Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Capacity of local authority and community on epidemic response in Vietnam: Implication for COVID-19 preparedness

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ABSTRACT

Local authority's response and community adaptive capacity are critically important for the prevention and control of infectious diseases, especially for the disease with an astonishing speed of spreading like COVID-19. This study aims to examine the perception on the capability of local authority's response and community adaptation among core workforces in responding to acute events in Vietnam. Health professionals, medical students, and community workers in all regions of Vietnam were invited to participate in a web-based survey from December 2019 to February 2020. The snowball sampling technique was utilized to recruit respondents. The Tobit multivariable regression model was used to identify associated factors. The results showed that based on a 0–10 numeric rating scale, the mean scores of the capacity of local agencies and community adaptation were 6.2 ± 2 and 6.0 ± 1.8, respectively. Regarding local authority competencies, the lowest score went to "Adequate equipment, infrastructures and funding for disease prevention". For community adaptation, the respondents evaluated the capacity on "Periodic training, equipment and drills to prepare for epidemic and disaster response" competency" with the lowest mark (5.2 ± 2.5). Overall, there were significant differences in the assessment of community adaptive capacity between urban and rural areas ($p < 0.01$). This study indicated the moderate capacity of the local authority and community adaptation on epidemics and disasters in Vietnam. It is critically necessary to develop the action plan, response scenario and strategies to optimize the utilization of equipment and human resources in combating epidemics for each setting.

1. Introduction

COVID-19, which is caused by a new strain of coronavirus, is an infectious disease that can lead to pneumonia in humans (World Health Organization, 2020a). After more than three months from the first cases detected in December 2019 in China (World Health Organization, 2020a), the numbers of confirmed cases and death toll by this disease reached 2 million and 120,863 respectively in total 185 countries and territories (Johns Hopkins University, 2020). With an astonishing speed of spreading (World Health Organization, 2020b), the COVID-19 outbreak was announced to be a Public Health Emergency of International Concern on 30 January 2020 by the World Health Organization (WHO) (World Health Organization, 2020a). WHO has estimated that without any interventions, 7.0 billion people will be infected SARS-COV-2 and resulting in 40 million deaths around the world this year (Walker et al., 2020). This emerging disease was described as a nightmare for the

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whole globe since it has shocked the healthcare systems and caused deep and broad socio-economics consequences (World Health Organization, 2020c).

All countries are at risk and need to prepare for and respond to COVID-19 (World Health Organization, 2020d). The COVID-19 pandemic threatens psychological resilience (Ho et al., 2020). The psychological impact of COVID-19 remained high at the outbreak (Wang et al., 2020a) and during the peak of the epidemic (Wang et al., 2020b). The response of individual nations will be crucial in influencing the movement of country epidemics (Walker et al., 2020). Recently, WHO has provided technical guidance on "Critical preparedness, readiness and response actions for COVID-19". According to this document, WHO has recommended specific actions for countries to respond to the four different transmission scenarios of SARS-COV-2, including (1) No cases; (2) Sporadic cases; (3) Cluster of cases; and (4) Community transmission (World Health Organization, 2020e). In the worst situation when countries suffering a larger outbreak of local transmission, raising awareness of people and community engagement was among the top priority works to slow further transmission of COVID-19 and to alleviate the outbreak impact in all nations (World Health Organization, 2020f). In addition, as of 14 April 2020, the most updated COVID-19 Strategy by WHO has highlighted the pivotal role of community in prevail against COVID-19. It is highly recommended that communities must be empowered and adapted based on their feedback and local context (World Health Organization, 2020c). Previous literature also highlighted the important role of community adaptive capacity in addressing major threats from infectious diseases and natural disasters (Katz et al., 2006; Madrigano et al., 2017).

Within different countries, governments are implementing a wide range of measures to combat the COVID-19 outbreak, leading to the variation in the transmission speed of the SARS-COV-2 virus (Hale and Webster, 2020). Some of the Asian countries, such as China, Singapore, and South Korea seemed to control the pandemic swiftly by adopting strict social distancing policy, banning international travel and requiring people to wear masks in public (Dweepobotee Brahma and Menokee, 2020; Popov, 2020). These efforts could not produce favorable outcomes without the engagement of each member in the community (World Health Organization, 2020c). In contrast, the United States and European countries failed to have proper actions in order to limit interpersonal contact, leading to a rapid escalation of community infection and deaths (Sachs, 2020). However, the above control strategies are still in doubt as no scientific evidence was adopted (Xiao and Torok, 2020). The impact of interventions for the COVID-19 pandemic remains the key knowledge gap which requires more work of public health and intersectoral researchers (Yazdanpanah, 2020).

