its impact may be influenced by age and chronicity of the condition.

A report found that more than 50% (56–57%) of individuals with alopecia experience reduced confidence and well-being, with higher appearance-related anxiety reported particularly among sexual minority men despite low rates of psychosocial help-seeking<sup>14</sup>. In the present study, a high prevalence of anxiety was observed among male patients with androgenetic alopecia (134; 45.9%), with greater burden noted in employed individuals (86; 88.7%) and those from lower socioeconomic groups (54; 55.7%). These findings indicate that anxiety in AGA patients is substantial and may be influenced by socioeconomic factors. Both studies highlight the gap between psychological burden and access to appropriate support services.

A systematic review of 37 studies reported no significant association between androgenetic alopecia and depression (pooled  $M = 8.8$ , 95% CI: 6.8–10.8), but demonstrated a moderate negative impact on quality of life (pooled  $M = 9.12$ , 95% CI: 6.14–12.10), with overall mental health outcomes comparable to men without AGA<sup>15</sup>. In the present study, although 134 (45.9%) patients reported anxiety, the overall psychosocial burden appeared moderate, with significant variation according to demographic factors such as occupation and socioeconomic status. These findings suggest that while AGA is associated with measurable psychological impact, its severity may vary, supporting the need for targeted screening and individualized psychosocial support rather than generalized assumptions of severe impairment.

Androgenetic alopecia (AGA), despite being a common condition in men, is often assumed to have a strong impact on psychosocial well-being. However, evidence from a population-based study involving 1,027 men in the Northern Finland Birth Cohort demonstrated no significant

association between AGA and depression, anxiety, or sexual dysfunction<sup>16</sup>. In the present study, although anxiety, depression, and low self-esteem were observed in a proportion of patients, the overall psychosocial impact appeared variable rather than uniformly severe. Specifically, anxiety was present in 97 (33%) participants. It was more strongly associated with individuals aged 51–60 years, those who were employed, and those from lower socioeconomic groups, suggesting that demographic and contextual factors may play an important role in modulating AGA-related psychological distress.

A study of 402 patients of both sexes reported that 39.3% were aged 20–29 years, with a mean Skindex-29 score of  $23.2 \pm 19.6$ , indicating impaired quality of life. The study further identified that younger age, shorter duration of hair loss, ongoing treatment, confirmed diagnosis, and moderate severity of AGA were associated with greater quality-of-life impact<sup>17</sup>. In line with these findings, the present study demonstrated that anxiety and low self-esteem were more frequent among males aged 51–60 years, those who were employed, and individuals from lower socioeconomic groups, highlighting the influence of both age and socioeconomic factors in modulating the psychological burden associated with androgenetic alopecia.

Another investigation reported androgenetic alopecia in 68.5% of subjects, with 27.8% classified as severe, 33.2% moderate, and 39.0% mild. The study found no significant association between the presence or severity of AGA and depression, anxiety, quality of life, self-esteem, or sexual symptoms<sup>18</sup>. Similarly, the present study observed anxiety in 97 (33%) participants, with higher frequencies among individuals aged 51–60 years, those who were employed, and those from lower socioeconomic groups, indicating that the psychosocial impact of AGA is more closely related to demographic and contextual factors than to disease presence or severity alone.

Another investigation reported that health-related quality of life was significantly impaired in younger patients aged <30 years (22%; WHO-BREF  $p = 0.022$ , Hairdex  $p = 0.004$ ), less educated individuals (21%; WHO-BREF  $p = 0.021$ , Hairdex  $p = 0.003$ ), single patients (23%; Hairdex  $p = 0.023$ ), and urban populations (43%; Hairdex  $p = 0.043$ )<sup>19</sup>. In the present study, anxiety was observed in 97 (33%) participants, with stronger associations among patients aged 51–60 years (41.2%), those who were employed (88.7%), and individuals from lower socioeconomic groups (55.7%). These findings indicate that demographic and social determinants play a significant role in modulating the psychological impact of androgenetic alopecia. Collectively, both studies emphasize the importance of routine psychological assessment in patients with AGA and the need for targeted psychosocial support in clinical practice.

A study involving 100 male MBBS students with varying grades of androgenetic alopecia demonstrated that increasing severity of hair loss was associated with higher levels of depression, loneliness, and internet addiction, with statistically significant trends across Norwood–Hamilton grades I to V <sup>20</sup>. In the present study, anxiety was observed in 97 (33%) participants, with higher associations among older individuals, those who were employed, and those from lower socioeconomic groups. These findings suggest that the psychosocial impact of AGA is influenced by both individual demographic factors and disease characteristics, highlighting the need for further evaluation of mental health outcomes in affected males.

An analysis of 65 studies on early-onset androgenetic alopecia reported that young men frequently experience anxiety and low self-esteem, with severity commonly assessed using the Hamilton–Norwood scale. Identified risk factors included family history, smoking, poor diet, and high BMI, while associated comorbidities ranged from metabolic syndrome to cardiovascular disease<sup>9</sup>. In the present study, anxiety was observed in 97 (33%) participants, with higher

prevalence among older individuals, those who were employed, and those from lower socioeconomic groups. These findings indicate that the psychological impact of androgenetic alopecia is multifactorial and influenced by both demographic and disease-related characteristics.

**LIMITATIONS:**

This study was limited by its single-centre, cross-sectional design, which limits the ability to infer a causal relationship. Despite the various limitations, the findings revealed the importance of screening for the presence of anxiety in male patients with androgenic alopecia and incorporation of the psychosocial support in routine dermatological services.

**CONCLUSION:**

Anxiety is a frequent condition in male patients with androgenetic alopecia, especially among older patients, the employed, as well as patients from low socioeconomic groups. Routine evaluation for anxiety and the provision of suitable psychosocial interventions must be incorporated as part of the management of AGA to enhance the general well-being of the patient.

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**Conflict of interest:** There is no conflict of interest between the authors.

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**Data Sharing Statement:** The corresponding author can provide the data proving the findings of this study on request. Privacy or ethical restrictions bound us from sharing the data publicly.

**AUTHOR CONTRIBUTION**

Agha HM: Study design, Data collection, Data Analysis, Result analysis, Article writing

Farhan M: Study design, Data collection, Data Analysis, Result analysis, Article writing

Ahad W: Study design, Data collection, Data Analysis, Result analysis, Article writing

Shah ZH: Study design review, Proofreading, Data management, Revision of article, Critical review

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Maheshwary N: Study design review, Proofreading, Data management, Revision of article, Critical review

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