

Barriers to COVID-19 contact tracing: View from frontline healthcare students in Vietnam

Phuong Anh Hoang BSc, RN^{1,2}  | Ngoc Tran Tran¹ | Thi Hoa Huyen Nguyen PhD, RN¹ | Thi Thanh Huong Nguyen PhD, RN¹

¹College of Health Sciences, VinUniversity, Hanoi, Vietnam

²Faculty of Nursing and Midwifery, Hanoi Medical University, Hanoi, Vietnam

Correspondence

Thi Thanh Huong Nguyen, College of Health Sciences, VinUniversity, Hanoi, Vietnam.
Email: huong.ntt@vinuni.edu.vn

Abstract

In the context of the complicated continuous waves of the COVID-19 pandemic in Vietnam, contact tracing, along with social distancing and lock-down, proved its crucial role in the suppression of epidemic spreading and management. With the high demand for responsiveness, healthcare students were constantly involved in the process, and challenges have emerged along the way. This study aims to identify the barriers faced by healthcare students while performing the contact tracing task at the frontline of the pandemic. A qualitative study was conducted in July 2021 in a health center in Binh Duong province, Vietnam. A total of 20 healthcare students were invited through random recruitment of participants and interviewed until the principle of saturation was reached. Three main barriers were identified including ineffective work management of local managers, lack of capability of human resources and facilities, and uncooperative attitude of local residents. Given the existing barriers, cooperative, innovative strategies, shared data systems, and timely public awareness campaigns, especially among primary health centers of the healthcare system, are imperative to reduce the workload and optimize the efficacy of healthcare students' support.

KEYWORDS

barriers, contact tracing, COVID-19 pandemic, healthcare students, qualitative study

1 | INTRODUCTION

The COVID-19 pandemic caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was officially recognized worldwide in March 2020 (Jebri, 2020; World Health Organization, 2020). Vietnam had successfully handled three waves of COVID-19 attacks until the first quarter of 2021. In the context of this study, many cities and provinces in Vietnam, especially in the South, were facing a worse COVID-19 attack due to new severe variants, with about 133,000 confirmed cases and 1000 deaths up to July 2021 (World Health Organization, 2021). The Vietnamese government and healthcare system attempted to effectively control the pandemic outbreaks and lessen the local and national social-health consequences (Hardy

et al., 2020; Hung, 2021; Nguyen et al., 2021). One of the earliest steps implemented in Vietnam was contact tracing, which focused on rapid identification, timing isolation, rigorous tracking, and precautionary self-isolation of confirmed COVID-19-positive cases (F0), direct contact with an F0 (F1), close contact with an F1 (F2), and three more risk levels (F3 to F5), which are identified in the same way (Baraniuk, 2020; Quach et al., 2021).

Contact tracing, in addition to social distancing and lock-down, was well-documented as a cornerstone of initial epidemic suppression efforts within both small populations and widespread situations (Baraniuk, 2020). The most typical procedure, which could be done directly or via phone calls, includes the following steps: (1) investigate the confirmed case to identify clinical symptoms and onset; (2) recall memories

about epidemiologic schedules with all possible close contacts within the last 2 weeks since the onset of symptoms; and (3) categorize a list of close contacts of the confirmed case for self-isolation and further investigation (Hardy et al., 2020; Nachege et al., 2020). Previous studies revealed the importance and necessity of contact tracing in the early stages of the COVID-19 response (Asiimwe et al., 2021; Baraniuk, 2020; Pelton et al., 2021), as it timely isolated confirmed cases from the community to prevent further transmission and supported primary contact cases to self-quarantine.

