Epidemiology of alopecia among Assiut University students

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Background
Hair loss is a common problem that affects both males and females of all ages. It is one of the most common complaints among all patients consulting a dermatologist and is usually associated with severe psychological disturbances, distress, and symptoms of depression.
Aim
The aim was to measure the percentage of alopecia among Assiut University students, to portray the sociodemographic characteristics of study participants and associated factors of hair loss, to measure quality of life among those who experienced hair loss, and to increase community awareness regarding the most important predictors of hair loss.
Patients and methods
This was a cross-sectional study that included 1014 students at four faculties of Assiut University during the academic year 2016/2017. The percentage of alopecia among students who attended clinics in their faculties was 63.9%. Alopecia among males was 20.2% and among females was 79.8%.

Keywords:
alopecia, epidemiology, students

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Introduction

Hair loss is one of the most common complaints among all patients consulting a dermatologist [1]. Common causes of diffuse hair loss include heredity, androgenetic alopecia (AGA), telogen effluvium (TE), anagen effluvium, and systemic diseases, such as systemic lupus erythematosus, syphilis, and others [2]. A study conducted in 2011 at Ain Shams University Hospital, Cairo, found that the prevalence of hair disorders was 6.7% and diffuse hair loss was 3.1% [3]. Another study conducted in rural areas in Assiut Governorate in 2003 found that the prevalence of diffuse hair loss among study sample was 8.4% [4]. A community-based cross-sectional study that was done in India (2018) found that hair fall as a problem was reported by 60.3% of study participants [5]. In Nigeria (2016), the study concluded that there was a higher prevalence of alopecia (80.6%) in the age group 20–29 years [6]. There are limited community-based studies of alopecia among Assiut University students. So, the current study was conducted in Assiut University during the academic year 2016–2017, with the aim to study the problem of alopecia among Assiut University students.

Aim

General objective

The aim was to increase community awareness regarding the risk factors of hair loss through disseminating of the findings of the study that may reduce the toll of hair loss problem.

Specific objectives

Specific objectives were to measure the percentage of alopecia among Assiut University students, to portray the sociodemographic characteristics of study participants and associated factors of hair loss, and to measure the quality of life among those who experienced hair loss.

Patients and methods

Study site

The current study was conducted at four faculties of Assiut University (Faculty of Art, Faculty of Low, Faculty of Education, and Faculty of Computer Science) during the academic year 2016/2017.

Study population

All recorded students of the first and last grades in four faculties were eligible to be recruited in the study.

Study design

This was a cross-sectional study.

Sampling technique

The university faculties were classified into two groups (theoretical faculties and practical faculties). The researcher and the supervisors randomly chose two faculties from each group to be included in the study. Faculty of Laws and Faculty of Arts represented the theoretical faculties, whereas Faculty of Education and Faculty of Computer Science represented the practical faculties. Then, a nonprobability, nonproportionate quota sample was drawn from the target students in 2016/2017 (total number of the students was 59 420 in Assiut University) (as shown in the following table).

Table i: Distribution of the study sample frame at Assiut University 2016/2017

Study settings	Number of students		
	First grade	Last grade	Total#
(1) Practical faculties			
1. Faculty of Computer and Information	276	304	1171
2. Faculty of Education	2416	1064	7094
(2) Theoretical faculties			
1. Faculty of Law	2348	3112	10 356
2. Faculty of Art	2705	1953	9285

#Total number of students in all grades.

The sample size was calculated to be 1000 participants.

When the total population from which the sample intended to be drawn is greater than 10 000, statistics suggest the following formula:

$$n = \frac{Z^2 pq}{d^2} = \frac{4 \times 50 \times 50 \times 100 \times 100}{5 \times 5 \times 100 \times 100} = 400.$$

To guard against the expected drop-outs, the present study recruited 1000 students.

A total of 600 participants were recruited, according to the number of students in each category.

f × 1

(1) Data collection: the researcher announced to the students about the free clinical examination of the hair, which was done at the clinic of each faculty. It was done by telling them directly at their lectures and by putting advertisement on the door of the clinic and near to their stadium.

A semistructured questionnaire was to be filled in by personal interview through using three study tools:

(1) The first tool (questionnaire) aimed to collect the relevant data about the following aspects: personal data, sociodemographic data, health status data, family history, use of hair cosmetics, thyroid disorders, nutritional disorders, smoking status, comorbidities, and diet.
(2) The second tool (clinical examination) was used for collecting data about local scalp examination of the study participants.
(3) The third tool (questionnaire) [Dermatology Life Quality Index (DLQI)] was used to assess the participants' quality of life. It is a simple practical questionnaire technique for routine clinical use [7].

