© 2026 Journal of Pharmacy & Pharmacognosy Research, 14 (4), 2722, 2026
ISSN 0719-4250
https://jppres.com

DOI: https://doi.org/10.56499/jppres_14.4.2722

Original Article

Self-reported implant-site inflammatory reactions after COVID-19 vaccination among Indonesian cosmetic implant recipients: Cross-sectional survey

[Reacciones inflamatorias autoinformadas tras vacunación COVID-19 en receptores indonesios de implantes cosméticos: estudio transversal]

Ago Harlim[1]*, Hulman Panjaitan[2], Hubert Andrew[3], Chastine Harlim[3]

[1]Department of Dermatology and Venereology, Faculty of Medicine, Universitas Kristen Indonesia, Jakarta, Indonesia.
[2]Faculty of Law, Universitas Kristen Indonesia, Jakarta, Indonesia.
[3]Faculty of Medicine, Universitas Indonesia, Jakarta, Indonesia.
*E-mail: ago.harlim@uki.ac.id

Abstract

Context: Delayed inflammatory reactions at cosmetic implant sites have been reported after coronavirus disease 2019 vaccination, but population-level data from Indonesia remain limited.

Aims: To estimate the prevalence of self-reported implant-site inflammatory reactions after coronavirus disease 2019 vaccination among cosmetic implant users in Indonesia and to explore associated factors.

Methods: A cross-sectional online survey was distributed in Indonesia from November 2021 to July 2022. Respondents receiving at least one coronavirus disease 2019 vaccine dose who reported having a cosmetic implant were included. The primary outcome was self-reported localized redness, swelling, or pain at the implant site rather than clinically verified foreign-body reaction.

Results: Among 1,610 valid responses, 266 respondents reported having cosmetic implants. Implant-site inflammatory reactions were reported by 10 respondents, corresponding to a period prevalence of 3.76% (95% CI: 1.82–6.80%). Adverse vaccine reactions were reported by 91 respondents (34.2%). An exploratory analysis suggested these respondents had higher odds of implant-site inflammatory reactions (OR: 4.78; 95% CI: 1.21–18.94; p = 0.04). However, this finding must be interpreted cautiously because only 10 events were observed and multivariable adjustment was not possible. No significant association was observed with age, sex, or vaccine type.

Conclusions: A small proportion of respondents with cosmetic implants reported implant-site inflammatory symptoms following coronavirus disease 2019 vaccination. Because outcomes were self-reported, derived from a cross-sectional design, and key confounders were unmeasured, causal interpretation remains uncertain. These findings should be interpreted strictly as hypothesis-generating pharmacovigilance evidence. Prospective, clinically validated studies incorporating detailed implant characterization and reaction timing are required.

Keywords: coronavirus disease 2019 vaccines; cosmetic techniques; dermal fillers; inflammation; Indonesia; prostheses and implants.

Resumen

Contexto: Existen reportes de reacciones inflamatorias tardías en implantes cosméticos tras vacunarse contra la enfermedad por coronavirus 2019, pero los datos poblacionales indonesios son limitados.

Objetivos: Estimar la prevalencia de reacciones inflamatorias autorreportadas en implantes tras la vacunación contra la enfermedad por coronavirus 2019 en Indonesia y explorar factores asociados.

Métodos: Encuesta transversal en línea distribuida en Indonesia (noviembre 2021-julio 2022). Se incluyeron receptores de al menos una dosis de vacuna contra la enfermedad por coronavirus 2019 con implantes cosméticos. El resultado primario fue el autorreporte de eritema, edema o dolor localizado en el implante, y no reacciones a cuerpo extraño clínicamente verificadas.

Resultados: De 1.610 respuestas válidas, 266 reportaron implantes cosméticos. Diez presentaron reacciones inflamatorias en el implante (prevalencia de periodo: 3,76%; IC 95%: 1,82–6,80%). Noventa y un encuestados (34,2%) reportaron reacciones adversas sistémicas. Un análisis exploratorio sugirió una mayor probabilidad de reacciones locales en este grupo (OR: 4,78; IC del 95%: 1,21–18,94; p = 0,04). Este hallazgo exige cautela: solo se observaron 10 eventos y no fue posible realizar un ajuste multivariable. No hubo asociación significativa con la edad, el sexo ni el tipo de vacuna.

Conclusiones: Una pequeña proporción con implantes cosméticos reportó síntomas inflamatorios locales posvacunación contra la enfermedad por coronavirus 2019. La causalidad es incierta por tratarse de datos autorreportados, transversales y sin control de confusores. Constituyen estrictamente investigación de farmacovigilancia generadora de hipótesis. Se requieren estudios prospectivos validados clínicamente que evalúen las características del implante y su temporalidad.

Palabras Clave: inflamación; Indonesia; prótesis e implantes; rellenos dérmicos; técnicas cosméticas; vacunas contra la COVID-19.

ARTICLE INFO
Received: December 11, 2025.
Accepted: July 28, 2026.
Available Online: August 15, 2026.

AUTHOR INFO
ORCID: 0000-0001-8556-2982 (AH) 0000-0002-8881-9787 (HA)
0000-0003-4049-0983 (HP) 0009-0007-1979-249X (CH)

Abbreviations: CI: confidence interval; **COVID-19:** coronavirus disease 2019; **HA:** hyaluronic acid; **OR:** odds ratio; **SARS-CoV-2:** severe acute respiratory syndrome coronavirus 2.

INTRODUCTION

Skin aging is a physiological process frequently associated with cosmetic concerns and reduced psychosocial well-being, leading to an increase in aesthetic procedures worldwide. The materials utilized, which range from hyaluronic acid (HA) and collagen fillers to contour threads and solid silicone implants, vary in invasiveness and immunogenicity. While generally safe, these materials can rarely induce localized inflammatory reactions, historically referred to as foreign body reactions (Harlim et al., 2018). Background literature suggests these delayed reactions are initiated by surface protein adsorption, triggering an acute macrophage-driven cascade that eventually transitions into fibrous encapsulation (Carnicer-Lombarte et al., 2021; Harlim et al., 2018). Prior to the pandemic, the rate of delayed foreign body reactions to HA fillers was estimated at approximately 1% (Sadeghpour et al., 2019).

