

Socioeconomic and health characteristics of people with alopecia(hair loss) after COVID-19 vaccination in South Korea

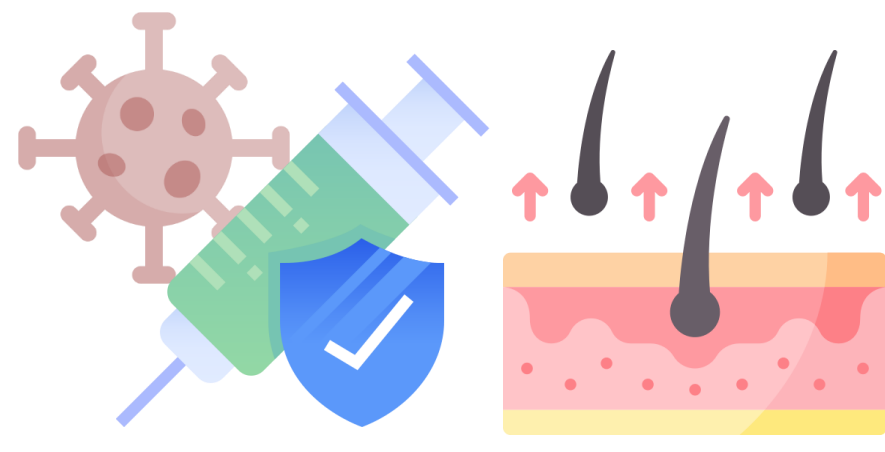
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Background

- According to the Korea Centers for Disease Control and Prevention, between 2021 and 2023, 1,544 cases of alopecia were recorded among 483,059 reported COVID-19 vaccination cases.
- Reports of alopecia as an adverse event have continued to emerge both domestically and internationally; however, there is a scarcity of large-scale survey studies examining the risk of alopecia following COVID-19 vaccination. Most existing research is limited to analyses of a small number of cases.