It was used to measure the health-related quality of life of adult patients suffering from a skin disease. Quality-of-life assessment was done using the Arabic Version of DLQI, which consisted of 10 questions concerning patients' perception of the effect of skin diseases on different aspects of their health-related quality of life over the last week. It has been validated for adult dermatology patients aged 16 years and older. The items of the DLQI encompass aspects such as symptoms and feelings, daily activities, leisure, work or school, personal relationships, and the adverse effects of treatment.

Scoring of DLQI scores [8]:
0–1 = no effect at all on patient's life.
2–5 = small effect on patient's life.
6–10 = moderate effect on patient's life.
11–20 = very large effect on patient's life.
21–30 = extremely large effect on patient's life.

Ethical considerations

(1) A copy of the proposal was submitted to Ethics Review Committee of Faculty of Medicine Assiut University to gain its approval before conducting the study. The approval number was 17101410.
(2) The aim of the study was explained to the students, and a verbal consent was taken from students who agreed to participate in the study.
(3) The collected data were kept confidential and were used for scientific research only.

Data analysis

Data entry and data analysis were done using Excel 2016 program and SPSS, version 22 (Statistical Package for Social Science, SPSS Inc., Chicago, IL, USA). Data were presented as number, percentage, mean, and SD. χ^2 test and Fisher exact test were used to compare qualitative variables. Multiple logistic regression analysis (binary logistic and enter method) was done to measure the risk factors. Significant variables in bivariate analysis and all variables are presented. P value was considered statistically significant when P value less than 0.05 . The used variables are present in Tables 3 and 4.

Results

The percentage of alopecia among students who attended clinics in their faculties was 63.9%, where the percentage of alopecia among male was 20.2% and among female was 79.8%. Table 1 shows that among students with hair loss, 28.5% were in the age group 20 to less than 22 years versus 21.3% among students with no hair loss, with a statistically significant difference (P = 0.020). Table 2 shows that in hair loss, there were statistical significant differences between males with hair loss and males without hair loss regarding the number of washing hair, used chemicals in straightening hair, using brush, and blow drying in styling hair. Table 3 shows that significant predictors of hair loss were exposure to stressful conditions [odds ratio (OR)=16.140, P < 0.001], followed by those who had history of anemia (OR = 7.563, P < 0.001), then following regimen diet (OR = 7.397, P < 0.001), then using chemicals in straightening hair (OR = 6.622, P < 0.001). Table 4 shows that significant predictors of TE were exposure to stressful conditions (OR = 18.921, P < 0.001). Table 5 shows DLQI. Regarding DLQI questionnaire, 18.9% of the students with alopecia had moderate to very large effect on their life, whereas 72.3% of them had a small effect on their life. Figure 1 shows that among female students, 92.1% had TE versus 75.6% among male students, with a highly statistically significant difference (P < 0.001).

Discussion

Hair loss is one of the most common complaints among all patients consulting a dermatologist [1]. Common causes of diffuse hair loss include heredity, AGA, TE, anagen effluvium, and systemic diseases, such as systemic lupus erythematosus, syphilis, and others [2].

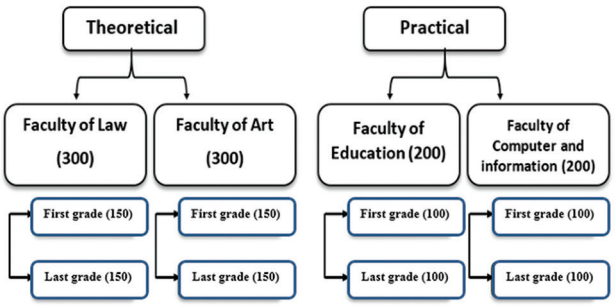
Prevalence of alopecia

This was a cross-sectional study design that included 1014 university students. It was conducted at four colleges in Assiut University during a period extended from October 2016 to May 2017. The study recruited 305 from Faculty of Law, 305 students from Faculty of Arts, 203 students from Faculty of Education, and 201 students from Faculty of Computer and Information Science.

Hair loss in general

Regarding hair loss, the current study found that 63.9% of the students had hair loss by local scalp examination.

Figure 1



Types of alopecia among diagnosed cases according to sex.