The State Party Self-Assessment Annual Reporting (SPAR) tool was developed by WHO to help all countries self-measure the status of 13 International Health Regulation (IHR) capacities required to detect, assess, notify, report and respond to domestic and international public health threats and acute events. According to IHR SPAR 2018, among total 13 capacity, Vietnam had self-assessed 10 aspects with lower scores than the regional and global average (World Health Organization, 2019). Understanding the current capacity of community responses on epidemics in Vietnam will support the decision-makers to issue appropriate policies to empower and optimize the local resources during the battle of combating dangerous diseases. This study aims to examine the perception of healthcare providers, medical students, and community workers about the capability of local authority's response and community adaptation on epidemics in Vietnam.

2. Material and methods

This study was a component of the overall project on COVID-19 outbreak response assessment, which was conducted right after the COVID-19 outbreak occurred in China and posed threats to Vietnam, the country shared a long border with China. In this cross-sectional study, we invited three main subjects, including health professionals, medical students, and community workers in all regions of Vietnam to participate in a web-based survey from December 2019 to February 2020.

2.1. Sampling method and sample size

The eligibility criteria for selecting respondents were: 1) being 18 years old and above; 2) giving consent to participate in the survey and 3) having full ability to answer the questions. The snowball sampling technique was utilized to recruit respondents until data saturation. The recruitment process focused on several core groups of the Vietnam Young Physician Association, Vietnam Youth Federation and medical universities in three metropolises of Vietnam, including Hanoi, Da Nang, and Ho Chi Minh City. In total, 1109 participants gave consent and took part in this online survey.

2.2. Measures and instruments

A structured questionnaire was developed to collect the following information:

Socioeconomic characteristics included age, sex, living area, marital status, educational level, participation in community activities.

Occupational characteristics included working position, workplace and the administration level of the workplace in the state management system (central; province; under province; university/college).

Sources of information on disease prevention included (1) Training programs at the college/university; (2) Training at the workplace; (3) Information, instructions in residential areas; (4) Traditional newspapers; (5) Online newspaper, internet, social networks; (6) Radio and television; (7) Relatives; (8) Friends and neighbors; (9) Religious activities in pagodas and churches; and (10) Unions, associations, clubs.

Local authority capacity on epidemics and disasters were assessed using 4 criteria: (1) Adequate capacity of health workers to effectively control epidemics and disasters; (2) Sufficient number of staff for disease control; (3) Adequate equipment, infrastructure and funding for disease prevention; (4) Effective coordination of local organizations to respond to epidemics and disasters.

Community adaptive capacity on epidemics and disasters was obtained based on 5 aspects: (1) Adequate measures to avoid extreme weather; (2) Sufficient equipment at home to cope with storms and floods; (3) Appropriate support of local policies for people experiencing disasters and epidemics; (4) Adequate access to clean water and food during disasters and epidemics; and (5) Periodic training, equipment and drills to prepare for epidemics and disaster response.

2.3. Statistical analysis

STATA 15.0 software was used to analyze the data. Quantitative variables were presented as mean and standard deviation, tested by *t*-test or U Mann Whitney, with a significance level of $p < 0.05$. The qualitative variables were presented as proportion and tested by Chi-squared or Fisher test. The Tobit multivariable regression model was utilized to determine factors associated with perception on capacity of local authority and community adaptation on epidemics and disasters. Stepwise forward selection strategies were used with a log-likelihood ratio test at a p-value of 0.2 to obtain reduced models.

2.4. Ethics approval

The Scientific Committee of Vietnam Youth Research Institute has reviewed and approved the protocol of this study. The participants had the right to decide whether they would participate or withdraw from the survey at any time. All information of respondents was kept confidentially and only served for research purposes.

Table 1
Socioeconomic characteristics of respondents.

