

Original Article



The Levels of COVID-19 Related Health Literacy among University Students in Vietnam

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Conflict of Interest

No conflict of interest.

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ABSTRACT

Background: Vietnam is among the few countries that were successful in the fight against the first wave of coronavirus disease 2019 (COVID-19). However, subsequent domestic outbreaks of COVID-19 continue to occur. To sharp the community education program to guarantee the final success in the fight against COVID-19 in Vietnam and comparable countries, we examined the levels of COVID-19 knowledge and associated predictors among university students in Vietnam.

Materials and Methods: A cross-sectional study was conducted on all students enrolling at Phenikaa University using a self-developed questionnaire consisted of 20 questions regarding COVID-19's risk factors, transmission routes, symptoms, and prevention.

Results: Among 728 participants, 40.9% were male, 63.2% studied health-related majors, and 18.1% lived alone. Correct response rates ranged from 25.3% to 98.9% across 20 questions. Only 51.9% (378/728) of participants had good knowledge levels. Studying health majors (adjusted odds ratio [AOR] 0.547, 95% confidence interval [CI] 0.398 - 0.751, $P < 0.001$), and living with the seniors (AOR 0.612, 95% CI 0.389 - 0.963, $P = 0.034$) or with friends (AOR 0.405, 95% CI 0.252 - 0.650, $P < 0.001$) were negatively associated with a poor level of COVID-19 knowledge.

Conclusion: The proportion of university students having good knowledge levels is suboptimal. It is essential to improve the quality of COVID-19 education with a more focus on not only the preventive measures, but also the disease itself. More studies are needed to improve the level of COVID-19 knowledge among those living alone or do not study health-related majors.

Keywords: COVID-19 knowledge; Vietnam; University students; Community education

INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic is caused by the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The disease manifestations of COVID-19 infection range from asymptomatic to very severe pneumonia, which may cause death [1]. By December 23 2020, COVID-19 had caused 78,335,670 laboratory-confirmed infections and



Author Contributions

Conceptualization: MCD. Data curation: MCD, HTN, MTV, BTD. Formal analysis: MCD, BTD. Investigation: MCD, HTN, MTV, BTD. Methodology: MCD, HTN. Project administration: MCD, HTN, MTV. Software: MCD. Supervision: MCD. Validation: MCD, HTN. Visualization: MCD. Writing - original draft: MCD, HTN, MTV, BTD. Writing - review & editing: MCD, HTN, MTV, BTD.

1,722,612 deaths [2]. Despite ongoing research in this field, the prevention and control of COVID-19 remains a huge challenge due to limited understanding of the effectiveness of and compliance with the prevention and control measures in different settings, particularly in the non-healthcare settings [3-8].

At this stage, the World Health Organization (WHO) recommends physical distancing, hand hygiene practice, and wearing a face mask to prevent COVID-19 in the community [9]. It is documented that the COVID-19 pandemic with social transmission pathways require social and community responses [10]. Particularly, for societies to reopen safely, communities should be fully engaged and empowered to protect themselves from the virus [8]. To achieve this, in addition to the governmental regulations and policy, there is a need to monitor and increase the levels of COVID-19 related health literacy [11]. Basically, the health literacy notion “entails the motivation, knowledge and competencies to access, understand, appraise and apply health information in order to make judgements and take decisions in everyday life concerning healthcare, disease prevention and health promotion to maintain or improve quality of life throughout the course of life” and is a major determinant of a person’s health and health behavior [11]. Indeed, it is evidence that lower health literacy is associated with mortality or lower self-rated health status [11].

Vietnam is among the few countries that were successful in the fight against the first wave of COVID-19 [12, 13]. Although Vietnam has since experienced a small community outbreak, this has been well controlled [13]. It is believed that these successes have been attributable to the early response to the pandemic with a focus on containment efforts and particularly, extensive public health measures in which Vietnam follows the WHO’s recommendations [12]. Given the Vietnam young population, the working age group accounts for 61.5% of population [14]. Of these 61.5%, 15.8% is the 15 - 45 years-old group of whom 2.2 million were enrolled at a tertiary education level in 2019 [14, 15]. However, the actual level of COVID-19 related health literacy among university students remains unknown. To assist in sharpening community education program to prevent domestic outbreaks and guarantee the final success, the presenting study was conducted to examine the levels of knowledge towards COVID-19 and control measures and associated predictors among university students in Vietnam.