Table 1 Relationship between personal data of study participants and hair status

Personal data	No hair loss [*n* (%)] *n*=366 (36.1%)	Hair loss [*n* (%)] *n*=648) (63.9%)	Total (1014)	*P*
Age (years)				
<20	181 (49.5)	271 (41.8)	452	
20 to<22	78 (21.3)	185 (28.5)	263	0.020*
≥22	107 (29.2)	192 (29.6)	299	
Mean±SD	20.09±2.16	20.27±2.06		
Range (17-24)				0.192
Sex				
Male	174 (47.5)	131 (20.2)	305	<0.001*
Female	192 (52.5)	517 (79.8)	709	
Residence				
Urban	237 (64.8)	387 (59.7)	624	0.114
Rural	129 (35.2)	261 (40.3)	390	
Faculty				
Faculty of Laws	111 (30.3)	194 (29.9)	305	
Faculty of Arts	94 (25.7)	211 (32.6)	305	
Faculty of Education	86 (23.5)	117 (18.1)	203	0.063
Faculty of Computer and Information Science	75 (20.5)	126 (19.4)	201	
Grade				
First grade	196 (53.6)	309 (47.7)	505	0.073
Fourth grade	170 (46.4)	339 (52.3)	509	

χ^2 test. *: P-value < 0.05

Table 2 Risk factors affecting hair loss according to sex among study participants

Variables	Males [*n* (%)]		Total (305)	*P*	Females [*n* (%)]		Total (709)	*P*
	Hair loss	No hair loss			Hair loss	No hair loss		
Number of washing hair								
More than once in the day	23 (17.6)	31 (17.8)	54		32 (6.2)	4 (2.1)	36	
Once every day	55 (42.0)	42 (24.1)	97	0.002*	45 (8.7)	7 (3.6)	52	<0.001*
Once day after day	34 (26.0)	46 (26.4)	80		62 (12.0)	14 (7.3)	76	
Twice per week	11 (8.4)	28 (16.1)	39		238 (46.0)	88 (45.8)	326	
Once every week	8 (6.1)	27 (15.5)	35		140 (27.1)	79 (41.1)	219	
Used materials in washing hair								
Water only	1 (0.8)	3 (1.7)	4		3 (0.6)	0	3	
Soap and water	43 (32.8)	56 (32.2)	99		124 (24.0)	44 (22.9)	168	
Shampoo, conditioner and hair mask cream	7 (5.3)	14 (8.0)	21	0.695	33 (6.4)	16 (8.3)	49	0.582
Soap and shampoo, conditioner and hair mask cream	80 (61.1)	101 (58.0)	181		357 (69.1)	132 (68.8	489	
Using chemicals in straightening hair								
Yes	33 (25.2)	7 (4.0)	40	<0.001*	93 (18.0)	14 (7.3)	107	<0.001*
No	98 (74.8)	167 (96.0)	265		424 (82.0)	178 (92.7)	602	
Straighteners								
Straightener cream	32 (97.0)	7 (100.0)	39		43 (46.2)	10 (71.4)	53	
Keratin	1 (3.0)	0	1	--@	19 (20.4)	2 (14.3)	21	0.199
Protein	0	0	0		31 (33.3)	2 (14.3)	33	
No. of using these materials								
1/2-3 weeks	1 (3.0)	1 (14.3)	2		4 (4.3)	0	4	
1 month	1 (3.0)	0	1	-@	3 (3.2)	3 (21.4)	6	–@
Few times in the year	31 (93.9)	6 (85.7)	37		86 (92.5)	11 (78.6)	97	
Tools used in styling hair≠								
Iron	1 (0.8)	1 (0.6)	2	1.000^	31 (6.0)	7 (3.6)	38	0.217
Plastic comb	31 (23.7)	49 (28.2)	80	0.377	298 (57.6)	104 (54.2)	402	0.407
Blow drying	15 (11.5)	1 (0.6)	16	<0.001*^	48 (9.3)	4 (2.1)	52	0.001*
Brush	107 (81.7)	125 (71.8)	232	0.046*	166 (32.1)	68 (35.4)	234	0.405
Woody comb	1 (0.8)	5 (2.9)	6	0.242^	77 (14.9)	22 (11.5)	99	0.241

≠More than one answer. χ^2 test. ^Fisher Exact test. @Not applicable test. *: *P*-value < 0.05

Table 3 Multiple logistic regression analysis for risk factors of hair loss among study participants

