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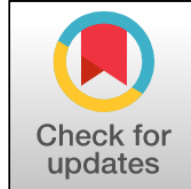

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Evaluation Effect of COVID -19 Vaccines on Alopecia Areata

Efek Evaluasi Vaksin COVID -19 pada Alopecia Areata

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Abstract

This study investigates the impact of COVID-19 vaccination on Alopecia Areata (AA) severity, particularly focusing on gender differences. Data from 65 AA patients (30 vaccinated, 35 unvaccinated) and 1,602,596 healthy controls were analyzed. Physical examinations, laboratory tests, and Severity of Alopecia Tool (SALT) scores were used. Results showed a significant increase in AA severity among vaccinated individuals, especially males, with Pfizer's vaccine having a stronger effect post-second dose. These findings highlight the need for continued research and monitoring of AA post-COVID-19 vaccination.

Highlight:

1. **Severity Rise:** COVID-19 vaccination linked to increased Alopecia Areata severity, especially in males.
2. **Pfizer's Impact:** Second dose shows stronger Alopecia Areata association than AstraZeneca.
3. **Continued Monitoring:** Emphasizes need for ongoing research on vaccine-autoimmune disorder interactions.

Keyword: Alopecia Areata, COVID-19 Vaccination, Gender Differences, Severity, Monitoring

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Introduction

Alopecia Areata (AA) is an auto-immune disorders, normally giving sketchy balding on the scalp . The pathophysiological premise is believed to be the breakdown of the safe honor of the hair follicle, bringing about expanded conglomerations of regular executioner cells in follicles . AA characterized through hair loss often patchy on the scalp, face or body. Persons suffer from AA undergo signs when immune cells assault healthy hair follicles, causing hair to full out, predominantly initial with downy, round spots. The average age is among (25 and 35) but it can also influence children and adolescent, and visible in both genders and all ethnicities . Exceeding half of patients undergo poor health conditions and as a result, may lead to serious psychological consequence, counting great levels of depression and nervousness outside elements like profound pressure, medications, and immunizations have additionally been ensnared alopecia areata can be usual off through viral infection, for example (flu, cytomegalovirus, and the Epstein-Barr infection) .Over than 468 million infection and more than 6 million death caused by Corona virus illness 2019 .

Several vaccines have been developed and approved for (COVID-19). Because of the new variations for example Omicron the utilization of extra vaccine doses is likewise being assessed and endorsed used for prevent . There is as yet inadequate data on the safe connected issues of Coronavirus immunizations then whether they can cause of the flare of immune system illnesses. Various skin conditions and responses have been accounted for after coronavirus immunizations .

Various skin neighborhood responses like (enlarging, sclerosis, redness, and pruritis) as well as infusion place agony then delicacy remained between the regularly noticed next Coronavirus infection . Additional announced signs involved intense sort I excessive touchiness responses like atrophedema, urticaria, then hypersensitivity in addition to postponed (type IV) extreme touchiness responses then immune system interceded cutaneous sores, for example, vasculitis .

Immunizations have been recommended as likely triggers for immune system sicknesses, generally in hereditarily defenseless people, then have likewise remained future as a reasonable justification of (Alopecia A, herpes zoster, Hepatitis B, Japanese encephalitis, flu, and Quadrivalent HPV 6, 11, 16, and 18) . Coronavirus immunizations have all been connected to an expanded occurrence of AA in examinations the stated period intermission among vaccination and the beginning of AA is extremely variable, then varied current and or systemic . In Iraq, their been limited studies on the role of infection with COVID-19 or its vaccines in the occurrence of AA, so in the current study we are trying to clarify that.

Method

The current study, a cross sectional study, relied on data analysis medicinal archives for infected persons vaccinated through the Covid-19 vaccines then suffering from moderate to severe alopecia at Diwaniyah General Teaching Hospital from (January- December 2022). All patients have constant illness for no less than 3 months.

Physical examination of patients revealed patchy, sharply defined without any scars or scales of hair loss on the scalps general investigation did not reveal any additional related skin or systemic defects. Furthermore, (KOH) test was negative for fungal infections, laboratory tests counting (liver, kidney, thyroid function, anti-thyroid Abs and antinuclear Abs tests were normal values.

Severity of Alopecia Tool (SALT) scores measures hairlessness through scalp quadrant and assigns score using the weight total ratio hairlessness in the 4 scalp quadrants a SALT (notch of 0 mean) no hairlessness, while a SALT (notch of 100) is completed hairlessness .

SPSS version 23 was used to categorize and test the data by Fisher's exact Test. A descriptive content analysis was utilized to analyze the data. The correlation analysis was used to compare related variables' significant values usual at (P-value <0.05).