MATERIAL AND METHODS

1. Study design and setting

A cross-sectional study was conducted on all students studying at Phenikaa University which is a large multidisciplinary university in Hanoi, Vietnam between 2 July 2020 and 2 August 2020. Inform consent was obtained from all study participants. The study was approved by the University Ethics Committee (reference No. 09/TT-KDD). At the time the study was conducted, there was a total of 902 students including 576 students from the health-related faculties (Faculty of Nursing and Faculty of Pharmacy) and 326 from non-health related faculties.

A questionnaire including demographic information and 20 questions classified into seven groups including COVID-19’s (1) risk factors, (2) routes of transmission, (3) signs and symptoms, and the effectiveness of (4) face mask, (5) hand hygiene and (6) other preventive measures (social distancing, quarantine of suspected cases, and isolation and management of laboratory-confirmed cases), and (7) wearing a face mask correctly. These questions

were based on the recommendations of the WHO and Vietnam Ministry of Health [9, 16]. Demographic information included age, gender, geographical distribution (urban and rural areas), level of education (first year, second year, third year, and the fourth year – final year), academic majors (health related majors and non-health related majors), and living conditions (living alone, with the seniors (grandparents, parents, uncles, and/or aunts), with siblings and/or cousins, and with friends). To ensure that the study participants fully understood the questionnaire, the questionnaire was in Vietnamese (a translated questionnaire is in **Appendix 1**). Also, assistance with the questionnaire was provided by the researchers (HTN and MTV). The types of the questions included (1) single-choice questions in which, participants could only choose one response from a predetermined list and (2) array questions in which, participants could either chose 'yes', 'no' or 'not sure' for their responses. Each correct answer was awarded one score and a selection of "not sure" was awarded a zero score. Therefore, the total highest score was 20.

2. Statistical analysis

Data were managed and analyzed using the Statistical Package for the Social Sciences (SPSS) version 26 (IBM, Armonk, NY, United States). Continuous variables were displayed as mean \pm one standard deviation (SD), and range. Categorical variables were presented as count data with their share (%) in the sample. In this study, for the identification of the level of knowledge, the mean score achieved by all study participants was calculated. A good level of knowledge was defined as an individual's score higher than the point estimate of the mean score, while an individual's score lower than or equal to the mean score indicated a poor level of knowledge. This analytical approach had been validated elsewhere [17]. Chi-square test and Chi-squared test for trend were used to calculate significance levels for categorical data. *t*-test was utilized for the comparison of continuous data. To control for potential confounding effects, a binary logistic regression model was used to test predictors for a poor level of COVID-19 knowledge to enable future target intervention. Independent variables were entered into the model and included living conditions, geographical distribution, and academic majors. The significance was set at $P \leq 0.05$.

RESULTS

1. Baseline characteristics of study participants

A total of 728 participants were recruited to participate in this study of whom two thirds (63.2%, 460/728) were from health-related faculties (**Fig. 1**). The mean age of study participants was 20.8 ± 1.4 years and over half (52.1%, 379/728) of them aged 20 years and younger (**Table 1**). Male participants accounted for 40.9% (298/728). Just under half (46%, 335/728) were living in urban areas and 18.1% (132/728) of participants lived alone.

2. COVID-19 knowledge score of study participants

The percentage of correct answer for each of 20 questions varied from 25.3% to 98.9% (**Fig. 2**). Most participants (97.9%) knew about the main COVID-19 symptoms, but only 65.2% knew about the differences between COVID-19 symptoms and those of common cold. Just more than half (58.5%) knew about the risk factors of severe COVID-19 and less than 64% answered questions regarding risk factors of COVID-19 correctly. Most participants knew that COVID-19 is transmitted through respiratory droplets (98.9%) and contaminated surfaces (93.8%), while only 51.2% and 25.3% of participants knew that it can be transmitted through aerosols and other routes, respectively. Most participants knew about the effectiveness of hand hygiene