Variables	*P*	OR	95% CI	
			Lower	Upper
Exposure to stressful conditions	<0.001*	16.140	9.650	26.994
History of anemia	<0.001*	7.563	4.117	13.892
Following regimen diet	<0.001*	7.397	2.837	19.287
Using chemicals in styling hair	<0.001*	6.622	3.240	13.535
Tools used in styling hair				
Iron	0.676	0.762	0.213	2.724
Plastic comb	0.138	1.919	0.811	4.539
Blow drying	0.087	3.519	0.831	14.891
Brush	0.051	2.406	0.997	5.805
Woody comb	0.060	2.669	0.961	7.415
Taking treatment to regulate menses	0.164	2.817	0.656	12.108
Family history of hair loss				
Father	0.069	1.783	0.956	3.324
Mother	0.239	2.284	0.578	9.023
Brother	0.297	0.465	0.110	1.962
Sister	0.348	3.330	0.269	41.144
Age	0.903	1.007	0.902	1.123
Sex	0.384	0.325	0.026	4.078
Chronic diseases	0.188	4.592	0.474	44.462
Bun	0.640	1.113	0.711	1.743
Auto-immune disease	0.438	0.384	0.034	4.314

CI, confidence interval; OR, odds ratio. *: *P*-value < 0.05

This nearly agreed with a community-based study in India that was carried out by Priyadharshini and Christina [5], which found that hair fall among study participants represented 60.3%. Another study conducted by Hadiza *et al.* [6], in Nigeria, concluded that 80.6% of the study participants whose age ranged from 20 to 29 years were suffering from alopecia.

Alfredo *et al.* [9] concluded that the prevalence of hair loss among female was 59 versus 41.0% among male. A study conducted by Khattar *et al.*[24] and Kamal *et al.* [4] concluded that hair problems were more common among females than among males. This corresponds with the period of life stresses.

Telogen effluvium

TE is one of the most common causes of diffuse nonscarring and noninflammatory hair loss [10]. The current study revealed TE represented 92.1% of hair loss among females. A Saudi study conducted by Fatani *et al.* [11] found that 36.6% of females whose age ranged from 21 to 30 years were diagnosed as having TE. A study conducted in Iraq by Naif [12] reported that 53% of women diagnosed with TE were between 20 and 29 years

of age. The diversity in findings between the present study and the other comparative studies may be owing to difference in participant's age and study methodology.

Risk factors of hair loss

Anemia and hair loss

The current study showed a significant association between anemia and TE, where 31.7% of who experienced hair loss had anemia compared with 5.5% among those who did not have anemia (P = 0.001). Other similar studies supported the evidence of anemic association with TE, where Fatani *et al.* [11], in a Saudi study, reported that 94.9% of the female patients with TE were anemic.

Stress and hair loss

Stress may be a primary reason for unexplained hair loss [13]. The current study revealed that 66.8% of students with alopecia experienced stressful conditions. Similar studies conducted by Deo *et al.* [14] in India, Rushton *et al.* in UK, and Maklud *et al.* in India reported that psychological stress was a major underlying cause of hair loss commonly in age ranged from 21 to 30 years with an incidence of 86, 42, and 36.92%, respectively. On the contrary, Patel *et al.* [15] reported that 5% of hair loss cases had psychological stress. The difference between the current study and the other comparable ones may be attributed to the difference in methodology.

Table 4 Multiple logistic regression analysis for risk factors of telogen effluvium

	P	OR	95% CI	
			Lower	Upper
Exposure to stressful conditions	<0.001*	18.921	10.921	32.780
Following regimen diet	<0.001*	9.384	3.507	25.110
History of anemia	<0.001*	8.951	4.753	16.857
Using chemicals	<0.001*	6.647	3.218	13.731
Tools used in styling hair				
Iron	0.762	0.815	0.217	3.063
Plastic comb	0.113	2.120	0.837	5.369
Blow drying	0.047*	4.611	1.022	20.800
Brush	0.029*	2.859	1.115	7.335
Woody comb	0.030*	3.428	1.123	10.466
Age: (years)	0.376			
20 to <22	0.257	1.385	0.788	2.435
≥22	0.239	1.401	0.799	2.458
Number of hair washing	0.203			
More than 1 in the day	0.385	0.497	0.103	2.405
Once every day	0.146	2.284	0.750	6.956
Once day after day	0.212	1.723	0.733	4.052
Twice a week	0.089	1.566	0.934	2.624
History of chronic disease	0.175	4.817	0.496	46.764
Bun	0.857	1.044	0.652	1.672
Family history of hair loss				
Father	0.162	0.626	0.325	1.206
Brother	0.052	4.748	0.989	22.789
Auto-immune relative	0.987	0.992	0.396	2.488

*: *P*-value < 0.05

Hair care practices and hair loss

Using shampoo: the current study reported that 42% of male students who experienced hair loss washed their hair once daily. On the contrary, 46% of female students with hair loss washed their hair twice per week.

