**Adverse Events Following Immunization Associated with the first and second doses of the ChAdOx1 nCoV-19 vaccine among health care workers in Korea**

## ONLINE SUPPLEMENT MATERIALS

**Table S1:** Solicited adverse events and grades

**Table S2:** Severity of adverse events following the first and second dose of ChAdOx1 nCoV-19 vaccine by age group

**Table S3:** Incidence of the adverse events following the first and second doses of ChAdOx1 nCoV-19 vaccine by age under 30 years and over 30 years

**Table S4:** Patients who visited the outpatient clinic or emergency room due to adverse events following immunization

**Table S1.** Solicited adverse events and grades.

| Adverse events | Grade 0 | Grade 1 | Grade 2 | Grade 3 | Grade 4 |
|---|---|---|---|---|---|
| Injection site tenderness | None | Minor tenderness when injection site is touched | Very tender when injection site is touched, pain increased when it is moved | Severe pain so that limb movement reduced | - |
| Injection site resting pain | None | No interference with activity | Interferes with activity or requires use of pain-relieving medication | Prevents daily activity or requires use of prescription pain-relieving medication | - |
| Injection site redness[b] | None | < 2.5 cm | 2.5–5 cm | 5.1–10 cm | > 10 cm |
| Injection site swelling[b] | None | < 2.5 cm | 2.5–5 cm | 5.1–10 cm | > 10 cm |
| Fatigue | None | No interference with activity | Some interference with activity | Prevents daily activity | - |
| Headache | None | No interference with activity | Some interference with activity or requires use of pain relieving medication | Prevents daily activity or requires use of prescription pain-relieving medication | - |
| Malaise | None | No interference with activity | Some interference with activity or requires use of pain-relieving medication | Prevents daily activity or requires use of prescription pain-relieving medication | - |
| Arthralgia | None | No interference with activity | Some interference with activity or requires use of pain-relieving medication | Prevents daily activity or requires use of prescription pain-relieving medication | - |
| Chills | None | No interference with activity | Some interference with activity or requires medical intervention | Prevents daily activity or requires medical intervention | - |
| Fever[a] | < 38°C | 38.0–38.4°C | 38.5–38.9°C | 39.0–40.0°C | > 40.0°C |

| | | | | | |
|---|---|---|---|---|---|
| Nausea/vomiting | None | No interference with activity or 1–2 episodes/day | Some interference with activity or ≥ 3 episodes/day | Prevents daily activity or requires outpatient intravenous hydration | - |
| Diarrhea | None | 1 episode/day | 2–3 episodes/day | 4–5 episodes/day | ≥ 6 episodes/day or requires outpatient intravenous hydration |

[a]Measured value by using tympanic thermometer; [b]Measured the largest single diameter of lesion.