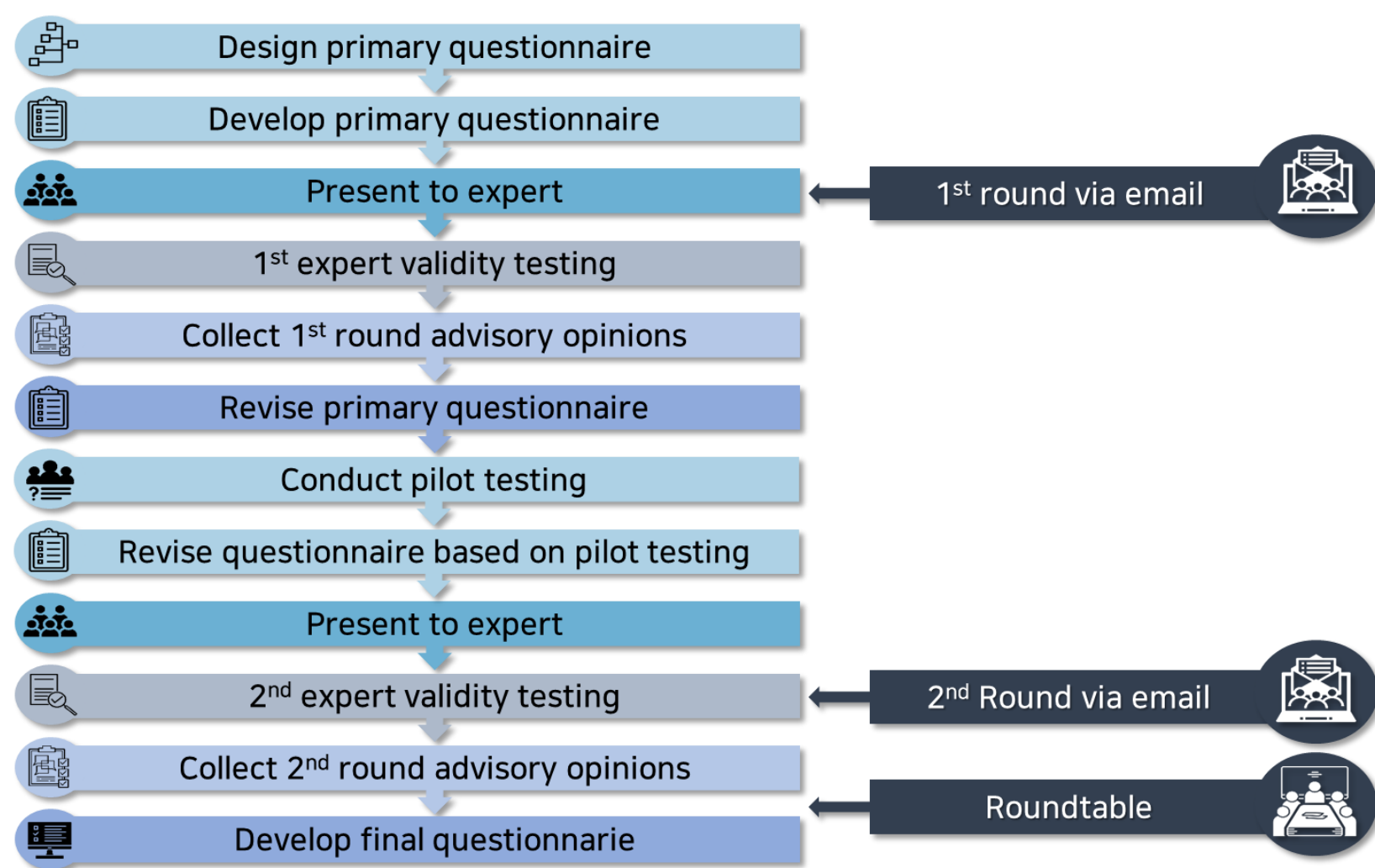
Objectives

- This study aimed to identify patterns of alopecia following COVID-19 vaccination and to examine health-related characteristics associated with post-vaccination adverse events in South Korea.

Methods

Study design

- Cross-sectional self-reported online questionnaire-based survey
- The questionnaire was finalized through expert validity testing and a preliminary pilot test.



Participants

- A total of 1,153 Korean adults - 225 individuals who experienced alopecia after COVID-19 vaccination and 928 individuals who did not have alopecia as a comparison group

Measures

- Sociodemographic characteristics**(sex, age group, occupation, education level, household income, residence area, family history)
- Experiences of alopecia symptoms**(types, severity, period, recovery)
- COVID-19-related characteristics**(vaccine type, infection)
- Health-related characteristics**(underlying diseases, health status, lifestyle, and mental health)

Analysis

- All data were analyzed using IBM SPSS Statistics 27.0
- Descriptive statistics, cross-tabulation analyses, and independent sample t-tests** were conducted to identify the patterns of alopecia symptom onset and to analyze the association between alopecia experience and health-related characteristics.
- Logistic regression analyses** assessed the association between experiences of alopecia symptoms and health-related characteristics controlled by sociodemographic factors including sex, age group, occupation, education level, household income, residence area, family history of alopecia

Conclusion

- This study identified the characteristics of alopecia symptom patterns after COVID-19 vaccination and to examine factors associated with the occurrence of alopecia, such as **socioeconomic vulnerability, presence of underlying conditions, insufficient sleep duration, smoking, being overweight, and anxiety or depression.**
- These findings should be interpreted cautiously due to potential recall bias and subjective symptom assessment from the time gap between vaccination and the survey.
- The small number of participants with alopecia and differences in comparison group sizes may limit result generalizability, highlighting the need for more participants and future large-scale studies.
- Priorities for future vaccination and recovery projects can be discerned. Special consideration should be directed towards **economically and socially disadvantaged groups, individuals with suboptimal lifestyle habits and mental health conditions, and those diagnosed with relevant medical conditions.**

Results

Patterns of alopecia following COVID-19 vaccination

- Participants who experienced alopecia showed **vulnerability factors** such as **younger age** ($p < 0.001$), **lower education** ($p < 0.001$), **income levels** ($p < 0.01$), **rural residence** ($p < 0.01$), **employment in production, service, or sales jobs** ($p < 0.001$), and **part-time work** ($p < 0.01$) compared to those who did not experience alopecia.