Due to the heavy workload against COVID-19, healthcare students majoring in medicine, preventive medicine, and nursing served as frontline health workers to strengthen the healthcare system's capacity (Klasen et al., 2021; Taghrir et al., 2020; Tran et al., 2021). Mostly, the students were equipped with proper guidelines and sufficient personal protective equipment (PPE) when they voluntarily participated in tracing programs (Niccolai et al., 2021; Pelton et al., 2021) or non-invasive medical supports (Klasen et al., 2021). Although challenges regarding contact tracing remained, such as missing or inaccurate databases, a long turnaround time of polymerase chain reaction (PCR) results, a lack of resources, and uncooperative attitudes from patients (Nachege et al., 2020; Niccolai et al., 2021); studies appreciated the effectiveness of integrating trained healthcare students into contact tracing programmes (Koetter et al., 2020; Pelton et al., 2021).

Given the exponential rise in total confirmed cases in Vietnam, more healthcare students were continuously involved for support. Contact tracing with support from healthcare students continued to be a key part of public health management (Juneau et al., 2020). The more effectively contact tracing was implemented regarding the number and timespan in which contacts were traced and quarantined, the better community infection control. Specifically, within 2–3 days from the onset of symptoms in a new case, if isolated and at least 80% of its contacts quarantined, cases and contacts were reported to not infect any additional cases. Contrarily, less efficient tracing with delays of 4–5+ days and/or fewer than 60% of contacts quarantined may have little impact on COVID-19 control (Juneau et al., 2020). The existing barriers at work might limit the working efficacy of the healthcare students in contact tracing and result in the slowing time of the quarantine. This paper aimed to explore the barriers that healthcare students experienced in effectively performing their contact tracing task at the frontlines of the COVID-19 pandemic in Vietnam.

2 | METHOD

2.1 | Research design

This is a qualitative study using a semi-structured interview guide (with prompts).

2.2 | Research time and setting

The study was conducted in a health center in Binh Duong province, Vietnam, during July 2021, the peak time of the COVID-19 explosion

Implications for Policy & Practice

- The voluntary involvement of healthcare students in the new waves of COVID-19 or other impending pandemics are crucial, largely in their readiness and preparedness.
- Barriers such as ineffective work management, lack of capability, and uncooperative attitude of local residents remained.
- To effectively involve healthcare students in the frontline, especially in the contact tracing process, innovative strategies, shared data systems, and timely public awareness campaigns are strongly recommended.

in this province and Southern areas of Vietnam. In particular, the interviews were performed in a private room placed in a health center and subjected to follow the Vietnam Ministry of Health recommendations about the procedure for COVID-19 prevention at that time.

2.3 | Research participants

Healthcare students who (1) were supporting frontline healthcare staff on the COVID-19 contact tracing task in Binh Duong, (2) signed in an agreement form to participate in this study, and (3) were healthy without any physical and/or mental disorders at the time of recruitment were eligible to participate in this study. Before entering the frontline force, every healthcare student had been required to go through comprehensive health check-ups and hand in the results. The current health state of the students was also self-disclosed to the interviewer.

2.4 | Process of participants recruitment

According to the list of students volunteering at Binh Duong province, the interviewer randomly drew two numbers aligning with names from the list for the interview every day. The interviewer first provided a brief overview of the study to explore the students' interest in the topics and their willingness to share their experiences. An explanation letter and an agreement form about this study were sent to eligible students after that. However, a few healthcare students were not available during the data collection due to a conflict in the schedule when arranging the interview appointment. The research team kept randomly inviting participants until reaching the principle of saturation. The principle of saturation (Liamputtong, 2020) was used to determine the completion of the interviewing process when no more new information emerged. All participants were carefully explained about information confidentiality that could not be discussed outside of the interview to both ensure their comfort to share in the interview and the quality of the data. In total, 20 healthcare students participated in this

study. Many were group leaders who monitored a team of 4–5 contact tracers, assigning contacts and performing quality assurance checks on the completeness of case interviews.