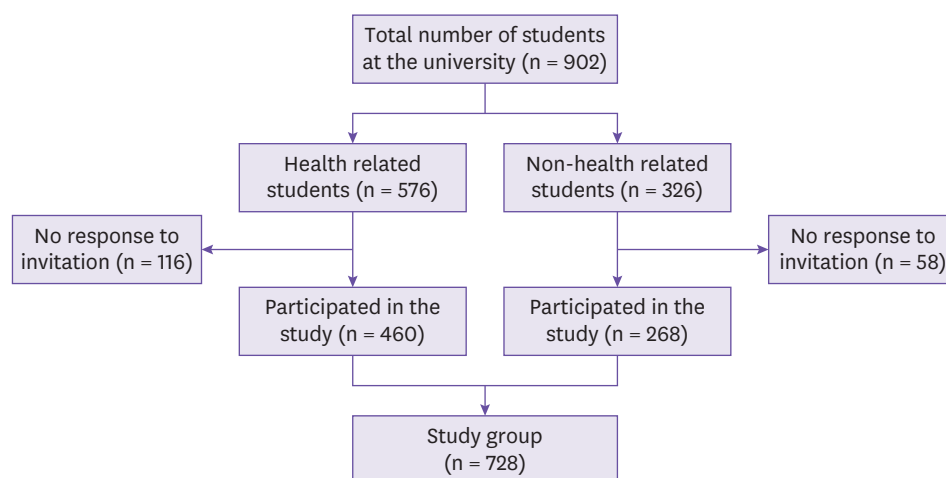


Figure 1. Flowchart of study enrolment and exclusions.

Table 1. Demographic characteristics, living conditions, academic major, and level of education of 728 study participants

Characteristics	Summary statistics ^a
Age (years) (range)	20.8 ± 1.4 (19 - 34)
Age groups	
<20	379 (52.1)
21 - 25	344 (47.3)
26 - 30	4 (0.5)
≥31	1 (0.1)
Male	298 (40.9)
Living in urban areas	335 (46)
Living conditions	
Alone	132 (18.1)
With the seniors (grandparents, parents, uncles, and/or aunts)	274 (37.6)
With siblings and/or cousins	124 (17.1)
With friends	198 (27.2)
Health related majors	460 (63.2)
Level of education	
1st year	113 (15.5)
2nd year	302 (41.5)
3rd year	186 (25.6)
4th year (final year)	127 (17.4)

^amean ± SD (min - max) for continuous variables and n (%) for categorical variables.

(97.9%) and face mask (95.9%) and knew how to wear a face mask correctly (correct answer rates ranging from 93.1% to 96%). More than 88% participants answered questions related to other COVID-19 preventive measures correctly, except a question about the practice of COVID-19 prevention and control measures among children and young adults (68.5%).

Most (68.4%, 498/728) study participants had a score higher than or equal to 16, while 29.1% (212/728) had a score between 11 and 15 (Table 2). Only 2.5% (18/278) had a score between 6 and 10, while there was no participant having a score of less than 6. The mean score was 16.2 ± 2.1. A score higher than 16.2 was considered as a good level of knowledge which accounted for 51.9% (378/728). Overall, only 1.1% (8/728) of the participants answered correctly all 20 questions (data not shown).