The coronavirus disease 2019 (COVID-19) pandemic prompted mass vaccination programs worldwide. Concurrently, reports emerged of localized inflammatory reactions, contractions, and seromas occurring at the anatomical sites of prior cosmetic procedures following COVID-19 vaccination (Cheng et al., 2023). While these isolated reports have raised valid concern and warrant further investigation (Osmond & Kenny, 2021), they signal a pattern rather than establishing true prevalence or definitively proving causality.

To appropriately contextualize the present study, two methodological constraints must be declared upfront. First, although dermal fillers, solid implants, and suspension threads are biologically heterogeneous interventions with distinct immunogenic profiles, they are analyzed collectively in this study under the umbrella term of "cosmetic implants." This grouping represents a pragmatic limitation due to the constraints of the available survey dataset. Second, because this study lacks biomarker, histological, and precise temporal data, the aforementioned immunopathogenesis serves strictly as context rather than a framework for the interpretation of the current findings. Accordingly, the outcomes of this study must be interpreted as exploratory and not material-specific.

To address the current epidemiological gap, this preliminary study aimed to investigate the period prevalence of self-reported implant-site inflammatory reactions following COVID-19 vaccination in Indonesia, and to explore potential associations with systemic adverse vaccine reactions.

MATERIAL AND METHODS

Data collection

A cross-sectional study was conducted using an online questionnaire (Google Forms, Google LLC, USA) distributed from November 2021 to July 2022. The questionnaire link was distributed nationwide via WhatsApp messaging groups and social media platforms, with dissemination coordinated by the Indonesian Consumers Foundation and its regional networks. The invitation text briefly outlined the survey's aim to assess consumer experiences and post-vaccination symptoms. Because the exact number of individuals who received the invitation could not be determined, a response rate could not be calculated. Because participation was voluntary, the final convenience sample was not nationally representative.

The survey instrument (Supplementary File 1) was developed de novo by a multidisciplinary team of native Indonesian-speaking dermatologists and legal professionals to assess general consumer legal protection and broad post-vaccination side effects. Consequently, the present study represents a secondary, opportunistic analysis restricted to a specific subset of the dataset: respondents who reported having cosmetic implants. Because the primary survey was not designed as a targeted clinical instrument, this implant-reaction analysis was not pre-specified. While the instrument underwent expert and content review, formal pilot testing, cognitive interviewing, and test-retest reliability assessments were not performed prior to deployment. These limitations were considered when interpreting the findings.

To ensure dataset integrity, all responses were cross-referenced and deduplicated using unique mobile phone numbers. Data completeness varied by question design. The digital platform mandated responses for all primary categorical variables (e.g., demographics, vaccine type, and occurrence of adverse reactions), resulting in no missing data for the analyzed outcomes. Conversely, qualitative details regarding specific implant materials and temporal intervals were collected via open-ended, optional text fields. Due to an exceptionally high rate of non-disclosure and missing data within these optional fields, these specific variables were entirely excluded from the final analysis. However, no respondent responses were excluded from the primary outcome analysis due to missing implant-type data.

The researchers ensured the confidentiality of respondent data. Informed consent was obtained from

the respondents for inclusion in the research and publication. Ethical approval was obtained from the Ethics Committee of the Faculty of Medicine, Universitas Kristen Indonesia on 15 July 2021 (No. 24B/Etik Penelitian/FKUKI/2021). The STROBE checklist was used to guide the preparation of the manuscript (Supplementary File 2).

Variables and outcome definitions

Eligible respondents were individuals who had received at least one dose of a COVID-19 vaccine and reported having a cosmetic implant. The questionnaire collected demographic information, province of residence, type of cosmetic implant, vaccine type, adverse vaccine reactions, and localized symptoms at the implant site. Adverse vaccine reactions were defined as self-reported systemic symptoms, including fever, malaise, drowsiness, allergic symptoms, or shortness of breath.

The primary outcome was self-reported implant-site inflammatory symptoms, defined as self-reported redness, swelling, or pain at the implant location after COVID-19 vaccination. These symptoms were not clinically verified and were not classified using standardized diagnostic criteria. No data were collected on symptom duration, severity, medical evaluation, or histopathological confirmation.

Statistical analysis

Data were analyzed using SPSS version 21 (IBM SPSS Inc, USA). Categorical variables were summarized as frequencies and percentages. The period prevalence of self-reported implant-site inflammatory reactions was calculated with 95% exact confidence intervals. Statistical significance was set at $p \leq 0.05$. Given the small number of outcome events, inferential analyses were considered exploratory. Fisher's exact test was used for categorical comparisons, and odds ratios with 95% confidence intervals were calculated where applicable. No multivariable regression analysis was performed because the event count was insufficient to support reliable adjustment for confounders.

RESULTS

A total of 1,610 valid responses were obtained, of which 266 respondents (16.5%) reported having cosmetic implants and were included in the analysis. When queried about their specific implant material, 265 respondents (99.6%) declined to answer or provided uninterpretable text. Only 1 of the 266 respondents (0.4%) provided information, reporting a generic "filler" which lacked the specificity required for material classification. Therefore, the implant-type variable was excluded from further analysis. Implant-site inflammatory reactions were reported by 10 respondents (Fig. 1), corresponding to a period prevalence of 3.76% (95% CI: 1.82–6.80%). Male respondents represented 149/266 respondents (56.0%). Most respondents resided in the Special Capital Region of Jakarta (49.2%). Table 1 contains the full demographic characteristics of the respondents.