**Table S2.** Severity of adverse events following the first and second dose of ChAdOx1 nCoV-19 vaccine by age group.

| Adverse events | 1st dose | | | | 2nd dose | | | |
|---|---|---|---|---|---|---|---|---|
| | < 30 yr (*n* = 394) | 30–50 yr (*n* = 471) | > 50 yr (*n* = 129) | *p* value | < 30 yr (n =244) | 30–50yr (n =378) | > 50 yr (n =105) | *p* value |
| ALL | | | | 0.011 | | | | 0.466 |
| None | 5 (1.3) | 7 (1.5) | 7 (5.4) | | 21 (8.6) | 32 (8.5) | 13 (12.4) | |
| Grade 1 | 19 (4.8) | 56 (11.9) | 33 (25.6) | | 70 (28.7) | 105 (27.8) | 46 (43.8) | |
| Grade 2 | 165 (41.9) | 201 (42.7) | 56 (43.4) | | 114 (46.7) | 159 (42.1) | 30 (28.6) | |
| Grade 3 | 199 (50.5) | 196 (41.6) | 33 (25.6) | | 38 (15.6) | 80 (21.2) | 16 (15.2) | |
| Grade 4 | 6 (1.5) | 11 (2.3) | 0 ( 0.0) | | 1 (0.4) | 2 (0.5) | 0 (0.0) | |
| Local AEFIs | | | | <0.001 | | | | 0.079 |
| None | 12 (3.0) | 21 (4.5) | 16 (12.4) | | 39 (16.0) | 52 (13.8) | 24 (22.9) | |
| Grade 1 | 44 (11.2) | 99 (21.0) | 48 (37.2) | | 81 (33.2) | 117 (31.0) | 44 (41.9) | |
| Grade 2 | 182 (46.2) | 187 (39.7) | 36 (27.9) | | 91 (37.3) | 139 (36.8) | 22 (21.0) | |
| Grade 3 | 151 (38.3) | 157 (33.3) | 29 (22.5) | | 32 (13.1) | 68 (18.0) | 15 (14.3) | |
| Grade 4 | 5 (1.3) | 7 (1.5) | 0 (0.0) | | 1 (0.4) | 2 (0.5) | 0 (0.0) | |
| Systemic AEFIs | | | | <0.001 | | | | 0.711 |
| None | 11 (2.8) | 19 (4.0) | 16 (12.4) | | 62 (25.4) | 88 (23.3) | 28 (26.7) | |
| Grade 1 | 50 (12.7) | 97 (20.6) | 42 (32.6) | | 88 (36.1) | 153 (40.5) | 53 (50.5) | |
| Grade 2 | 229 (58.1) | 254 (53.9) | 64 (49.6) | | 87 (35.7) | 113 (29.9) | 23 (21.9) | |
| Grade 3 | 103 (26.1) | 97 (20.6) | 7 (5.4) | | 7 (2.9) | 24 (6.3) | 1 (1.0) | |
| Grade 4 | 1 (0.3) | 4 (0.8) | 0 (0.0) | | 0 (0.0) | 0 (0.0) | 0 (0.0) | |
| Tenderness | | | | <0.001 | | | | 0.051 |
| None | 12 (3.0) | 23 (4.9) | 20 (15.5) | | 46 (18.9) | 54 (14.3) | 25 (23.8) | |
| Grade 1 | 48 (12.2) | 109 (23.1) | 51 (39.5) | | 75 (30.7) | 120 (31.7) | 45 (42.9) | |
| Grade 2 | 187 (47.5) | 182 (38.6) | 31 (24.0) | | 91 (37.3) | 138 (36.5) | 21 (20.0) | |
| Grade 3 | 147 (37.3) | 157 (33.3) | 27 (20.9) | | 32 (13.1) | 66 (17.5) | 14 (13.3) | |
| Resting pain | | | | <0.001 | | | | 0.337 |