Result

The present study involved 65 people suffering from alopecia, 30 individuals of them were vaccinated with corona vaccines whereas 35 individuals not vaccinated control group involved 1,602.596 health individuals among them 988.855 individuals vaccinated by COVID -19 vaccines and 613.641 not vaccinated. Most (67%) of vaccinated patients were males while most (71%) of non- vaccinated patients were females as shown in (Table 1). We also found that the COVID- 19 vaccines used in our population were the Pfizer and AstraZeneca vaccines. The results showed that most patients and control groups were immunized with the Pfizer vaccine (73% and 76% respectively) as shown in (Fig 1).

The probability of acquiring AA was lower in the vaccinated group overall, with P value equal to 0.047(OR=0.84, Cl

from 0.017 to 44.7) (see Fig 2). The risk of AA was different among the vaccinated females (P value= 0.0029, OR=2.09, CI from 0.07 to 0.57) and males (P value= 0.003, OR=5.00, CI from 1.74 to 14.37). At each demographic level, the risk of AA was either lower than the unvaccinated group or not statistically significant see (Fig 2).

In (Table 2) we found an increase in the severity of hair loss in vaccinated patients especially the Pfizer vaccine (Mean of SALT = 64) compared to those who were not vaccinated (Mean of SALT = 24) that lead to significant differences (P<0.05). (Table 3) reveals that cases of alopecia worsened after taking the first dose of the vaccines, as the SALT for Pfizer and AstraZeneca appeared equal to 33 and 39 respectively. After the second dose, we noticed an increase in hair loss, especially for the Pfizer vaccine (SALT = 66) compared to the AstraZeneca vaccine (SALT = 57).
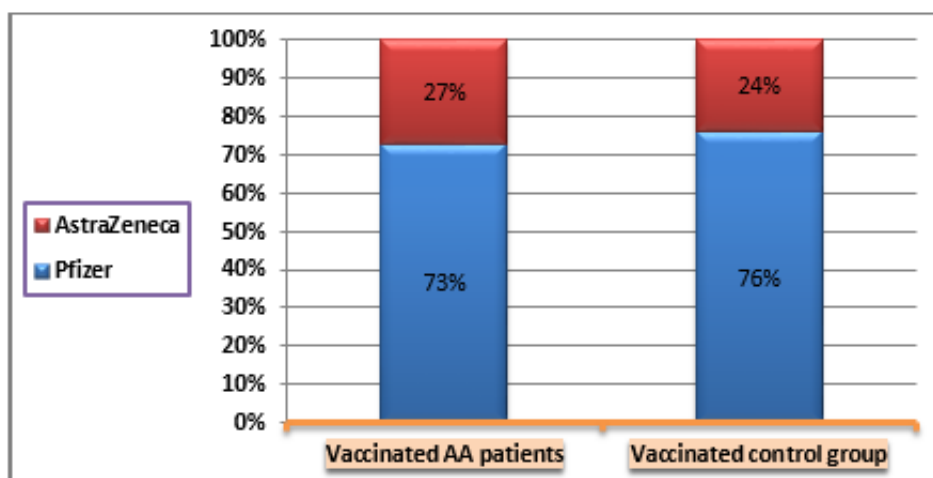
We found significant differences when comparing SALT after taking amounts of the Pfizer vaccine injection within the AstraZeneca vaccine (P<0.05). On the other hand, the average hair loss time when taking the vaccine was 2.7 ± 0.33 and 3.6 ± 0.12 weeks for the Pfizer and AstraZeneca vaccines.

Clinical trichoscopic diagnosis showed that the scalp of studied cases associated with alopecia areata were suffering from black dots; broken hair; yellow dots as shown in (Table 3). On the other hand, the average hair loss time when taking the vaccine was 2.7 ± 0.33 and 3.6 ± 0.12 weeks for the Pfizer and AstraZeneca vaccines.

When comparing the effect of vaccines on the severity of alopecia Areata by gender, we found that males are more affected after taking the first dose of either the Pfizer or AstraZeneca vaccine (SALT = 40 and 45, respectively) as shown in (Fig 3) compared to women (SALT = 29 and 33, respectively) as shown in (Fig 4) , (Table 4), when taking the second dose: we found that females are more susceptible to baldness compared to males when taking the Pfizer vaccine (SALT=66 and 47 respectively), in contrast to the AstraZeneca vaccine, whose second dose had a greater effect on males (SALT= 70 and 64 respectively) as shown in (Table 5).