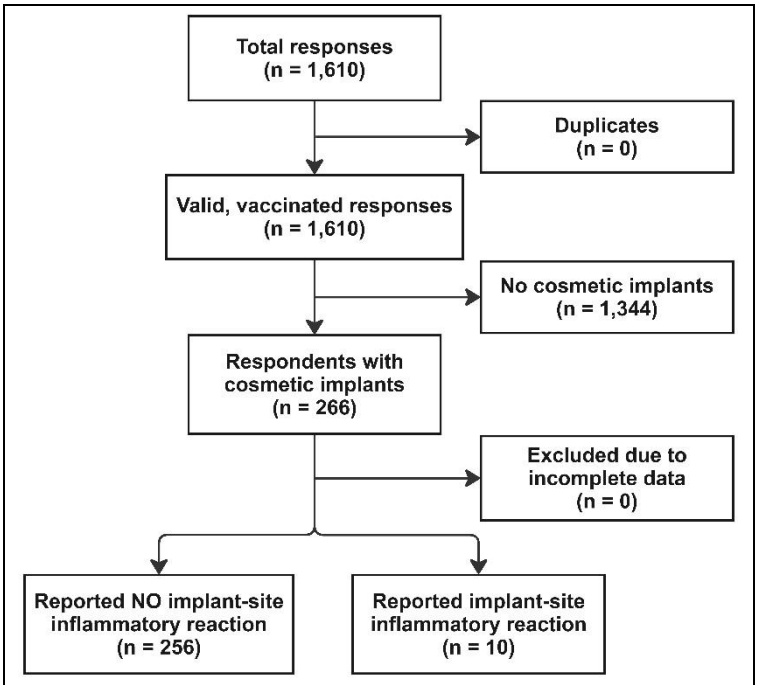


Figure 1. Flowchart of participant selection.

Table 1. Demographic characteristics of COVID-19 vaccine recipients with cosmetic implants.

Variable n (%)	Total 266 (100)	Inflammatory reaction 10 (3.8)	No reaction 256 (96.2)
Sex			
Male	149 (56)	8 (3.0)	141 (53.0)
Female	117 (44)	2 (0.8)	115 (43.2)
Age group (in years)			
18–20	31 (11.7)	2 (0.8)	29 (10.9)
21–30	75 (28.2)	4 (1.5)	71 (26.7)
31–40	39 (14.7)	2 (0.8)	37 (13.9)
41–50	40 (15.0)	0	40 (15.0)
51–60	52 (19.5)	1 (0.4)	51 (19.1)
>60 (Elderly)	29 (10.9)	1 (0.4)	28 (10.5)
Province			
Special Capital Region of Jakarta	131 (49.2)	3 (1.1)	128 (48.1)
Rest of Java[1]	73 (27.4)	0	73 (27.4)
Sumatra[2]	33 (12.5)	6 (2.3)	27 (10.2)
Central & Eastern Indonesia[3]	29 (10.9)	1 (0.4)	28 (10.5)

[1]Rest of Java: Banten, Special Region of Yogyakarta, West Java, Central Java, East Java.

[2]Sumatra: Aceh, North Sumatera, West Sumatera, Riau, Bengkulu, Lampung, Riau Islands.

[3]Central & Eastern Indonesia: East Kalimantan, South Kalimantan, Bali, North Sulawesi, South Sulawesi, East Nusa Tenggara, West Nusa Tenggara, Maluku, Papua, West Papua.

Table 2. Vaccine-related characteristics among COVID-19 vaccine recipients with implants.

Variable n (%)	Total 266 (100)	Inflammatory reaction 10 (3.8)	No reaction 256 (96.2)
Adverse vaccine reactions			
Yes	91 (34.2)	7 (2.6)	84 (31.6)
No	175 (65.8)	3 (1.1)	172 (64.7)
Vaccine type			
CoronaVac (Sinovac)	222 (83.5)	8 (3.0)	214 (80.5)
mRNA-1273 (Moderna)	7 (2.6)	0	7 (2.6)
ChAdOx-1 (Oxford-AstraZeneca)	29 (11.0)	2 (0.8)	27 (10.2)
Don't know	8 (3.0)	0	8 (3.0)

Adverse vaccine reactions were reported by 91 respondents (34.2%). CoronaVac was the most frequently reported vaccine type (83.5%). Among respondents with implant-site inflammatory reactions, 8 received CoronaVac, and 2 received ChAdOx1-S. Vaccine-related characteristics are shown in Table 2.

A comparative analysis between respondents with and without self-reported implant-site inflammatory reactions is shown in Table 3. Sex, age group, and vaccine type were not significantly associated with reported reactions. Respondents who reported systemic adverse vaccine reactions had higher odds of reporting implant-site inflammatory reactions than those who did not report systemic reactions; however, this exploratory association should be interpreted cautiously because only 10 events were observed and no confounder adjustment was possible.

DISCUSSION

In the literature, clinically confirmed foreign-body reactions may occur after fillers, threads, silicone implants, and other implanted materials, manifesting as erythema, edema, induration, tenderness, or nodules and may emerge weeks to years post-procedure.

Table 3. Comparison of characteristics between respondents with and without self-reported implant-site inflammatory reactions.

Variable	Inflammatory reaction 10 (3.8)	No reaction 256 (96.2)	Odds ratio (95% CI)	p-value
Sex				
Male	8 (3.0)	141 (53.0)	3.26 (0.68–15.67)	0.19
Female	2 (0.8)	115 (43.2)		
Age group (in years)				
18–20	2 (0.8)	29 (10.9)	—	0.63
21–30	4 (1.5)	71 (26.7)		
31–40	2 (0.8)	37 (13.9)		
41–50	0	40 (15.0)		
51–60	1 (0.4)	51 (19.1)		
>60 (Elderly)	1 (0.4)	28 (10.5)		
Adverse vaccine reactions				
Yes	7 (2.6)	84 (31.6)	4.78 (1.21–18.94)	0.04*
No	3 (1.1)	172 (64.7)		
Vaccine type				
CoronaVac (Sinovac)	8 (3.0)	214 (80.5)	—	0.63
mRNA-1273 (Moderna)	0	7 (2.6)		
ChAdOx-1 (Oxford-AstraZeneca)	2 (0.8)	27 (10.2)		
Don't know	0	8 (3.0)		

Fisher's exact test was used for sex, age group, adverse vaccine reactions, and vaccine type because of small expected cell counts. OR: odds ratio; CI: confidence interval. *p≤0.05.

In the present study, however, the outcome was limited to self-reported implant-site inflammatory symptoms. (Artzi et al., 2020; Harlim et al., 2018). During the COVID-19 pandemic, infections, dental procedures, and vaccinations have been proposed as possible immunological triggers in susceptible individuals (Beleznay et al., 2015; Humphrey et al., 2020; Munavalli et al., 2022). Theoretically, non-degradable cosmetic materials may act as adjuvants, exacerbating specific immune responses or serving as chronic foci for localized inflammation (Humphrey et al., 2020; Munavalli et al., 2022; Rice et al., 2021). However, the available evidence remains largely based on case reports, case series, retrospective studies, and pharmacovigilance reports. Therefore, the present findings should be interpreted as preliminary and hypothesis-generating.