| None | 39 (9.9) | 47 (10.0) | 33 (25.6) | | 87 (35.7) | 119 (31.5) | 40 (38.1) | |
| Grade 1 | 206 (52.3) | 267 (56.7) | 70 (54.3) | | 138 (56.6) | 217 (57.4) | 58 (55.2) | |
| Grade 2 | 147 (37.3) | 156 (33.1) | 25 (19.4) | | 19 (7.8) | 42 (11.1) | 7 (6.7) | |
| Grade 3 | 2 (0.5) | 1 (0.2) | 1 (0.8) | | 0 (0.0) | 0 (0.0) | 0 (0.0) | |
| Redness[a] | | | | 0.129 | | | | 0.071 |
| None | 249 (63.2) | 312 (66.2) | 94 (72.9) | | 193 (79.1) | 268 (70.9) | 76 (72.4) | |
| Grade 1 | 111 (28.2) | 113 (24.0) | 27 (20.9) | | 47 (19.3) | 98 (25.9) | 27 (25.7) | |
| Grade 2 | 15 (3.8) | 31 (6.6) | 3 (2.3) | | 4 (1.6) | 7 (1.9) | 1 (1.0) | |
| Grade 3 | 16 (4.1) | 10 (2.1) | 5 (3.9) | | 0 (0.0) | 4 (1.1) | 1 (1.0) | |
| Grade 4 | 3 (0.8) | 5 (1.1) | 0 (0.0) | | 0 (0.0) | 1 (0.3) | 0 (0.0) | |
| Swelling[a] | | | | 0.051 | | | | 0.364 |
| None | 185 (47.0) | 250 (53.1) | 75 (58.1) | | 172 (70.5) | 249 (65.9) | 67 (63.8) | |
| Grade 1 | 136 (34.5) | 146 (31.0) | 44 (34.1) | | 57 (23.4) | 99 (26.2) | 30 (28.6) | |
| Grade 2 | 45 (11.4) | 56 (11.9) | 7 (5.4) | | 13 (5.3) | 24 (6.3) | 5 (4.8) | |
| Grade 3 | 25 (6.3) | 12 (2.5) | 3 (2.3) | | 1 (0.4) | 4 (1.1) | 3 (2.9) | |
| Grade 4 | 3 (0.8) | 7 (1.5) | 0 (0.0) | | 1 (0.4) | 2 (0.5) | 0 (0.0) | |
| Fatigue | | | | <0.001 | | | | 0.168 |
| None | 20 (5.1) | 31 (6.6) | 20 (15.5) | | 81 (33.2) | 104 (27.5) | 37 (35.2) | |
| Grade 1 | 92 (23.4) | 133 (28.2) | 51 (39.5) | | 95 (38.9) | 164 (43.4) | 51 (48.6) | |
| Grade 2 | 187 (47.5) | 215 (45.6) | 52 (40.3) | | 61 (25.0) | 88 (23.3) | 16 (15.2) | |
| Grade 3 | 95 (24.1) | 92 (19.5) | 6 (4.7) | | 7 (2.9) | 22 (5.8) | 1 (1.0) | |
| Headache | | | | <0.001 | | | | 0.694 |
| None | 60 (15.2) | 115 (24.4) | 47 (36.4) | | 140 (57.4) | 229 (60.6) | 64 (61.0) | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Grade 1 | 89 (22.6) | 127 (27.0) | 46 (35.7) | | 54 (22.1) | 92 (24.3) | 29 (27.6) | |
| Grade 2 | 243 (61.7) | 223 (47.3) | 36 (27.9) | | 50 (20.5) | 56 (14.8) | 12 (11.4) | |
| Grade 3 | 2 (0.5) | 6 (1.3) | 0 (0.0) | | 0 (0.0) | 1 (0.3) | 0 (0.0) | |
| Malaise | | | | <0.001 | | | | 0.281 |
| None | 51 (12.9) | 74 (15.7) | 36 (27.9) | | 156 (63.9) | 218 (57.7) | 61 (58.1) | |
| Grade 1 | 89 (22.6) | 109 (23.1) | 38 (29.5) | | 56 (23.0) | 105 (27.8) | 35 (33.3) | |