Variables	AA patients		Control group	
	Not vaccinated	Vaccinated	Not vaccinated	Vaccinated (at least one dose)
Sex				
Male	10 (29%)	20 (67%)	325,408	720,266
Female	25 (71%)	10 (33%)	288,233	268,689
Total number	35	30	613.641	988.855
All ages	35	30	613,641	988,955
<7	1	1	125,487	5,301
7–12	2	2	55,344	50,775
13–18	3	2	72,890	96,354
19–45	20	19	320,750	555,457
46–65	6	5	70,344	223,461
66+	3	1	30,556	357,477

Table 1. *Demographic features of patients*

Figure 1. *percentage of vaccine types that used by cases and control*

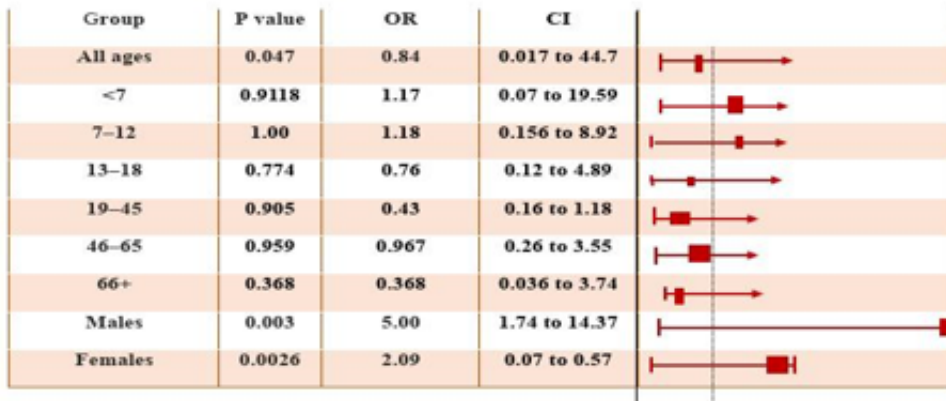| Group	P value	OR	CI	
All ages	0.047	0.84	0.017 to 44.7	
<7	0.9118	1.17	0.07 to 19.59	
7–12	1.00	1.18	0.156 to 8.92	
13–18	0.774	0.76	0.12 to 4.89	
19–45	0.905	0.43	0.16 to 1.18	
46–65	0.959	0.967	0.26 to 3.55	
66+	0.368	0.368	0.036 to 3.74	
Males	0.003	5.00	1.74 to 14.37	
Females	0.0026	2.09	0.07 to 0.57	

Figure 2. *A forest tree plot showing the p-value, odds ratio (OR) and confidence interval (CI) for each demographic level (age and gender) in our patient cohort. Each square shows the OR for each demographic level, while the size of the square corresponds to precision. Red line intervals and vectors indicate the 95% CI for each OR*

AA Severity	AA patients			P value
	Unvaccinated patients	Vaccinated patients		
		Pfizer	AstraZeneca	
Mean of SALT	24	65	49	0.027
Total number of patients	35	23	7	0.040
P value	0.038	0.049		

Table 2. *compared severity of Alopecia score between vaccinated and unvaccinated AA patients*

Type of vaccine	Mean of SALT after First dose	Mean of SALT after Second dose	ΔSALT increase	Vaccine-hair Loss time (week) Mean + SD	Trichoscopic Features
Pfizer	33	66	33	2.7 ± 0.33	Black dots; broken hair; yellow dots
AstraZeneca	39	57	16	3.6 ± 0.12	
P value	0.036	0.049		0.052	

Table 3. *Mean of hair loss time and SALT according to vaccines doses*

Figure 3. *A man (35 year-old) with mild to severe alopecia areata (a) before (SALT 20%) and (b) 2 weeks (SALT 47%) after administration of Pfizer/BioNTech COVID- 19 vaccine (second dose)*

Figure 4. *A woman (27 year-old) with mild to severe alopecia areata (a) before (SALT 10%) and (b) 2 weeks (SALT 40%) after administration of Pfizer/BioNTech COVID- 19 vaccine (first dose).*

Vaccines	Mean of SALT		X2	P value
	Males	Females		
Pfizer	40	29	3.82	0.033
AstraZeneca	45	33		

Table 4. *Effect first dose of vaccines on severity of alopecia score according to patients' sex*

Vaccines	Mean of SALT		X2	P value
	Males	Females		
Pfizer	47	66	1.90	0.038
AstraZeneca	70	64		
P value	0.007	0.375		

Table 5. *Effect COVID- 19 second dose on severity of Alopecia score according to patients' sex.*

Discussion

The SARS COV- 2 virus can make the immune system hyperactive because of interaction and molecular imitation among self-antigens and virus like to illness itself (Covid 19) vaccines able to increasing inflammation response . NF-KB activate lead toward production numerous cytokines as raised (IFN in addition to IL-6), remain related to Alopecia arteria pathology and cause hair loss .Injections of vaccines have been optional as possible trigger for autoimmune illnesses, typically in hereditarily vulnerable persons and have too future as a possible reason of (alopecia arteria, Herpes Zoster, Hepatitis B, Japanese Encephalitis, flu and Quadrivalent HPV). Covid -19 vaccines injection had all related to amplified occurrence of Alopecia arteria in studies .