Post-vaccination immune modulation has been widely documented. Recent evidence suggests severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and its corresponding vaccines may induce aberrant immune responses through molecular mimicry, bystander activation, and the release of pro-inflammatory cytokines, potentially reducing host immune tolerance. Multiple autoantibodies have been detected among patients with COVID-19 (Guo et al., 2023; Peng et al., 2023).

Among the 1,610 respondents from multiple Indonesian regions in this study, 266 reported having cosmetic implants, with 10 experiencing implant-site inflammatory reactions (period prevalence of 3.76%). For contextual comparison, Sadeghpour et al. (2019) reported a delayed reaction incidence of approximately 1.0% in a cohort receiving HA fillers before the COVID-19 pandemic. Humphrey also reported a similar rate of immunologic complications from HA at 0.98% (Humphrey et al., 2020). Although the observed prevalence was numerically higher than some historical estimates for delayed reactions to HA fillers (Artzi et al., 2020), direct comparison was methodologically inappropriate. Those historical studies involved fundamentally different patient populations, evaluated non-vaccination-related delayed reactions, focused strictly on specific HA fillers rather than heterogeneous cosmetic materials, and relied on clinical confirmation rather than self-reported outcomes. Therefore, this finding should be interpreted strictly as an exploratory epidemiological signal rather than definitive proof of increased risk.

A 2020 French prospective cohort of 1093 patients injected with HA fillers during the pandemic reported zero immune-related complications, even among those with concurrent COVID-19 infections (Naouri et al., 2021). However, the study was limited by a short two-month follow up period and did not assess the impact of COVID-19 vaccination. When inflammatory events do occur post-vaccination, their idiosyncratic nature suggests a multifactorial etiology. The occurrence and severity of these inflammatory events are likely influenced by material properties, procedural techniques, vaccine formulations, and baseline host immune tolerance (Hosoki et al., 2020).

The exploratory association observed in this study aligns with hypotheses suggesting that systemic immune activation from SARS-CoV-2 infection and vaccination may precipitate local implant-related inflammation (McMahon et al., 2021; Peng et al., 2023). Respondents reporting systemic adverse vaccine reactions had nearly fivefold higher odds of self-reported implant-site inflammatory reactions. While this supports a potential association between systemic immune activation and local implant-related inflammation, the occurrence of only 10 events resulted in a wide confidence interval, necessitating extreme caution in interpretation. Furthermore, public health authorities maintain that post-vaccination inflammatory reactions at implant sites are typically transient, treatable, and do not constitute a contraindication to COVID-19 vaccination (National Institute for Public Health and the Environment, 2022).

Finally, although mRNA and viral vector vaccines generally demonstrate higher systemic reactogenicity than inactivated viral vaccines (San Francisco Ramos et al., 2024), the present study did not indicate an increased rate of local inflammatory reactions associated with these more reactogenic vaccine platforms. However, this observation is heavily skewed by the predominant administration of the inactivated CoronaVac vaccine (>80%) within the study cohort.

Limitations and future directions

The current preliminary study has several significant methodological limitations which restrict causal inference. First, the primary outcome was self-reported and lacked clinical confirmation. Because symptoms were not verified by dermatological examination, imaging, or histopathology, the reported events cannot be confidently classified as true foreign body reactions. Alternative diagnoses such as infection, trauma, allergic reactions, seroma, filler edema, implant contracture, or nonspecific pain cannot be excluded. Furthermore, interpretation of these self-reported symptoms should consider the potential influence of surveillance bias, differential healthcare-seeking behavior, and nocebo effects driven by social media.

Second, the survey instrument was designed to assess general post-vaccination side effects and consumer rights, rather than implant-related inflammatory outcomes specifically. Furthermore, the questionnaire did not undergo formal validation processes, such as pilot testing, cognitive interviewing, or test-retest reliability assessments prior to deployment. This opportunistic study design and lack of validation inevitably affected construct validity. Consequently, the instrument did not capture the exact interval between vaccination and symptom onset, preventing the assessment of a plausible temporal relationship.

Third, the study lacked implant-specific characterization. Essential variables including implant material, anatomical site, procedure type, time since implantation, and the number of prior procedures were not recorded. Because different materials (e.g., HA fillers, silicone implants, suspension threads) differ fundamentally in their biological and clinical profiles, this omission restricts material-specific analysis.

Fourth, the survey did not collect data on critical confounders. Variables such as prior COVID-19 infection, autoimmune disease, allergy history, concurrent medication use, previous dental procedures, history of prior implant reactions, and exact vaccine dose number were unmeasured and therefore could not be controlled.

Fifth, the inferential reliability of the study is severely limited by the small outcome event count (n=10). This low reported frequency was likely exacerbated by a high rate of non-disclosure, which may have reflected cultural sensitivities surrounding cosmetic procedures. Consequently, multivariable regression could not be performed, and the calculated odds ratio exhibits a very wide confidence interval (95% CI: 1.21–18.94). This association must therefore be interpreted strictly as exploratory.

Finally, the recruitment methodology relied on voluntary participation via an online questionnaire distributed by a nongovernmental organization. This convenience sampling approach introduced distinct selection and response biases, resulted in significant urban overrepresentation, and cannot be considered nationally representative of the broader Indonesian population.

To move beyond the preliminary epidemiological observations presented here, future research must employ rigorous, adequately powered prospective cohort designs. Such studies should establish a clear timeline of events to reduce recall bias and incorporate objective clinical confirmation of outcomes using standardized

diagnostic criteria, imaging, or histopathology. Furthermore, studies must implement categorical implant-type stratification to account for fundamentally different immunogenic profiles, alongside multivariable regression to control for critical temporal and baseline confounders. Finally, the evaluation of relevant biomarkers—such as C-reactive protein, erythrocyte sedimentation rate, and inflammatory cytokines—in clinically confirmed cases is required to clarify potential mechanistic pathways.