| Grade 2 | 247 (62.7) | 279 (59.2) | 54 (41.9) | | 32 (13.1) | 53 (14.0) | 9 (8.6) | |
| Grade 3 | 7 (1.8) | 9 (1.9) | 1 (0.8) | | 0 (0.0) | 2 (0.5) | 0 (0.0) | |
| Arthralgia | | | | 0.086 | | | | 0.045 |
| None | 154 (39.1) | 169 (35.9) | 60 (46.5) | | 197 (80.7) | 293 (77.5) | 72 (68.6) | |
| Grade 1 | 82 (20.8) | 114 (24.2) | 31 (24.0) | | 30 (12.3) | 61 (16.1) | 23 (21.9) | |
| Grade 2 | 155 (39.3) | 184 (39.1) | 38 (29.5) | | 17 (7.0) | 24 (6.3) | 10 (9.5) | |
| Grade 3 | 3 (0.8) | 4 (0.8) | 0 (0.0) | | 0 (0.0) | 0 (0.0) | 0 (0.0) | |
| Chills | | | | 0.001 | | | | 0.570 |
| None | 117 (29.7) | 149 (31.6) | 60 (46.5) | | 206 (84.4) | 308 (81.5) | 89 (84.8) | |
| Grade 1 | 90 (22.8) | 109 (23.1) | 33 (25.6) | | 23 (9.4) | 50 (13.2) | 13 (12.4) | |
| Grade 2 | 179 (45.4) | 207 (43.9) | 35 (27.1) | | 15 (6.1) | 17 (4.5) | 3 (2.9) | |
| Grade 3 | 8 (2.0) | 6 (1.3) | 1 (0.8) | | 0 (0.0) | 3 (0.8) | 0 (0.0) | |
| Fever[b] | | | | <0.001 | | | | 0.084 |
| None | 264 (67.0) | 337 (71.5) | 119 (92.2) | | 243 (99.6) | 367 (97.1) | 103 (98.1) | |
| Grade 1 | 83 (21.1) | 88 (18.7) | 10 ( 7.8) | | 1 (0.4) | 8 (2.1) | 2 (1.9) | |
| Grade 2 | 40 (10.2) | 34 (7.2) | 0 (0.0) | | 0 (0.0) | 2 (0.5) | 0 (0.0) | |
| Grade 3 | 7 (1.8) | 10 (2.1) | 0 (0.0) | | 0 (0.0) | 1 (0.3) | 0 (0.0) | |
| Grade 4 | 0 (0.0) | 2 (0.4) | 0 (0.0) | | 0 (0.0) | 0 (0.0) | 0 (0.0) | |
| Nausea/vomiting | | | | <0.001 | | | | 0.446 |
| None | 217 (55.1) | 311 (66.0) | 104 (80.6) | | 208 (85.2) | 333 (88.1) | 94 (89.5) | |
| Grade 1 | 143 (36.3) | 124 (26.3) | 21 (16.3) | | 32 (13.1) | 41 (10.8) | 11 (10.5) | |
| Grade 2 | 28 (7.1) | 35 (7.4) | 4 (3.1) | | 3 (1.2) | 3 (0.8) | 0 (0.0) | |
| Grade 3 | 6 (1.5) | 1 (0.2) | 0 (0.0) | | 1 (0.4) | 1 (0.3) | 0 (0.0) | |
| Diarrhea | | | | 0.081 | | | | 0.184 |
| None | 302 (76.6) | 386 (82.0) | 108 (83.7) | | 219 (89.8) | 333 (88.1) | 99 (94.3) | |
| Grade 1 | 56 (14.2) | 54 (11.5) | 9 (7.0) | | 9 (3.7) | 28 (7.4) | 6 (5.7) | |
| Grade 2 | 30 (7.6) | 26 (5.5) | 10 (7.8) | | 14 (5.7) | 15 (4.0) | 0 (0.0) | |
| Grade 3 | 5 (1.3) | 3 (0.6) | 2 (1.6) | | 2 (0.8) | 2 (0.5) | 0 (0.0) | |
| Grade 4 | 1 (0.3) | 2 (0.4) | 0 (0.0) | | 0 (0.0) | 0 (0.0) | 0 (0.0) | |

