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COVID-19 Vaccines and Related Adverse Effects among Health Sciences and Non-Health Sciences Students from Two Large Public Universities in Thailand

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ABSTRACT

Introduction: Existing data on vaccine regimens received by university students and related adverse effects are limited.

Methods: An online survey study was conducted among students from 12 Health Sciences faculties (HS), including Faculty of Medicine and from 16 non-Health Sciences faculties (NHS) of two large urban Thai universities from October 2021 to January 2022. Types, doses and adverse effects (AEs) of COVID-19 vaccines received by HS and NHS were assessed.

Results: There were 1,439 participating students who had received two doses of COVID-19 vaccines. Of these 1,439 students, 522 (36%) were HS (208 were medical students), 393 (27%) were from faculties of Sciences, and 524 (37%) were from faculties of Social Sciences. The types of the first dose vaccine received were inactivated (49%), viral vector (46%) and mRNA (5%), while the types of the second dose vaccine received were viral vector (53%), inactivated (40%) and mRNA (7%). For the first dose vaccines, the most common AE of inactivated, viral vector and mRNA vaccines were muscle pain (47%, 82%, 58%, respectively). For the second dose vaccines, the most common AE were cough (47%) for inactivated vaccines and muscle pain (49% for viral vector and 56% for mRNA vaccines). Viral vector vaccines were more likely to cause fever, muscle pain, diarrhea, headache and rashes while inactivated vaccines were more likely to cause cough. The mRNA vaccines caused injection site pain more than inactivated vaccines. Tables 1 and 2 demonstrate the type and onset of AEs by types of the vaccines. Overall, the majority of AEs occurred at 24-48 hours after vaccination (57-68%), were more severe with the first dose compared to the second dose (59%) and resolved spontaneously or with symptomatic treatment without the need for hospitalization (98%). The AEs experienced by HS and NHS were different according to the types of vaccine they received.

Conclusion: The AEs experienced by the students were different according to the type and number of doses of COVID-19 vaccines. The AEs were mostly non-severe and occurred less for the second dose compared to the first dose. The study findings could serve as information provided to university students for decision making regarding COVID-19 vaccination.

INTRODUCTION

- Coronavirus disease 2019 (COVID-19) pandemic has posed a great impact on medical profession worldwide. Several vaccine regimens have been developed to provide an effective measures against COVID-19.
- Hesitation and refusal of available vaccines is one of the global public health threats, while past studies on vaccine hesitancy found that concerns about vaccine adverse effects was a major reason (1,2).
- University students are considered a group of population at risk for COVID-19 due to socialization and reluctance to COVID-19 preventive measures, including the vaccination (1). Existing data on type of vaccine received in Thai university students and related adverse effects have been limited.

METHODS

Population: University students
Setting: Chulalongkorn University and Thammasat University, Thailand
Study design: A cross-sectional survey study
Study period: 1 October 2021 to 31 January 2022

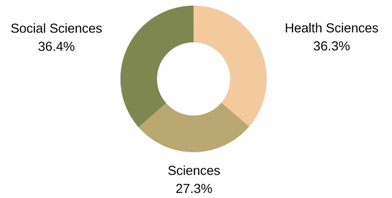
Study protocol:
An online Google form survey collecting the data regarding type of vaccine, adverse effects and impacts of the adverse effects. Internal consistency of the survey from a pre-test on 20 students with Cronbach's alpha 0.77

Statistical analysis: Software Package IBM SPSS statistics Version 22.0 supplied by SPSS Inc (SPSS, Chicago, Illinois). Descriptive data were presented in numbers (percent). Categorical variables were compared using the Chi-square test.

RESULTS

Demographic data

Participating students from Thammasat University (N = 748) and Chulalongkorn University (N = 691) comes from



Health Sciences Faculties (N=522)	Sciences Faculties (N=393)	Social Sciences Faculties (N=524)
• Medicine • Dentistry • Allied Health Sciences • Pharmaceutical Science • Cardiothoracic Technology • Chinese Medicine • Veterinary Science • Psychology • Nursing • Thai Traditional Medicine • Public Health • Sport and Exercise Science	• Science • Engineering • Sirindhorn International Institute of Technology • Architect • Science and Technology	• Communication Art • Law • Economics • Accounting • Liberal Art • Political Science • Arts • Fine Art • Social Work • Social and Humanity • Education

Types of the first dose and second dose of COVID-19 vaccines received by the participating university students