CONCLUSION

This preliminary cross-sectional survey identified self-reported implant-site inflammatory reactions in a small proportion of COVID-19-vaccinated Indonesian respondents with cosmetic implants. An exploratory analysis suggested a higher frequency of reported implant-site reactions was observed among respondents who also reported systemic vaccine adverse events. However, because the outcome was self-reported, clinically unverified, and assessed without temporal data or control for key confounders, these findings must be interpreted strictly as hypothesis-generating rather than causal. Prospective, clinically verified studies are required to clarify the timing, risk factors, and mechanisms of these reactions.

CONFLICT OF INTEREST

The research was conducted entirely free from any involvement in commercial, financial, or personal matters that might be perceived as a possible conflict of interest or that could have influenced the outcomes or interpretation of the study.

ACKNOWLEDGMENTS

Special thanks are due to the Rector of Universitas Kristen Indonesia and to the Indonesian dermatologists and the Indonesian Consumers Foundation. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

GENERATIVE ARTIFICIAL INTELLIGENCE (AI)

The authors declare that no generative artificial intelligence (AI) or AI-assisted technologies were used in the preparation, writing, or editing of this manuscript. All content was developed solely by the authors, who take full responsibility for its accuracy and integrity.

REFERENCES

Artzi O, Cohen JL, Dover JS, Suwanchinda A, Pavicic T, Landau M, Goodman GJ, Ghannam S, Al Niaimi F, van Loghem JA, Goldie K, Sattler S, Cassuto D, Lim TS, Wanitphakdeedecha R, Verner I, Fischer TC, Bucay V, Sprecher E, Shalmon D (2020) Delayed inflammatory reactions to hyaluronic acid fillers: A literature review and proposed treatment algorithm. Clin Cosmet Investig Dermatol 13: 371–378. https://doi.org/10.2147/CCID.S247171

Beleznay K, Carruthers JDA, Carruthers A, Mummert ME, Humphrey S (2015) Delayed-onset nodules secondary to a smooth cohesive 20 mg/mL hyaluronic acid filler. Dermatol Surg 41(8): 929–939. https://doi.org/10.1097/DSS.0000000000000418

Carnicer-Lombarte A, Chen S-T, Malliaras GG, Barone DG (2021) Foreign body reaction to implanted biomaterials and its impact in nerve neuroprosthetics. Front Bioeng Biotechnol 9: 622524. https://doi.org/10.3389/fbioe.2021.622524

Cheng W, Cai Z, Tang X (2023) Adverse reactions to cosmetic implants after COVID-19 vaccination: A literature review. J Cosmet Dermatol 22(12): 3199–3212. https://doi.org/10.1111/jocd.15828

Guo M, Liu X, Chen X, Li Q (2023) Insights into new-onset autoimmune diseases after COVID-19 vaccination. Autoimmun Rev 22(7): 103340. https://doi.org/10.1016/j.autrev.2023.103340

Harlim A, Kanoko M, Aisah S (2018) Classification of foreign body reactions due to industrial silicone injection. Dermatol Surg 44(9): 1174–1182. https://doi.org/10.1097/DSS.0000000000001531

Hosoki K, Chakraborty A, Sur S (2020) Molecular mechanisms and epidemiology of COVID-19 from an allergist's perspective. J Allergy Clin Immunol 146(2): 285–299. https://doi.org/10.1016/j.jaci.2020.05.033

Humphrey S, Jones DH, Carruthers JD, Carruthers A, Beleznay K, Wesley N, Black JM, Vanderveen S, Minokadeh A (2020) Retrospective review of delayed adverse events secondary to treatment with a smooth, cohesive 20-mg/mL hyaluronic acid filler in 4500 patients. J Am Acad Dermatol 83(1): 86–95. https://doi.org/10.1016/j.jaad.2020.01.066

McMahon DE, Amerson E, Rosenbach M, Lipoff JB, Moustafa D, Tyagi A, Desai SR, French LE, Lim HW, Thiers BH, Hruza GJ, Blumenthal KG, Fox LP, Freeman EE (2021) Cutaneous reactions reported after Moderna and Pfizer COVID-19 vaccination: A registry-based study of 414 cases. J Am Acad Dermatol 85(1): 46–55. https://doi.org/10.1016/j.jaad.2021.03.092

Munavalli GG, Guthridge R, Knutsen-Larson S, Brodsky A, Matthew E, Landau M (2022) COVID-19/SARS-CoV-2 virus spike protein-related delayed inflammatory reaction to hyaluronic acid dermal fillers: a challenging clinical conundrum in diagnosis and treatment. Arch Dermatol Res 314(1): 1–15. https://doi.org/10.1007/s00403-021-02190-6

Naouri M, Dahan S, Le Pillouer Prost A, Coutant-Foulc P, Raimbault C, Cucurella F, Beille L, Creusot M, Baspeyras M, Darchy M, Khallouf R, Cartier H, Baratte I, Dubois M, Cogrel O, Laubach H (2021) Good tolerance of hyaluronic acid injections during the period of the COVID-19 pandemic: observing a cohort of 1093 patients in a prospective, observational real-life study. J Eur Acad Dermatol Venereol 35(7). https://doi.org/10.1111/jdv.17271

National Institute for Public Health and the Environment (2022) Hypersensitivity reactions to fillers in combination with COVID-19 vaccinations. Ministry of Health, Welfare and Sport of the Netherlands, Bilthoven, Netherlands. https://rivm.nl/documenten/hypersensitivity-reactions-to-fillers-in-combination-with-covid-19-vaccinations [Consulted 20 June 2026]

Osmond A, Kenny B (2021) Reaction to dermal filler following COVID-19 vaccination. J Cosmet Dermatol 20(12): 3751–3752. https://doi.org/10.1111/jocd.14566

Peng K, Li X, Yang D, Chan SCW, Zhou J, Wan EYF, Chui CSL, Lai FTT, Wong CKH, Chan EWY, Leung WK, Lau C-S, Wong ICK (2023) Risk of autoimmune diseases following COVID-19 and

the potential protective effect from vaccination: A population-based cohort study. EClinicalMedicine 63: 102154. https://doi.org/10.1016/j.eclinm.2023.102154

Rice SM, Ferree SD, Mesinkovska NA, Kourosh AS (2021) The art of prevention: COVID-19 vaccine preparedness for the dermatologist. Int J Women's Dermatol 7(2): 209–212. https://doi.org/10.1016/j.ijwd.2021.01.007