A study conducted by Satheesha *et al.* [16] reported that 65.8% of male students washed their hair twice a day versus 34.2% who washed their hair once a day.

Regarding hair care products used by the participants of the present study, it was found that 61.1% of males and 69.1% of females used soap and shampoo with conditioner and hair mask cream.

The current study reported that 73.6% of students used shampoo for hair washing, compared with 47.3% in the study by Pierard-Franchimont *et al.* [17].

Using chemicals as hair straightener: the current study illustrated that 18% of female students with hair loss had reported that they used chemicals as hair straightener.

A Nigerian cross-sectional study conducted by Olayinka [18] reported that chemical hair relaxers caused alopecia among 45% of the women who complained of various degrees of hair loss.

A study conducted in United States by Swee *et al.* [19] concluded that 95% of participants reported using hair-straightening commercial products, and they noticed hair breakage and/or hair loss, which may be due to use of such chemical products. Three-quarters (75%)

Table 5 Dermatology Life Quality Index among alopecia cases

DLQI	Telogen effluvium (*n*=575) [*n* (%)]	Androgenic alopecia (*n*=41) [*n* (%)]	Traction alopecia (*n*=28) [*n* (%)]	Total (*n*=648) [*n* (%)]
No effect	49 (8.5)	3 (7.3)	1 (3.6)	53 (8.2)
Small effect	420 (73.0)	27 (65.9)	17 (60.7)	468 (72.3)
Moderate effect	66 (11.5)	7 (17.1)	7 (25.0)	80 (12.3)
Very large	36 (6.3)	4 (9.8)	3 (10.7)	43 (6.6)
Extremely large	4 (0.7)	0	0	4 (0.6)
Mean±SD	4.41±3.69	4.71±3.05	5.50±3.66	4.09±3.27

Alopecia areata (two cases). TTM (two cases). DLQI, Dermatology Life Quality Index.

of those who experienced hair loss reported losing 40% or more of their original hair.

Hair styling practices: in the current study, it was reported by the students with hair loss that 1.2% of them were using weaves and 12.6% were using braids. Hadiza *et al.* [6] found that 76.0% of the female students with hair loss were using braiding in styling hair.

Hair loss and quality of life

In the current study, the mean ± SD scores of both AGA and alopecia areata were 4.71 ± 3.05 and 4.00 ± 1.41, respectively. A study conducted by Min and Nan [20] in China on patients with alopecia areata and AGA aged more than 18 years found that the mean score of DLQI was 6.3 ± 6.3, and this was taken to represent a moderate limitation of quality of life.

The current study reported a mean ± SD score of DLQI for students with alopecia to be 4.09 ± 3.27. A study done in Cardiff (UK) by Williamson *et al.* [21] on patients with alopecia showed that the mean ± SD score of DLQI was 8.3 ± 5.6.

The current study illustrated that 73% of TE had a small effect on quality of life (73%) and 18.5% had moderate to extremely large effect on the quality of life, and in AGA, 65.9% had a small effect and 26.9% had moderate to extremely large effect. In the study by Jankovie *et al.* [22], TE had a major psychological effect on quality of life, and in the study by Tahir *et al.* [23], AGA had a marked effect on individuals' quality of life.

Conclusion

The percentage of alopecia among study participants was high, and the majority were females. TE was the most common cause of hair loss among female students. Important predictors for hair loss were exposure to stressful conditions, history of anemia, diet, use of chemicals in styling hair, and blow drying.

Recommendations

Raising community awareness about predictors of hair loss, avoiding exposure to stress situations, investigating anemia, intaking proper and balanced diet, wise use of hair cosmetics and hair dressing tools, and washing hair not more than once per week is recommended.

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Alaa A.Z. Mohammed participated in acquisition of data and analysis and interpretation of data. Mohammad H. Qayed participated in concept and design of study, analysis of data, and final approval of the version to be published. Hanan A. Morsy participated in concept and design of study, analysis and interpretation of data, and drafting of the article and revising it critically for important intellectual content. Asmaa M.A. Soliman participated in concept and design of study, analysis and interpretation of data, and drafting of the article and revising it critically for important intellectual content.

The manuscript has been read and approved by all of the authors, the requirements for authorship as stated earlier in this document have been met, and each author believes that the manuscript represents honest work.

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Conflicts of interest

There are no conflicts of interest.

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