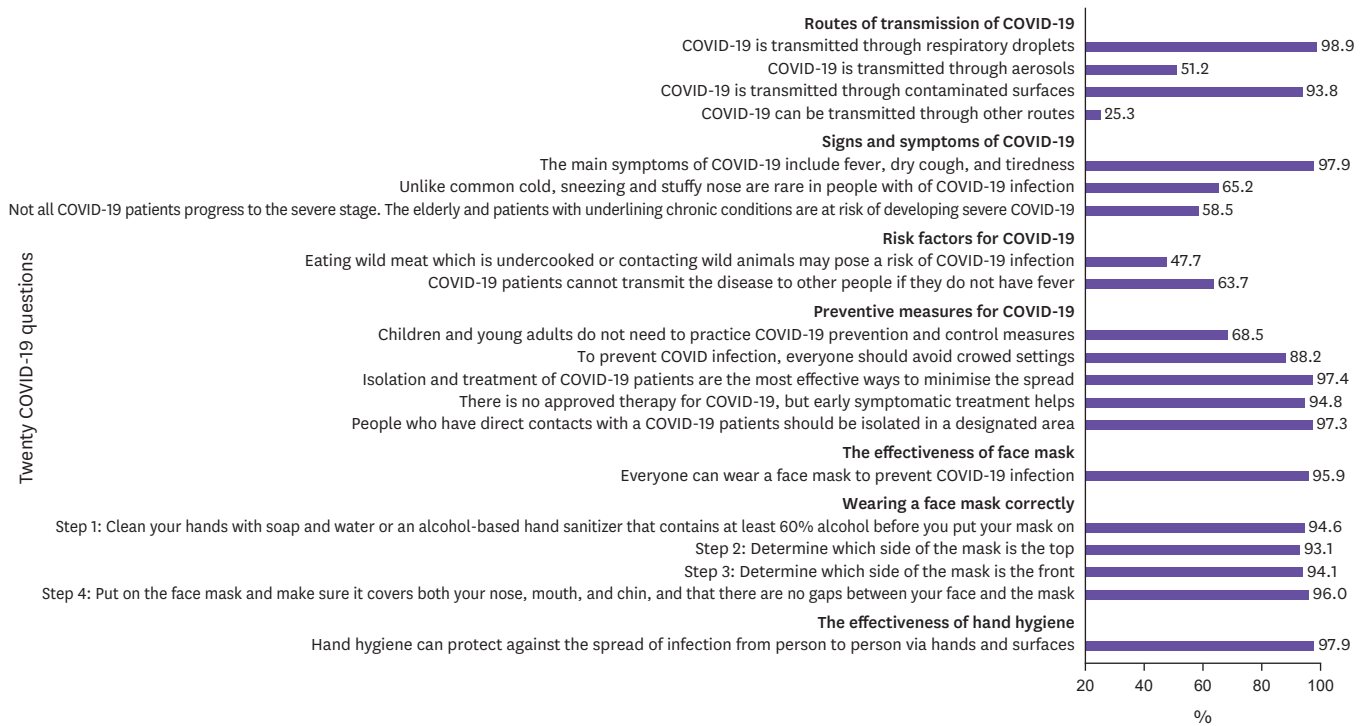


Figure 2. Percentage distribution of correct answers. COVID-19, coronavirus disease 2019.

Table 2. The COVID-19 knowledge score of 728 study participants

Characteristics	Summary statistics ^a
Knowledge score (points) (range)	16.2 ± 2.1 (6 - 20)
Score groups	
≤5	0
6 - 10	18 (2.5)
11 - 15	212 (29.1)
≥16	498 (68.4)
Knowledge level	
Poor	350 (48.1)
Good	378 (51.9)

^amean ± SD (min - max) for continuous variables and n (%) for categorical variables.

3. Predictors of poor level of COVID knowledge

There was a significant association between a poor level of COVID-19 knowledge and studying health related majors ($P < 0.001$) as well as living conditions ($P < 0.001$) (Table 3). There was no significant between level of COVID-19 knowledge and age, gender, living in urban areas, and level of education.

4. Model for the prediction of the level of COVID-19 knowledge

No other predictors for poor level of COVID-19 knowledge were identified other than studying health related majors (AOR 0.547, 95% CI 0.398 - 0.751, $P < 0.001$) and living conditions (Table 4). Similar to studying health related majors, living with the seniors (AOR 0.612, 95% CI 0.389 - 0.963, $P = 0.034$) or with friends (AOR 0.405, 95% CI 0.252 - 0.650, $P < 0.001$) corresponds with lower odds of having a poor level of COVID-19 knowledge compared with those living alone.

Table 3. Unadjusted predictors tested for poor level of COVID-19 knowledge among 728 study participants

Characteristics	Levels of COVID-19 knowledge		P OR (95% CI)
	Poor (n = 350)	Good (n = 378)	
Age (years) (mean ± SD)	20.7 ± 1.3	20.8 ± 1.6	0.86 ^a
Male, n (%)	149 (42.6)	149 (39.4)	0.41 ^b
Living in urban areas, n (%)	148 (42.3)	187 (49.5)	0.05 ^b
			0.75 (0.56 – 1.003)
Living conditions, n (%)			<0.001 ^b (-)
Alone	67 (19.1)	65 (17.2)	
With the seniors (grandparents, parents, uncles, and/or aunts)	127 (36.3)	147 (38.9)	
With siblings and/or cousins	79 (22.6)	45 (11.9)	
With friends	77 (22)	121 (32)	
Health related majors, n (%)	192 (54.9)	268 (70.9)	<0.001 ^b
			0.5 (0.37 – 0.68)
Level of education, n (%)			0.45 ^c
1 st year	54 (15.4)	59 (15.6)	
2 nd year	138 (39.4)	164 (43.4)	
3 rd year	95 (27.1)	91 (24.1)	
4 th year (final year)	63 (18)	64 (16.9)	