Values are presented as number (%). AEFI = adverse event following immunization. [a]Measured the largest single diameter of lesion; [b]Measured value by using tympanic thermometer.

| AEFIs | | A vs. B | A vs. C | B vs. C |
|---|---|---|---|---|
| **1st dose** | Any AEFIs | | 0.012 | 0.016 |
| | Local AEFIs | | < 0.001 | 0.002 |
| | Systemic AEFIs | | < 0.001 | 0.001 |
| | Tenderness | | < 0.001 | < 0.001 |
| | Resting pain | | < 0.001 | < 0.001 |
| | Fatigue | | < 0.001 | 0.002 |
| | Headache | < 0.001 | < 0.001 | 0.007 |
| | Malaise | | < 0.001 | 0.002 |
| | Chills | | 0.001 | 0.002 |
| | Fever | | < 0.001 | < 0.001 |
| | Nausea/vomiting | 0.001 | < 0.001 | 0.002 |
| 2nd dose | Arthralgia | | 0.011 | |

Post-hoc analysis by Bonferroni correction. A, age < 30 yr; B, age 30–50 yr; C, age > 50 yr. AEFI = adverse event following immunization.

**Table S3.** Incidence of the adverse events following the first and second doses of ChAdOx1 nCoV-19 vaccine by age under 30 years and over 30 years.

| Adverse events | 1st dose | | | 2nd dose | | |
|---|---|---|---|---|---|---|
| | < 30 yr ($n$ = 394) | ≥ 30 yr ($n$ = 600) | $p$ value | < 30 yr ($n$ = 244) | ≥ 30 yr ($n$ = 483) | $p$ value |
| Any AEFIs | 389 (98.7) | 586 (97.7) | 0.336 | 223 (91.4) | 438 (90.7) | 0.859 |
| Local AEFIs | 382 (97.0) | 563 (93.8) | 0.038 | 205 (84.0) | 407 (84.3) | > 0.999 |
| Tenderness | 382 (97.0) | 557 (92.8) | 0.008 | 198 (81.1) | 404 (83.6) | 0.460 |
| Resting pain | 355 (90.1) | 520 (86.7) | 0.126 | 157 (64.3) | 324 (67.1) | 0.514 |
| Redness | 145 (36.8) | 194 (32.3) | 0.166 | 51 (20.9) | 139 (28.8) | 0.028 |
| Swelling | 209 (53.0) | 275 (45.8) | 0.031 | 72 (29.5) | 167 (34.6) | 0.197 |
| Systemic AEFIs | 383 (97.2) | 565 (94.2) | 0.038 | 182 (74.6) | 367 (76.0) | 0.748 |
| Fatigue | 374 (94.9) | 549 (91.5) | 0.054 | 163 (66.8) | 342 (70.8) | 0.307 |
| Headache | 334 (84.8) | 438 (73.0) | < 0.001 | 104 (42.6) | 190 (39.3) | 0.440 |
| Malaise | 343 (87.1) | 490 (81.7) | 0.030 | 88 (36.1) | 204 (42.2) | 0.128 |
| Arthralgia | 240 (60.9) | 371 (61.8) | 0.822 | 47 (19.3) | 118 (24.4) | 0.140 |
| Chills | 277 (70.3) | 391 (65.2) | 0.106 | 38 (15.6) | 86 (17.8) | 0.515 |
| Fever | 130 (33.0) | 144 (24.0) | 0.002 | 1 (0.4) | 13 (2.7) | 0.068 |
| Nausea/vomiting | 177 (44.9) | 185 (30.8) | < 0.001 | 36 (14.8) | 56 (11.6) | 0.275 |
| Diarrhea | 92 (23.4) | 106 (17.7) | 0.035 | 25 (10.2) | 51 (10.6) | 0.998 |

Data are presented as number (%). AEFI = adverse event following immunization.

**Table S4.** Patients who visited the outpatient clinic or emergency room due to adverse events following immunization.

| No. | Age | Sex | Chief complaint | Dose | Time to visit after vaccination | Medical care unit |
|---|---|---|---|---|---|---|
| 1 | 24 | Female | pain, redness, warmth at the injection site | 1st | Day 6 | ID |
| 2 | 51 | Female | Redness, warmth, itching sense at the injection site | 1st | Day 5 | ID |
| 3 | 26 | Female | Urticaria at both arms | 1st | Day 1 | ID |
| 4 | 27 | Female | Urticaria at both legs | 1st | Day 2 | ER |
| 5 | 31 | Female | Fever | 1st | Day 2 | ER |
| 6 | 45 | Female | Fever, chills, malaise | 1st | Day 2 | ER |
| 7 | 19 | Female | Chills, headache, malaise, nausea | 1st | Day 1 | ID |
| 8 | 22 | Female | Hypotension, nausea, dyspnea, dizziness | 1st | Day 0 | ER |
| 9 | 39 | Female | Chills, malaise | 1st | Day 1 | ER |
| 10 | 23 | Female | Dizziness, nausea, weakness, and tingling sense of lower extremities | 1st | Day 0 | ER |
| 11 | 24 | Female | Pain, redness, swelling, induration, itching sense at the injection site | 1st | Day 7 | ID |
| 12 | 30 | Male | Diarrhea | 1st | Day 2 | ID |
| 13 | 37 | Male | Diarrhea, nausea, vomiting, malaise, fatigue | 1st | Day 2 | ID |
| 14 | 27 | Female | Throat pain and swelling | 2nd | Day 1 | ID |
| 15 | 46 | Female | Headache, chills, fatigue | 2nd | Day 3 | ID |
| 16 | 23 | Female | Petechiae on both legs | 2nd | Day 3 | ID |
| 17 | 65 | Male | Multiple ecchymosis on both arms | 2nd | Day 7 | ID |
| 18 | 38 | Female | Arthralgia, fatigue | 2nd | Day 7 | ID |

ID = department of infectious disease, ER = emergency room.