2.5 | Interview process

The principal investigator developed a semi-structured interview guide (with prompts), which was then reviewed by 2 senior researchers. The interview guides included 10 open-ended questions. We started our interview with the prompt “*How was your day at work as a contact tracer?*” and then followed up the answer to better understand the students’ preparation prior to volunteering on the frontline against COVID-19, the actual experience of contact tracing in the hotspots, and the effectiveness of their work in contact tracing. After three pilot interviews, the official interview guide was finalized. With the consent of healthcare students, phone recordings of interviews were made. In a separate room at the health center, each session lasted around 25 min and was subject to following mandatory regulations of social distancing.

2.6 | Data analysis

All personally identifiable data was deleted to ensure the confidentiality of participants. To gain an overview of the material on that particular evening when the interview took place, two researchers re-read the whole interview word by word after it had been transcribed. A Krippendorff-based qualitative content analysis was conducted (Krippendorff, 2004). The data analysis procedure is shown in Table 1 as an example. The Krippendorff approach involves unitizing, reducing, inferring, and analyzing facts. Meaning units (words, phrases, and paragraphs) from the original data are detected during unitization based on data frequency and similar meanings to establish the code framework. After evaluating and condensing significant settings, the data is reduced by identifying subcategories and clustering them into final themes. Results are drawn and written into texts in the advanced stages of inferences, conclusions, and interpretations.

2.7 | Ethical approval

The research underwent the ethical approval of VinMec Ethics Research Committee No.28/2021/CN-HĐĐĐ VMEC signed 28th June 2021.

3 | RESULTS

In total, 20 healthcare students from the age of 20–25 participated in this study, including 5 nursing students, 4 general practitioner students, 2 public health students, and 9 preventive medicine students. Most had

at least 2 weeks of serving voluntarily at the frontline in the previous waves of COVID-19. After the analysis process, three main themes were condensed with eight subthemes.

3.1 | Ineffective work management of local managers

3.1.1 | Manual management (the outdated way)

The overlap of tasks, the missing data, and the unclear information during contact tracing were apparent examples of gaps in the manual working process. Most contact tracing procedure steps were manually processed, resulting in duplicated workloads such as repeated callings. A student said: “*The data entry and data management from Provincial Center for Disease Control and Prevention level to the local level are still indeed problematic. This can be seen in the duplicated lists, wrong name spelling, wrong address, wrong phone number, missing information, etc. It takes time to track for the right information.*”

As the group leader, another student shared that they had to sometimes call a confirmed case at least twice or three times due to the slow and unclear steps of data management: “*Contact tracers even have to do the work repeatedly, with the process of manually updating the list from many sources, they will have to wait for the list to be filtered, which is very time-consuming.*”

3.1.2 | Lack of consistency in the working process

The most apparent inconsistency could be seen in the difference in the forms of reports. The tracing team had to fill in a variety of forms named “Summary Data” with similar information, which resulted in the overload of administrative paperwork, as a student who assisted the data management team shared: “*The report form is still not synchronized; the number of administrative tasks and papers is still overlapping. Sometimes, even the local health workers themselves do not know exactly what information they need.*”

While students had to deal with a high workload and overlapping information filled in the reports, they did not even fully understand the purposes or the meanings of the work they were doing. A nursing student in the tracing team explained: “*We have to do many reports and update a lot of information, but with such a huge volume of inputs, we do not know how the information will be used effectively.*”

The inconsistency was also shown in the working procedures or working guides of local authorities. As the outbreak happened suddenly, the responses of local authorities were not as fast as expected. Unclear responsibilities were shared among managers. A student group leader shared the experience working with local authorities: “*Because the pandemic broke out so suddenly, the local health system has not been able to adapt in time. We have to work with many different contacts with the same tasks, and each person has a different way of working. The process of taking COVID-19 tests and returning results is not timely and consistent.*”

TABLE 1 An example of the data analysis process.