Sadeghpour M, Quatrano NA, Bonati LM, Arndt KA, Dover JS, Kaminer MS (2019) Delayed-onset nodules to differentially crosslinked hyaluronic acids: comparative incidence and risk assessment. Dermatol Surg 45(8): 1085–1094. https://doi.org/10.1097/DSS.0000000000001814

San Francisco Ramos A, Liu Sanchez C, Bovill Rose T, Smith D, Thorn N, Galiza E, Miah T, Pearce J, Hultin C, Cosgrove C, Hsia Y, Heath PT (2024) Comparing reactogenicity of COVID-19 vaccine boosters: a systematic review and meta-analysis. Expert Rev Vaccines 23(1): 266–282. https://doi.org/10.1080/14760584.2024.2315089

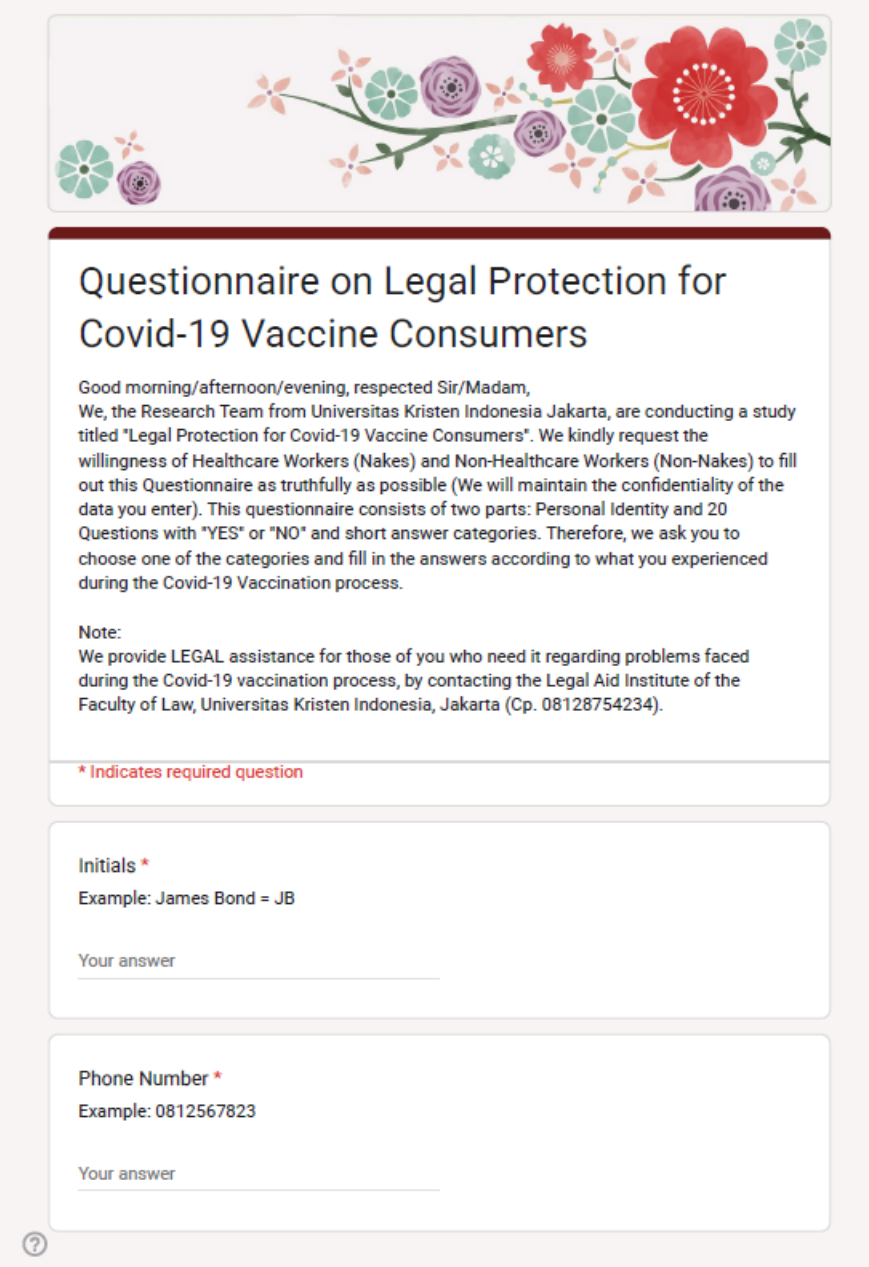
AUTHOR CONTRIBUTION:

Contribution	Harlim A	Panjaitan H	Andrew H	Harlim C
Concepts or ideas	x	x		
Design		x		
Definition of intellectual content	x			
Literature search				x
Experimental studies				
Data acquisition	x	x		
Data analysis			x	
Statistical analysis			x	
Manuscript preparation	x	x	x	x
Manuscript editing	x		x	x
Manuscript review	x	x	x	x

Citation Format: Harlim A, Panjaitan H, Andrew H, Harlim C (2026) Self-reported implant-site inflammatory reactions after COVID-19 vaccination among Indonesian cosmetic implant recipients: Cross-sectional survey. J Pharm Pharmacogn Res 14(4): 2722. https://doi.org/10.56499/jppres_14.4.2722

Supplementary data

Appendix 1. Questionnaire on legal protection for COVID-19 vaccine consumers.