Socio-demographic characteristics	Total (N=1153)	Alopecia-experienced participants (n=225)	Alopecia-free participants (n=928)	p
Sex				
Male	509	87 (17.1)	422 (82.9)	
Female	644	138 (21.4)	506 (78.6)	.005
Age group (years)	46,654±12,54	45,144±13,00	47,024±12,41	.043
10-19	149	39 (26.2)	110 (73.8)	
20-29	207	38 (18.4)	169 (81.6)	
30-39	232	51 (22.0)	181 (78.0)	
40-49	301	65 (21.6)	236 (78.4)	
50-59	260	28 (10.8)	232 (89.2)	<.001
60-69	4	4 (100.0)	0 (0)	
Education level				
Middle-school graduate	17	11 (64.7)	6 (35.3)	
High-school graduate	236	66 (28.0)	170 (72.0)	
College/University graduate	772	131 (17.0)	641 (83.0)	
Graduate school graduate	128	17 (13.3)	111 (86.7)	<.001
Household income (KRW)				
100-income	46	13 (28.3)	33 (71.7)	
100-income-300	310	77 (24.8)	233 (75.2)	
300-income-500	332	62 (18.7)	270 (81.3)	
500-income	465	73 (15.7)	392 (84.3)	.006

Socio-demographic characteristics	Total (N=1153)	Alopecia-experienced participants (n=225)	Alopecia-free participants (n=928)	p
Residence area				
Metropolitan area	758	150 (19.8)	608 (80.2)	
Small and medium-sized cities	342	56 (16.4)	286 (83.6)	.004
Rural areas	53	19 (35.8)	34 (64.2)	
Occupation				
Production jobs	63	21 (33.3)	42 (66.7)	
Office jobs	494	66 (13.4)	428 (86.6)	
Service and sales jobs	170	47 (27.6)	123 (72.4)	
Health and medical jobs	43	8 (18.6)	35 (81.4)	<.001
Housewife	214	46 (21.5)	168 (78.5)	
Others (unemployed, military service, students, etc.)	169	37 (21.9)	132 (78.1)	
Type of employment				
Full-time	672	112 (16.7)	560 (83.3)	
Part-time	98	30 (30.6)	68 (69.4)	.001

- Among those who experienced alopecia, the most common cases were those who experienced alopecia **after the second dose of the COVID-19 vaccine** (59.6%), those who experienced alopecia **between one to three months after vaccination** (35.1%), and those whose post-vaccine alopecia **lasted for more than six months** (44.9%).
- Compared to those without alopecia experience, those who experienced alopecia had **more cases of COVID-19 infections** ($p < 0.001$) and **fewer vaccine doses administered** ($p < 0.001$).

Experience of alopecia after COVID-19 vaccination	Alopecia-experienced participants (n=225)	Alopecia-free participants (n=928)	p
Timing of alopecia experience			
After 1st dose	127 (56.4)		
After 2nd dose	134 (59.6)		
After 3rd dose	71 (31.5)		
After 4th dose	10 (4.4)		
Timing of alopecia onset after vaccination			
Within 8 days post-vaccination	45 (20.0)		
More than 8 days but less than 1 month post-vaccination	68 (30.2)		
More than 1 month but less than 3 months post-vaccination	79 (35.1)		
More than 3 months but less than 6 months post-vaccination	40 (17.8)		
More than 6 months post-vaccination	34 (15.1)		
Duration of alopecia			
More than 1 month but less than 3 months	26 (11.6)		
More than 3 months but less than 6 months	43 (19.1)		
More than 6 months	35 (15.6)		
More than 6 months	101 (44.9)		
Unknown	20 (8.9)		

Characteristics of COVID-19 vaccine-related infections	Total (N=1153)	Alopecia-experienced participants (n=225)	Alopecia-free participants (n=928)	p
Infection of COVID-19				
Yes	769	156 (20.3)	613 (79.7)	
No	384	69 (18.0)	315 (82.0)	<.001