Our study is few studies in Iraq to address the relationship between Corona vaccines and AA, and it is also one of the few studies in the world, as most of the studies that focused on this topic were reports of cases or case studies that included a very limited number of patients who visited outpatient clinics . Our study showed that the Corona vaccine significantly affected the rate of hairlessness on the scalp, especially afterward taking the two doses. The Pfizer vaccine was the most widely used in our society and had the greatest impact on the severity of AA, compared to the AstraZeneca vaccine. Published reports by dermatologists in other countries, especially the European and United States, found that other vaccines, such as Moderna, were important in determining the increasing severity of AA.

Esaam *et all* study happened a limited days afterward give of the vaccine injection . The patient had 1 past incident of Alopecia A (six years) past nonetheless no family past of Alopecia A , the authors future molecular imitation, subsequent increase of pathology auto antibodies as a probable .device by vaccine injection can activate Alopecia A. Bard Azzi *et al* designate cases with early signs presence (1 - 2) weeks after vaccine administration, 2 of the patients has history of Alopecia A, one advanced to AT over the following (6 weeks) with no responses to therapy while the other case knowledgeable slight Alopecia A with decent response to therapy .

May lee *et all* report additional case develop Alopecia A one-week subsequent vaccine injection . This infected

person not any personally or family past of alopecia A or auto immune illness. Although firstly inadequate toward the scalp and facial hair afterward the two doses of the vaccine injection, the Alopecia A advanced to Alopecia T remained unresponsible toward therapy. Rossi *et all* study reported labelled (3 cases) who industrialized Alopecia A (2-3 weeks) post vaccination . The hairlessness was incomplete toward the {scalp and face hair} then all three had past of the alopecia A. Gallo *et all* reported labels additional case signs, which initial from (3 weeks) post vaccination was incomplete toward the scalp then facial hair of infected person no have personally past Alopecia A otherwise auto immune illnesses, and no any of family a history of Alopecia A .

The British medicines and health care product regular activity Publishes information on opposing proceedings report next Covid -19 vaccination . Overall, of 154 case Alopecia A, alopecia totals (AT affecting the full head or Alopecia universalis (AU affecting the full body had report 50% within Bnt162b2pfizer/BioNTech Network 40% with CHhAdOx1 NccoV-19 AstraZeneca Cambridge and 10% with mRNA 1237 Moderna vaccine. Though might simply reflect the amount to separately vaccine give in UK, probable related might current . United State middles for illness control and deterrence vaccine injection opposing occasion writing systemic data base remained examined for specified cases (Alopecia A, Alopecia T, and Alopecia U) next corona disease vaccine presented all 126 cases to 114 Alopecia A, 1 Alopecia T, and 11 Alopecia U). Massive mainstream remained {Pfizer/BioNTech} 66%and Moderna 29% one necessity reflect approximately bags slight hairlessness might not have been stated, sense the right amount cases might advance .

Pervious works all (18 patients) who industrialized Alopecia A next Covid-19 vaccine injection had labelled eleven next the Pfizer, BioNTech four next Moderna, then three next AstraZeneca vaccine injection. Almost patient knowledge Alopecia A incomplete toward scalp of head nonetheless minor amount infected person advanced toward (Alopecia T or Alopecia U) Semi of the infected persons nine have individual past Alopecia A, then only five infected persons no have personally or family past Alopecia A, otherwise in the least other auto immune illnesses. Start of signs next the immunization by vaccine in greatest cases reached as of little day toward three weeks .

Additional study from Saudi Arabia established hairlessness afterward Covid vaccines toward elevated as 63.2% within the majority afterward primary dose (55.8%) then 44.2% afterward the additional doses. Alternative learning measured the occurrence covid 19 vaccines established that available of 991 members, 670{67.6} stated after vaccine hairlessness. Possible reasons of after vaccine hairlessness be located vaccines connected in 185 {27.6%} members, additional reasons in326 {48.7%} members then indistinct in 326 {48.7%} members .

Conclussion

Evidence from this study supported the prior reports of an association between AA and COVID-19 vaccination. The results showed an increase in the severity of AA in vaccinated patients compared to unvaccinated patients, especially in males. When comparing the effect of vaccines on the severity of AA by gender, we found that males are more affected after taking the first Pfizer or AstraZeneca while when taking the second dose that females were more susceptible to baldness compared to males when taking the Pfizer vaccine, in contrast to the AstraZeneca vaccine, whose second dose had a greater effect on males.

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