^at-test, ^bChi-squared test, ^cChi-squared test for trend.
 COVID-19, coronavirus disease 2019; CI, confidence interval; OR, odds ratio.

Table 4. Binary logistic regression analysis for predictors of poor level of COVID-19 knowledge among 728 study participants

Predictors	P	Adjusted OR (95% CI)
Living conditions ^a		
With the seniors (grandparents, parents, uncles, and/or aunts)	0.034	0.612 (0.389 – 0.963)
With siblings and/or cousins	0.305	(-)
With friends	<0.001	0.405 (0.252 – 0.650)
Health related majors	<0.001	0.547 (0.398 – 0.751)
Living in urban areas	0.128	(-)

^aReference group: living alone.
 OR, odds ratio; CI, confidence interval.

DISCUSSION

The COVID-19 has been emerged for 11 months at the time this study was conducted. However, several countries worldwide have continued to experience an increase in the number of infected cases and deaths [2]. It is true that it is crucial to improve the COVID-19 community awareness to facilitate appropriate prevention behaviors [18]. Although there are similar studies conducted in the general population and specific population such as healthcare workers and chronic illness population [18-20], there was no study assessing the level of COVID-19 knowledge among university students. To the best of our knowledge, this is the first study examining the level of COVID-19 knowledge among Vietnamese university students and among very few studies in the world assessing the university student's COVID-19 knowledge. In the context of the pandemic continuing to progress globally and in Vietnam demonstrated by the presence of new waves of the pandemic, this study was crucial since it provided scientific evidence to promote the prevention and control of the pandemic among university students who are the prominent age-working population in Vietnam and comparable countries.

We included 80.7% of all 902 students at the study university. The study demonstrated a predominantly female population which is similar to other studies conducted in the general community in Vietnam [18, 21]. We found that only 51.9% possessed a good level of COVID-19 knowledge which is much lower than the rate reported in another study conducted in the general population comprising a predominant well-educated population in China in which

90% of participants were knowledgeable about COVID-19 [4]. Our rate is also lower than that of a study conducted in the general community in Vietnam in which 92.2% of the participants had a high knowledge level regarding COVID-19 prevention measures. It should be noted that the questionnaires used in these studies were also based on the guidelines of the WHO and the local governments. In this similar Vietnamese study, having $\geq 80\%$ of the total score was defined to have a high level of knowledge [18], while in our study having a good level of knowledge was defined as having a score higher than the mean score. However, only 68.4% of our study participants had a score ≥ 16 which is $\geq 80\%$ of the total score. In the Chinese study, the overall correct response rate of 90% was calculated by taking the mean score, divided by the highest score, multiplied by 100% [4]. For comparison purposes, our correct response rate using this formula would be 81% ($16.2/20 \times 100$) which remains lower than that of the Chinese study. These findings indicated that the differences in the correct response rates were not due to the differences in defining a good level of COVID-19 knowledge between studies, and thus most our respondents are not knowledgeable about COVID-19.