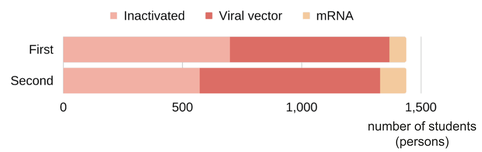


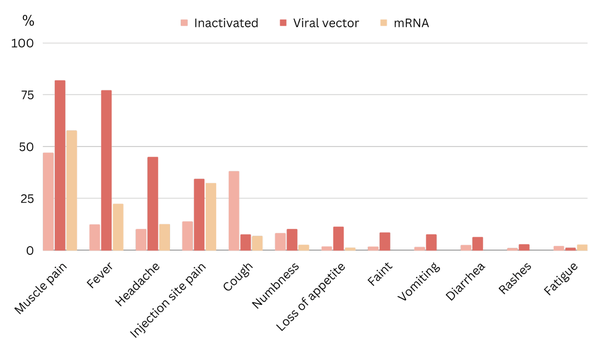
Table 1 Adverse effects of the first dose of COVID-19 vaccines stratified by type among the students who received two doses of the vaccines

Characteristics	All (N = 1439)	Inactivated (N = 699)	Viral vector (N = 669)	mRNA (N = 71)	p-value
Adverse effects					
Muscle pain	918 (63.8)	329 (47.1)	548 (81.9)	41 (57.7)	< 0.001
Fever	620 (43.1)	88 (12.6)	516 (77.1)	16 (22.5)	< 0.001
Headache	383 (26.6)	73 (10.4)	301 (45.0)	9 (12.7)	< 0.001
Injection site pain	351 (24.4)	98 (14.0)	230 (34.4)	23 (32.4)	< 0.001
Cough	323 (22.4)	266 (38.1)	52 (7.8)	5 (7.0)	< 0.001
Numbness	119 (8.3)	119 (8.3)	69 (10.3)	2 (2.8)	0.02
Loss of appetite	91 (6.3)	14 (2.0)	76 (11.4)	1 (1.4)	< 0.001
Faint	70 (4.9)	13 (1.9)	57 (8.5)	0 (0)	< 0.001
Vomiting	63 (4.4)	12 (1.7)	51 (7.6)	0 (0)	< 0.001
Diarrhea	60 (4.2)	18 (2.6)	42 (6.3)	0 (0)	0.001
Rashes	27 (1.9)	8 (1.1)	19 (2.8)	0 (0)	0.03
Fatigue	26 (1.8)	15 (2.1)	9 (1.3)	2 (2.8)	0.44
Onset of adverse effects (post-vaccination)					0.40
Within that day	227/717 (31.7)	72/268 (26.9)	144/411 (35.0)	11/38 (28.9)	
1-2 days	407/717 (56.8)	164/268 (61.2)	220/411 (53.5)	23/38 (60.5)	
3-4 days	44/717 (6.1)	16/268 (6.0)	25/411 (6.1)	3/38 (7.4)	
More than 4 days	39/717 (5.4)	16/268 (6.0)	22/411 (5.4)	1/38 (2.6)	

Table 2 Adverse effects of the second dose of COVID-19 vaccines stratified by type among the students who received two doses of the vaccines

Characteristics	All (N = 1439)	Inactivated (N = 572)	Viral vector (N = 757)	mRNA (N = 110)	p-value
Adverse effects					
Muscle pain	651 (45.2)	219 (38.3)	370 (48.9)	62 (56.4)	< 0.001
Cough	511 (35.5)	271 (47.4)	229 (30.3)	11 (10)	< 0.001
Fever	334 (23.2)	58 (10.1)	237 (31.3)	39 (35.5)	< 0.001
Injection site pain	289 (20.1)	87 (15.2)	169 (22.3)	33 (30.0)	< 0.001
Fatigue	223 (15.5)	81 (14.2)	117 (15.5)	25 (22.7)	0.08
Headache	217 (15.1)	45 (7.9)	150 (19.8)	22 (20.0)	< 0.001
Numbness	69 (4.8)	28 (4.9)	35 (4.6)	6 (5.5)	0.92
Loss of appetite	54 (3.8)	7 (1.2)	37 (4.9)	10 (9.1)	< 0.001
Faint	43 (3.0)	8 (1.4)	29 (3.8)	6 (5.5)	0.01
Diarrhea	38 (2.6)	11 (1.9)	22 (2.9)	5 (4.5)	0.23
Vomiting	35 (2.4)	7 (1.2)	23 (3.0)	5 (4.5)	0.03
Rashes	17 (1.2)	4 (0.7)	10 (1.3)	3 (2.7)	0.17
Onset of adverse effects (post-vaccination)					0.35
Within that day	129/574 (22.5)	37/189 (19.6)	80/325 (24.6)	12/60 (20.0)	
1-2 days	39/574 (68.1)	132/189 (69.8)	218/325 (67.1)	41/60 (68.3)	
3-4 days	32/574 (5.6)	13/189 (6.9)	13/325 (4.0)	6/60 (10.0)	
More than 4 days	22/574 (3.8)	7/189 (3.7)	14/325 (4.3)	1/60 (1.7)	