Step 1.			
Decontextualization			
Identify meaning units	<i>"Contact tracers even have to do the work repeatedly, with the process of manually updating the list from many sources, they will have to wait for the list to be filtered, which is very time-consuming."</i>	<i>"In this health center, health workers are not good at applying information technology. The public health specialist in charge did not handily use Google Drive, Microsoft Excel. When we collaborated, it took us the first whole week to agree on how to work."</i>	<i>"I remember that day we went to a company, the human resources department even told the workers not to declare all the schedules to avoid any confusion. There are even days when police forces are required to avoid riots."</i>
↓		↓	
Step 2.			
Recontextualization			
Condense the key context	The workload of the tracing team due to the slow and unclear steps data management	Lack of the application of online platforms in managing and updating data	Worried about impacting the operation of company which involves even thousands of staff and workers
↓		↓	
Step 3.			
Sub-categorization			
Identify homogeneous themes	The manual management (the outdated way)	Shortage in technological skills of health workers	Fear of consequences and responsibility
↓		↓	
Step 4.			
Compilation			
Shape sub-categories to key categories.	Ineffective work management	Lack of capability	Uncooperative attitude of local residents

3.1.3 | Ineffective use of human resources

There needed to be a more detailed description of the roles and tasks of healthcare workers and students providing medical support at the frontline. Thousands of healthcare workers and students from hospitals and medical schools in other parts of the country volunteered to contribute to the healthcare workforce at the center of the pandemic. However, in a short preparation time, local managers were challenged in organizing tasks, which led to the ineffective use of human resources. They sometimes assigned healthcare students without enough information and straightforward tasks. A student participating in community contact tracing showed his confusion when talking about the waste of human resources: *"Local staff sometimes do not know enough information about the confirmed cases that need to be traced or whether the location has been blocked yet. There are military forces supporting the community contact tracing, but they themselves seem unclear about where to go and what to do with the confirmed cases."*

Another student majoring in preventive medicine agreed that ineffective arrangement and workload assignment for healthcare students led to unproductive working results: *"Sometimes, when we go to the community, we waste so much time waiting for the setup process at the local areas because they do not know the information. The total working*

time is approximately 3 hours, but due to the long wait, it is very tiring and dispiriting."

The coordination between local authorities and healthcare students in each working position sometimes seemed unreasonable and created a waste of human resources: *"The capacity of local health workforces was too weak and scattered that healthcare students were involved in almost all tasks. However, an example of a messy arrangement was that there were days when the local authorities did not have a detailed working schedule, which led to little coordination of students."* *"Tracing at companies is sometimes not really necessary because it is time-consuming, wastes personal protective equipment, and is risky because of the centralized site of hundreds of primary contact cases (F1s). Instead, a list of phone numbers should be made to call or ask them to fill in the contact tracing form on their own."*

3.2 | Lack of capability of human resources and facilities

3.2.1 | Shortage in technological skills of health workers

Health workers in this area seemed to lack technological skills, especially the application of online platforms in managing and updating data, which negatively impacted the work efficacy and the accuracy



of information. A student of the data management team shared her experience when working with a local health worker without any technological skills: *"In this health center, health workers are not good at applying information technology. The public health specialist in charge did not handily use Google Drive or Microsoft Excel. When we collaborated, it took us the first whole week to agree on how to work." "Here, they still prefer handwritten to automatic work. The trace list is sometimes a handwritten note that blurred the number 4 with the number 1, or a scanned pdf file of handwritten photos that is unreadable."*

There were certain changes made with the application of digital data management. However, it was easier for healthcare students to adapt rather than the medical workforce. *"The team has overcome the problem by selecting two students with good technical skills to digitalize data and optimize the time needed to make reports and update everyone's information."*

In terms of professional skills in data collection during calls with confirmed cases, the difference in the capacity of contact tracers sometimes created conflicts of information. Nursing students who first-time joined the frontline workforce and healthcare students majoring in preventive medicine who experienced the task several times shared the same impression of the necessity of local training to agree on a coherent data collection format. *"Each person has their own skills and own way of collecting patient information. Although the students were given similar training, it was still very theoretical and different from reality." "The reality of the tracing call was not like my imagination and preparation. When I went to work with the medical staff and local authorities, I myself was confused as to whether the tracing team was missing any important information."*