Characteristics of COVID-19 vaccination-related symptoms*	Alopecia-experienced participants (n=225)			
	Total	No recovery	Partial recovery	Complete recovery
Worsening or recurrence of previously diagnosed hair loss condition	76 (33.8)	19 (8.0)	45 (20.0)	12 (5.3)
Scalp disorders (redness, itching, increased dandruff, etc.)	72 (32.0)	13 (5.8)	45 (20.0)	14 (6.2)
Skin conditions on non-scalp areas (itching, erythema, etc.)	39 (17.3)	8 (3.6)	22 (9.8)	9 (4.0)
Increase in gray hair	77 (34.2)	40 (17.8)	35 (15.6)	2 (0.9)
Total**	160 (69.4)	35 (15.4)	116 (52.0)	27 (12.0)

Health-related characteristics associated with post-vaccination adverse events

1) Underlying diseases at the time of COVID-19 vaccination

- Compared to non-experiencers, those who experienced alopecia had **more cases of alopecia diagnosed as a result of vaccination** ($p < 0.001$).
- Those with underlying alopecia areata had the highest risk** compared to the comparison group (OR=51.06, 95% CI: 21.31-122.37).

Types	variables	Covariate-adjusted OR* (95% CI)
Severe conditions (Ref: None)	Hypertension	0.687 (0.406 - 1.165)
	Hyperlipidemia	1.503 (0.869 - 2.598)
	Ischemic heart disease	9.439 (2.626 - 33.933)
	Stroke	0.000 (0.000 -)
	Diabetes	1.242 (0.646 - 2.390)
Hair loss and scalp conditions (Ref: None)	Alopecia areata	51.062 (21.307 - 122.370)
	Telogen effluvium	28.860 (12.491 - 66.683)
	Genetic hair loss	4.001 (1.733 - 9.237)
	Seborrheic dermatitis	2.544 (1.371 - 4.720)
Dermatological and auto-immune diseases (Ref: None)	Timea capitis	2.053 (0.422 - 9.992)
	Other hair loss conditions	8.800 (1.769 - 43.764)
	Eczema, atopic dermatitis	1.397 (0.644 - 3.031)
	Allergies	1.278 (0.564 - 2.896)
	Urticaria and rashes	3.311 (1.584 - 6.918)
	Vitiligo	0.477 (0.443 - 45.044)
	Psoriasis	0.938 (0.287 - 3.065)
	Allergic rhinitis/asthma	0.630 (0.309 - 1.286)
	Hypothyroidism or hyperthyroidism	2.518 (0.880 - 7.210)
	Autoimmune hemolytic anemia	0.000 (0.000 -)
Pernicious anemia	15.839 (2.399 - 104.558)	
Other dermatological and autoimmune diseases	6.819 (1.896 - 24.550)	

2) Health status and lifestyle at the time of COVID-19 vaccination

- Smokers** (OR=2.08, 95% CI: 1.24-3.49) and **overweight individuals** (OR=1.65, 95% CI: 1.07-2.54) had a higher risk of post-vaccination alopecia.
- Alopecia occurrence was more frequent among those with **insufficient sleep duration** ($p < 0.05$).
- Individuals with **moderate to severe anxiety disorders** also faced a heightened risk (OR=3.59, 95% CI: 2.06-6.25).

Variables	Total (N=1153)	Alopecia-experienced participants (n=225)	Alopecia-free participants (n=928)	p
Sleep				
Regular sleep (points)	3,494±0.85	3,484±0.94	3,494±0.83	.906
Sleep Duration	7,711±1.29	7,791±1.33	7,681±1.28	.252
Adequate sleep time	587	103 (17.5)	484 (82.5)	
Inadequate sleep time	566	122 (21.6)	444 (78.4)	.086
Anxiety and depression	15,484±5.56	17,364±6.49	15,024±5.22	<.001
Anxiety (points)	4,961±3.44	6,251±3.92	4,641±3.24	<.001
Normal	885	139 (15.7)	746 (84.3)	
Borderline disorder	183	52 (28.4)	131 (71.6)	
Moderate to severe disorder	85	34 (40.0)	51 (60.0)	<.001
Depression (points)	10,524±3.53	11,111±3.78	10,381±3.45	.005
Normal	225	41 (18.2)	184 (81.8)	
Borderline disorder	353	57 (16.1)	296 (83.9)	
Moderate to severe disorder	575	127 (22.1)	448 (77.9)	.074

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