Questionnaire on Legal Protection for Covid-19 Vaccine Consumers

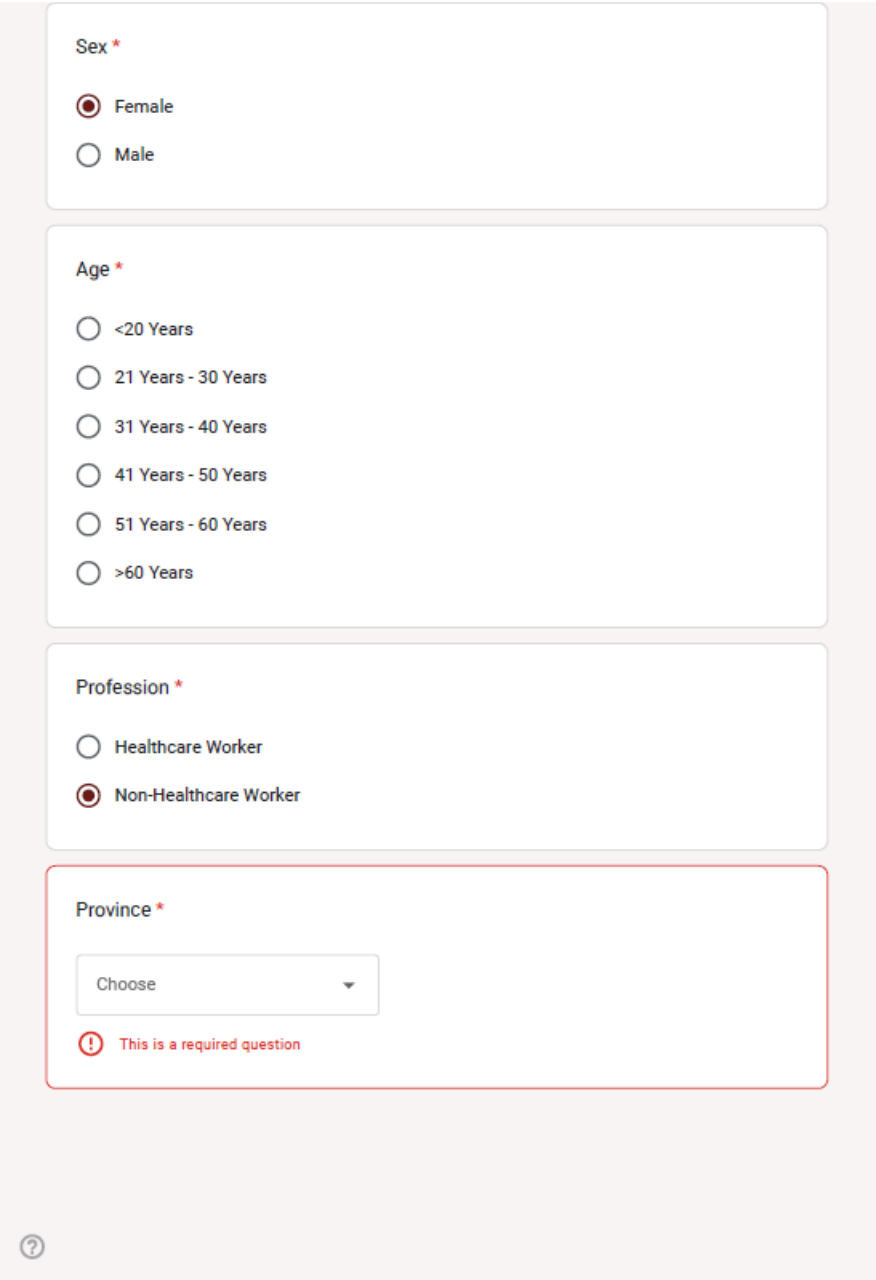
Good morning/afternoon/evening, respected Sir/Madam,
We, the Research Team from Universitas Kristen Indonesia Jakarta, are conducting a study titled "Legal Protection for Covid-19 Vaccine Consumers". We kindly request the willingness of Healthcare Workers (Nakes) and Non-Healthcare Workers (Non-Nakes) to fill out this Questionnaire as truthfully as possible (We will maintain the confidentiality of the data you enter). This questionnaire consists of two parts: Personal Identity and 20 Questions with "YES" or "NO" and short answer categories. Therefore, we ask you to choose one of the categories and fill in the answers according to what you experienced during the Covid-19 Vaccination process.

Note:
We provide LEGAL assistance for those of you who need it regarding problems faced during the Covid-19 vaccination process, by contacting the Legal Aid Institute of the Faculty of Law, Universitas Kristen Indonesia, Jakarta (Cp. 08128754234).

* Indicates required question

Initials *
Example: James Bond = JB
Your answer

Phone Number *
Example: 0812567823
Your answer


Sex *
Female
Male
Age *
<20 Years
21 Years - 30 Years
31 Years - 40 Years
41 Years - 50 Years
51 Years - 60 Years
>60 Years
Profession *
Healthcare Worker
Non-Healthcare Worker
Province *
Choose
This is a required question

City/Regency *
Example: City: East Jakarta; Regency: Bogor

Your answer

What type of vaccine was injected into you?

- ○ Sinovac
- ○ AstraZeneca
- ○ Other:

Vaccination Location *
Example: City: East Jakarta; Regency: Bogor

- ○ Hospital
- ○ Community Health Center (Puskesmas)
- ◉ Clinic
- ○ Workplace Institution
- ○ Other:

Did you feel comfortable during or after being vaccinated? *

- ○ Yes
- ◉ No

Did you ever feel worried or doubtful about the efficacy and usefulness of the vaccine after being injected? *

- (●) Yes
- ( ) No

Did the vaccination process follow health protocols (masks, keeping distance, washing hands)? *

- (●) Yes
- ( ) No

Did you experience any other complaints or symptoms shortly after or following the vaccination? *

- ( ) Yes
- ( ) No

Did you feel safe being injected with the vaccine? *

- ( ) Yes
- ( ) No

At the time you were injected, did you think of negative or bad things related to the side effects of the vaccine? *

- ( ) Yes
- ( ) No

Did you have a choice regarding the type of vaccine to be injected or consumed? *

- Yes
- No

Was it easy for you to get the vaccine? *

- Yes
- No

Was there clear information regarding the composition or type of vaccine before you were vaccinated? *

- Yes
- No

Was there clear information regarding the efficacy or benefits of the vaccine before you were vaccinated? *

- Yes
- No

Was there clear information regarding the use of the vaccine before or after you were vaccinated? *

- Yes
- No

For those of you who have certain illnesses, did you feel worried before being vaccinated and convey those concerns to the healthcare workers? *

- Yes
- No

Did the healthcare workers listen to and follow up on the complaints you conveyed? *

- Yes
- No

Was any counseling regarding the vaccine ever provided to you? *

- Yes
- No

Were you ever informed about what actions you should take if complaints or other symptoms occurred after being vaccinated? *

- Yes
- No

Were you ever informed about what actions you should take if there were adverse effects/losses due to the use of the vaccine? *