We recorded different correct response rates in different areas of COVID-19 knowledge. In details, we found high correct response rates for questions regarding the effectiveness of hand hygiene and using a face mask as well as how to wear a face mask correctly. This can be attributable to the overwhelming news in the media and daily warning messages from the government as well as the local community education campaigns with a focus on hand hygiene and wearing a face mask [18, 22]. In addition, the previous experiences in controlling other virus outbreaks that have similar preventive measures, such as influenza A (H1N1) and SARS, may have contributed to these high response rates [18]. However, we also found a suboptimal level of knowledge (correct response rates $\leq 68.5\%$) regarding the differences between COVID-19 symptoms and those of common cold, risk factors of COVID-19 and severe COVID-19, uncommon routes of COVID-19, as well as the need to practice control measures among children and young adults. Particularly, the lowest correct response rate (25.3%) was recorded for a question regarding the other routes of COVID-19 transmission in addition to respiratory droplets, aerosols, and surfaces. More studies have found other possible transmission routes including gastrointestinal tract and other body fluids and secretions such as saliva, urine, semen, and tears, all of which may play an important role in community transmission, particularly in a household setting [23-31]. Our finding is similar to other studies conducted on Vietnamese students regarding the knowledge of other infectious diseases such as dengue fever, and human papillomavirus infection [32, 33]. In light of this, given the quality of education is a key determinant of the disease knowledge as well as a person's health and health behavior [11, 32], improving the quality of the current COVID-19 education for the young adults with a more focus on not only on the preventive measures, but also the disease itself could be beneficial to the wider community in Vietnam.

We found that studying non-health related majors was positively associated with a poor level of COVID-19 knowledge. A large study conducted in China found that medical students had a deeper understanding of COVID-19 compared with non-medical students which may have affected their attitude and practice towards the prevention and control of COVID-19 [34]. Our finding is also in line with another similar study examining the level of knowledge of dengue fever which is a prevalent infectious disease in Vietnam among Vietnamese university students [32]. Also, we found that living with the seniors or with friends was negatively associated with a poor level of COVID-19 knowledge compared with those living alone. It has been well documented that in addition to individual characteristics, the influences of the seniors such as parents are especially relevant for young adults' health literacy [35]. Friends also have a

direct influence on the health literacy of young adults, given their growing prominent role in the lives of young adults as they transition into adolescence [35]. The seniors and friends who our participants lived with may have possessed a proper level of COVID-19 knowledge, and thus positively influenced our study participants. Regarding living location, a study conducted in Bangladesh found that COVID-19 more accurate knowledge was associated with location of permanent residence [36]. We found no significant association between living location and COVID-19 knowledge which may be due to the effective nationwide COVID-19 education program that covered all provinces in Vietnam. Indeed, multiple resources including art, mobile phones, and conventional and social media have been utilized for this purpose such as an approximately 6 billion text messages sent to mobile users to raise awareness about COVID-19 [37]. The proportion of those living alone in our study (18.1%) was not very high. Nevertheless, COVID-19 is contagious and asymptomatic patients may serve as a source of infection in the community [38]. It is crucial that everyone must have a proper level of COVID-19 related health literacy to act accordingly to protect themselves and other people, regardless of settings [18-20]. Therefore, to ensure the success of the COVID-19 control and prevention campaign in Vietnam, more studies should be conducted to examine the effective ways to improve the level of COVID-19 knowledge in this group.

Our study has some limitations. First, all study participants were from the only one university, and thus may not be a good representative of all university students in Vietnam. However, our study university is among the largest multidisciplinary universities in Vietnam. We also included 80.7% (728/902) of all enrolled students at the time the study was conducted. This study did not use an internationally validated questionnaire that has been developed to measure COVID-19 knowledge among university students, which may make further comparisons across studies and countries difficult. However, given COVID-19 is a novel disease, an internationally validated questionnaire is not available at the time the study was conducted. Nevertheless, to the best of our knowledge, like us, most similar published studies used questionnaires that were developed based on the guidelines of the WHO and their corresponding governments. Despite the limitations, this study provided valuable knowledge about COVID-19 related health literacy among university students – one of the prominent groups in Vietnam, which, to our knowledge, has not yet available elsewhere and would be essential in improving the prevention and control of COVID-19 in Vietnam and comparable countries.

The proportion of university students having good knowledge levels is suboptimal. The correct response rate is different across different areas of COVID-19 knowledge with low correct response rates for questions related to the disease itself and the need to practice control measures among children and young adults. Studying health related majors and living with the seniors or with friends were negatively associated with a poor level of COVID-19 knowledge. It is essential to improve the quality of the current COVID-19 education for the young adults with a more focus on not only the preventive measures, but also the disease itself. We recommend future research be conducted to examine the effective ways to improve the level of COVID-19 knowledge among those living alone or do not study health-related majors.

APPENDIX 1

Questionnaire. The levels of COVID-19 related health literacy among university students in Vietnam: a cross-sectional study

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