Adverse effects of the first dose of COVID vaccines



Adverse effects of the second dose of COVID vaccines

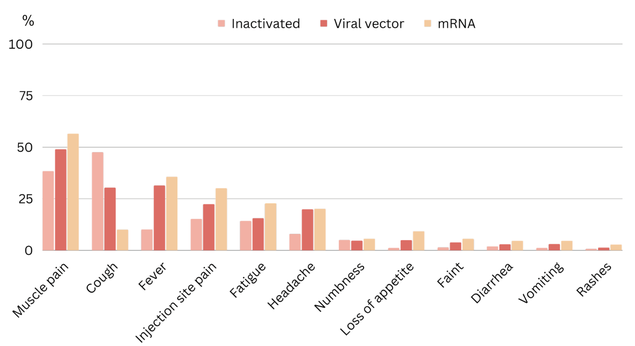


Table 3 Impact of the first and second doses of COVID-19 vaccines stratified by type among the students who received two doses of the same type of vaccines and reported having adverse effects

Characteristics	All (N = 924)	Inactivated (N = 327)	Viral vector (N = 549)	mRNA (N = 48)	p-value
Impact of Adverse effects of vaccine (any dose)					< 0.001
Spontaneously resolved	578 (62.6)	266 (81.3)	276 (50.3)	36 (75.0)	
Symptomatic treatment	330 (35.7)	54 (16.5)	264 (48.1)	12 (25.0)	
Hospitalization	16 (1.7)	7 (2.1)	9 (1.6)	0 (0)	
Impact of adverse effects comparing between the first dose and the second dose					< 0.001
First dose more than second dose	607 (65.7)	132 (40.4)	452 (82.3)	23 (47.9)	
First dose less than second dose	209 (22.6)	113 (34.6)	74 (13.5)	22 (45.8)	
First dose equals to second dose	108 (11.7)	82 (25.1)	23 (4.2)	3 (6.3)	

CONCLUSIONS

The adverse effects (AEs) experienced by the students were various according to the types and number of dose of COVID-19 vaccines.

- For the first-dose vaccines, the most common AEs of inactivated, viral vector (VV), and mRNA vaccines were muscle pain (47%, 82%, and 58%, respectively).
- For the second-dose vaccines, the most common AEs of inactivated vaccines were cough (47%) and those of VV and mRNA vaccines were muscle pain (49% and 56%, respectively).
- Cough was the adverse effect found exclusively different from those reported by other studies and may be due to the hypersensitivity reactions to the inactivated vaccines (3).
- Viral vector vaccines were more likely to cause fever, muscle pain, diarrhea, headache, and rashes than the others, consistent with those reported from the previous study (4).
- The mRNA vaccines caused injection site pain more than inactivated vaccines, consistent with the previous study's finding (4).

The majority of AEs were mostly resolved spontaneously without any treatment and occurred at 24-48 hours after vaccination with less severity in the second dose compared with the first dose.

These study findings could serve as information provided to university students for decision making regarding COVID-19 vaccination and policy makers for campaigns that promote COVID-19 vaccination.

REFERENCES

1. Neumann-Böhme S, Varghese NE, Sabat I, Barros PP, Brouwer W, van Exel J, et al. Once we have it, will we use it? A European survey on willingness to be vaccinated against COVID-19. Eur J Health Econ. 2020;21(7):977-82.
2. Cordina M, Lauri MA, Lauri J. Attitudes towards COVID-19 vaccination, vaccine hesitancy and intention to take the vaccine. Pharm Pract. 2021;19(1):2317.
3. Ozturk AB, Çağlayan B, Kapmaz M, Çalık I, Tekin S, İliaz S, et al. Hypersentivity reactions to COVID-19 vaccines: a case of eosinophilic pneumonia following Sinovac/CoronaVac vaccination. Eur Ann Allergy Clin Immunol. 2022;10.23822/EurAnnACI.1764-1489.247. Advance online publication. https://doi.org/10.23822/EurAnnACI.1764-1489.247.
4. Al Khames Aga QA, Alkhaffaf WH, Hatem TH, Nassir KF, Batineh Y, Dahham AT, et al. Safety of COVID-19 vaccines. J Med Virol 2021;93(12):6588–94.

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