3.2.2 | Shortage of equipment and facilities

Personal mobile phones were used for contact tracing, leading to situations where healthcare students' personal information was leaked, as shared by a group leader: *"We do not have a call center or any landline phone to trace and receive feedback from patients. We have to call by our personal numbers, which may result in leaking personal information. Not to mention in some cases, the contacts also add friends on social networking sites, even texting frequently to ask personal questions, which troubled the students a lot."*

A nursing student agreed on the disadvantage of this shortage. The contacted confirmed case then called the healthcare students back for personal reasons. She said, *"I was disturbed during the night; a man who was FO called me back, pretending to ask for advice on their health conditions. It turned out he was trying to make friends and then continued spamming me through chatting."*

Another issue related to using personal mobile was the phone charges, which sometimes interrupted the conversations between contact tracers and contacted confirmed cases. A student said: *"Because we have to call a lot during the day, the prepaid fee must be recharged regularly, sometimes up to 200,000 vnd/phone number/day. Sometimes when I am in the middle of a call, the phone runs out of credit, which is awfully unprofessional. The provincial mobile network center also supports us, but it does not help much."*

PPE was also a concern for healthcare students who directly contacted confirmed cases. A student majoring in preventive medicine showed his concern about the quality of PPE when collecting data on confirmed cases in the community. *"The N95 masks and the level-2 protective suits supplied at the local health center did not meet the standards for contacting FOs. Generally, the personal protective equipment provided by the locality ran out after the first few weeks, so we had to reuse it sometimes."*, said the student.

3.3 | Uncooperative attitude of local residents

3.3.1 | Insufficient perception of the severity of the pandemic

The local people showed a lack of proper knowledge about personal protection and the risk of exposure. Poor preventive attitudes of local people contributed to higher risks posed to both contact tracers and the community. Most students who participated in community contact tracing shared that: *"When we conducted contact tracing in the community, many FOs were still at home without being quarantined yet. The local officers or military forces are sometimes still imprudent, sitting on the sidewalk at iced-tea stalls while taking off their masks to have a chat. They are not aware that what they were doing is a risk and is the most contagious source for us students."*

In another case, insufficient knowledge resulted in noncompliance with social distancing. A nursing student shared that: *"Directives 15 and 16 issued by the Vietnamese government and mandatory blockade in some wards and quarters have been applied here. Local residents are required to limit their travel, but most of them do not have enough knowledge to fully understand and comply."*

3.3.2 | Doubtful attitudes from local people about the contact tracing

A group of local people, primarily those from the higher social-economic group, did not cooperate with contact tracers. There were two reasons for that. First, they were not informed by the local authorities about the purposes of contact tracing. Second, they distrusted a stranger with a private phone number calling them to get their personal information. The experiences shared by a nursing student: *"There are people that have been traced before. Then, during my call, they do not cooperate anymore, not to mention those who hang up or do not answer the phone. They said they were only aware of filling in a medical declaration once. Some people even kept questioning why the medical health workers did not provide information to each other and had to call back so many times."*

3.3.3 | Fear of consequences and responsibility

Most of the local people were unwilling to provide their epidemiological schedule because they worried that the publicity of their status

as a confirmed case might affect their daily life. In fact, if a case is confirmed in one business organization, it might affect the operation of the whole system, which involves even thousands of staff and workers. A student shared a story about a manufactory: "I remember that day we went to a company, the human resources department even told the workers not to declare all the schedules to avoid any confusion. There are even days when police forces are required to avoid riots."