- Yes
- No

Was the vaccination you received in accordance with procedures; sealed vaccine, alcohol swab before injection, observation for side effects before going home? *

If "Yes", please specify the actions that did not follow the procedure: (Write the answer in the "Other" option)

- [ ] Yes
- [ ] No
- [ ] Other: _____

Did any undesirable reactions occur after vaccination such as fever, allergies, shortness of breath, drowsiness, or others? *

If "Yes", please specify: (Write the answer in the "Other" option)

- ( ) Yes
- (•) No
- ( ) Other: _____

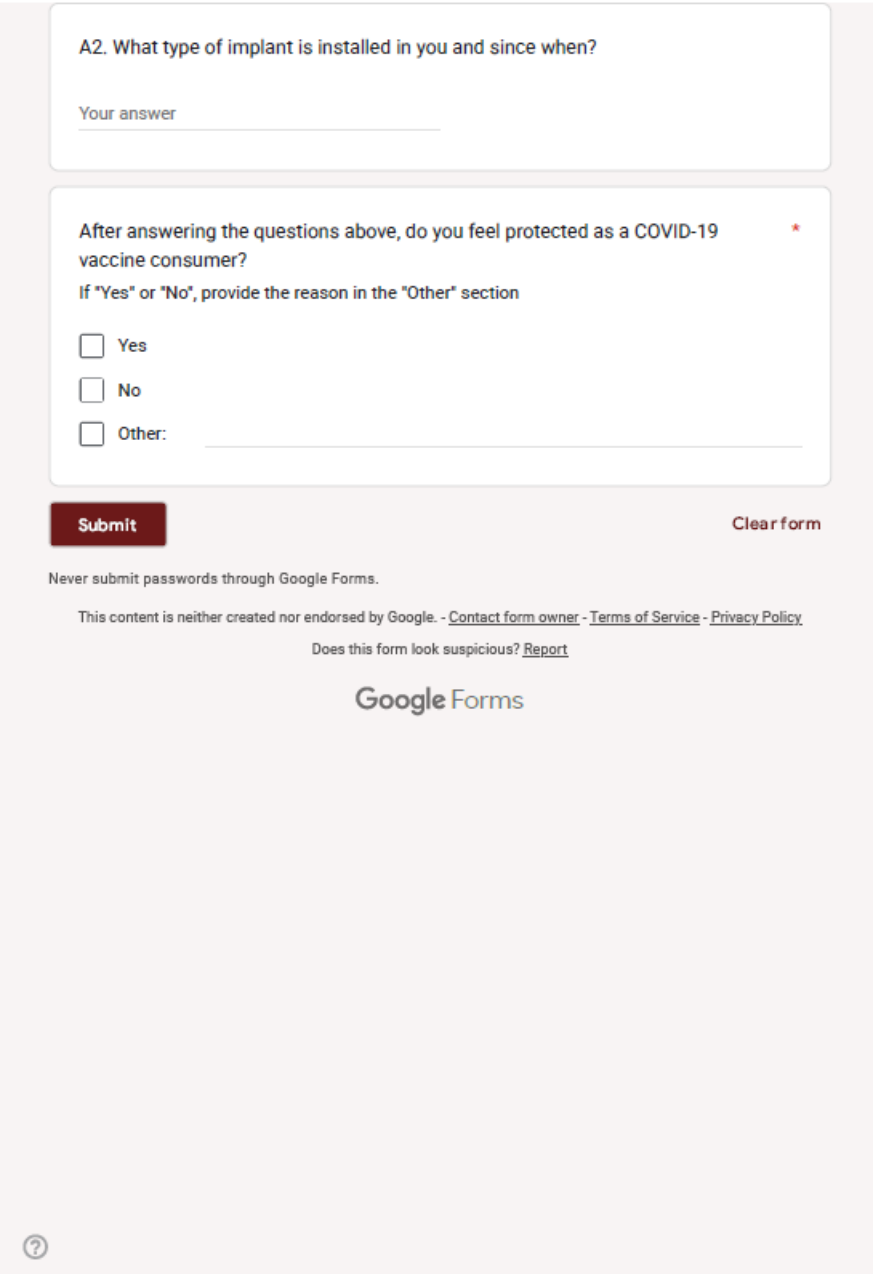
Did any reaction occur to implants installed in the body (thread lift, fillers, surgical implants, or others)? *

If the answer is "Yes, a reaction occurred", it is mandatory to answer questions A1 and A2 below

- [ ] No implant
- [ ] No reaction
- [ ] Yes, a reaction occurred

A1. If a reaction occurred to the installed implant, in which part did it occur and what was the reaction like?

Your answer


A2. What type of implant is installed in you and since when?

Your answer

After answering the questions above, do you feel protected as a COVID-19 vaccine consumer? *

If "Yes" or "No", provide the reason in the "Other" section

Yes

No

Other:

Submit

Clear form

Never submit passwords through Google Forms.

This content is neither created nor endorsed by Google. - Contact form owner - Terms of Service - Privacy Policy

Does this form look suspicious? Report

Google Forms

STROBE Statement—Checklist of items that should be included in reports of cross-sectional studies

	Item No	Recommendation	Page
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	1
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	2
Objectives	3	State specific objectives, including any prespecified hypotheses	2
Methods			
Study design	4	Present key elements of study design early in the paper	2–3
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	2–3
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	3
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	3
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	2–3
Bias	9	Describe any efforts to address potential sources of bias	2–3, 6–7
Study size	10	Explain how the study size was arrived at	4
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	3
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	3
		(*b*) Describe any methods used to examine subgroups and interactions	N/A
		(*c*) Explain how missing data were addressed	3
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	N/A
		(*e*) Describe any sensitivity analyses	N/A
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	3
		(b) Give reasons for non-participation at each stage	3
		(c) Consider use of a flow diagram	3
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	3–4
		(b) Indicate number of participants with missing data for each variable of interest	3-4
Outcome data	15*	Report numbers of outcome events or summary measures	3–5
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	5
		(*b*) Report category boundaries when continuous variables were categorized	
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	N/A
Discussion			
Key results	18	Summarise key results with reference to study objectives	5-6
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	6
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	6–7
Generalisability	21	Discuss the generalisability (external validity) of the study results	6–7
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	7

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the websites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.