A situation was also similar with local residents who are owners of small businesses. These people usually have complicated traveling schedules and were also unwilling to share with others as they were concerned their sharing could interrupt business. A nursing student said, "During the tracing process, the locals here themselves cannot remember the details of travel day by day. Also, many are traders and immigrants afraid of being involved and affecting their work, so even though the schedule is complicated, it is also difficult to exploit."

4 | DISCUSSION

This study pointed out barriers to contact tracing efforts as viewed by healthcare students who served at the frontlines of the COVID-19 pandemic. The lack of coordination between local management and volunteers in the administration of data and resources was one of the fundamental problems with the local healthcare system, which led to enormous workloads for volunteers and staff. Similar findings were found in other countries requiring massive traditional contact tracing efforts (Jian et al., 2020). The same findings were also found in studies on the efficiency of multitasking, case tracking, contact identification, epidemiology, and surveillance (Nachege et al., 2021). This highlighted the need for a consistent database, accurate and secure data storage, as well as efficient communication between local health authorities and contact tracers (Niccolai et al., 2021; Wong et al., 2020). The sudden arrival of the COVID-19 pandemic, which demanded rapid development of new policies and changes in the healthcare system, can explain this situation. Due to the higher volume of contacts that need to be tracked down, there must be more innovative ways to reduce the amount of human resources and the existing manual work required to perform contact tracing.

Not only Vietnam but other countries also faced significant challenges relating to the capacity of human resources and facilities (Jian et al., 2020; Pelton et al., 2021; Wong et al., 2020). Globally, it was acknowledged that there was a lack of equipment, including PPEs (Asiimwe et al., 2021; Dargaville et al., 2020), other supporting facilities, or the risk of infection (Pogreba Brown et al., 2021). In local health settings in Vietnam, without adequate equipment, healthcare workers preferred manual work and paperwork instead of technological adaptation (Hochwarter et al., 2020; Huong et al., 2021). A shared data system with technological adaptation and better connection between health departments and contact tracers is recommended by the research team for the near future of COVID-19 and the impending health crises in Vietnam. To implement contact tracing efficiently, training in technology skills and professional understanding of the process is essential (Jian et al., 2020; Pelton et al., 2021).

The uncooperative attitude of local residents is a similar issue to other countries at an early stage of contact tracing and pandemic control (Asiimwe et al., 2021; Baraniuk, 2020; Niccolai et al., 2021). For patients with confirmed COVID-19-positive results, according to the literature, their reasons for refusing to disclose personal information to contact tracers could be disrupted business (Abdelhafiz & Alorabi, 2020; Asiimwe et al., 2021; Baraniuk, 2020; Mahmud & Islam, 2020) and the inability to acquire necessary supplies in the event of self-quarantine (Pelton et al., 2021). Even a lack of awareness about the pandemic (Niccolai et al., 2021), ambiguous calling justifications, a lack of comprehension of contact tracking (Pelton et al., 2021; Wong et al., 2020), and a fear of social stigma (Barth et al., 2002; Reluga et al., 2019) could contribute to this circumstance, which are strongly related to personal attitudes and resistance to healthcare access. Therefore, it is crucial to undertake public awareness programmes that provide clear and adequate information about the necessity and process of contact tracing, especially among primary health centers of the healthcare system. Specifically, public awareness can be raised thoroughly via social media, information letters, or direct connection with public health specialists before contact tracing is implemented to ensure that the local people understand the urgency for collaboration. The involvement and engagement of community leaders are also recommended for a successful joint effort between the health workforce and local people.

CONFLICT OF INTEREST STATEMENT

The authors declare that they have no competing interests

DATA AVAILABILITY STATEMENT

Research Data are not shared.

ETHICS STATEMENT

The research has undergone the ethical approval of VinMec Ethics Research Committee No. 28/2021/CN-HĐĐĐ VMEC signed 28th June 2021.

ORCID

Phuong Anh Hoang BSc, RN  <https://orcid.org/0000-0002-9998-3523>

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