	Urban		Rural		Total		p value
	n	%	n	%	n	%	
Total	959	86.5	150	13.5	1,109	100.0	
Gender							
Male	271	28.3	48	32.0	319	28.8	0.35
Female	688	71.7	102	68.0	790	71.2	
Occupation							
Health professional	64	6.7	14	9.3	78	7.1	0.45
Medical students	828	86.9	125	83.3	953	86.4	
Community workers	61	6.4	11	7.3	72	6.5	
Marital status							
Single	867	90.9	132	88.0	999	90.5	0.54
Living with spouse	77	8.1	16	10.7	93	8.4	
Others	10	1.1	2	1.3	12	1.1	
Administration level of workplace							
Central	126	13.5	11	7.4	137	12.6	< 0.01
Province	157	16.8	22	14.9	179	16.5	
Under province	35	3.7	16	10.8	51	4.7	
College/University	618	66.0	99	66.9	717	66.1	
Participated in community activities							
Yes	455	47.6	73	48.7	528	47.7	0.81
No	501	52.4	77	51.3	578	52.3	
Region							
North	274	29.1	45	31.0	319	29.4	< 0.01
Central	34	3.6	34	23.5	68	6.3	
South	634	67.3	66	45.5	700	64.4	
Age group							
Under 25	790	87.1	116	82.9	906	86.5	0.17
25 and above	117	12.9	24	17.1	141	13.5	
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	**p value**
Age	22.0	4.6	22.2	4.8	22.0	4.6	0.93

3. Results

Table 1 shows that the mean age of participants was 22 ± 4.6 years old. The majority of them were female (71.2%), medical students (86.4%), single (90.5%) and living in the South of Vietnam (64.4%). Among health professionals and community workers, 16.5% worked at provincial level, followed by central level (12.6%) and under province level (4.7%). Nearly half of the participants have served community activities (47.7%).

The top three sources of information that participants accessed the most for updating knowledge related to disease prevention were online newspapers, internet, social networks (52.4%); training programs at the college/university (51%); and relatives (50.4%). The least common channels of getting this information were instructions in residential areas (46.9%), training at the workplace (46.6%) and religious activities in pagodas and churches (38%). There was no significant difference between people residing in urban and rural areas in terms of approaching all of the mentioned information sources **(**Table 2**)**.

The capability of local authority and community adaptation on epidemics and disasters was assessed by a 0–10 numeric rating scale. The mean scores of the capacity of local agencies and community adaptation were 6.2 ± 2 and 6 ± 1.8, respectively. In terms of local authority competencies, “Adequate capacity of health staff to effectively control epidemics and disasters” ranked the highest score (6.3 ± 2.1), while the lowest score went to “Adequate equipment, infrastructures and funding for disease prevention”. The difference in local authority capacity between urban and rural areas was not statistically significant in all domains. For community adaptation, the respondents evaluated the capacity on “Adequate measures to avoid extreme weather” with the highest mark (6.7 ± 2.1), whereas “Periodic training, equipment and drills to prepare for epidemic and disaster response” competency got the lowest grade (5.2 ± 2.5). Overall, there were significant differences between the evaluation of community adaptive capacity in urban and rural areas ($p < 0.01$) **(**Table 3**)**.

Table 2
Sources of information about disease prevention.

Sources of information	Urban		Rural		Total		p value
	n	%	n	%	n	%	
Online newspapers, internet, social networks	503	52.5	77	51.7	580	52.4	0.86
Training programs at the college/university	489	51.0	76	51.0	565	51.0	0.99
Relatives	482	50.3	76	51.0	558	50.4	0.87
Friends and neighbors	478	49.8	75	50.3	553	49.9	0.91
Traditional newspapers	470	49.0	75	50.3	545	49.2	0.76
Radio and television	469	48.9	75	50.3	544	49.1	0.75
Unions, associations, clubs	451	47.1	73	49.0	524	47.3	0.66
Information, instructions in residential areas	447	46.6	73	49.0	520	46.9	0.59
Training at the workplace	448	46.7	68	45.6	516	46.6	0.81
Religious activities in pagodas and churches	357	37.3	64	43.0	421	38.0	0.18

Table 4 demonstrates some associated factors with the perception on the capability of local authority and community adaptation to respond to epidemics and disasters. The competency of local authority was rated higher by people receiving information of disease prevention through religious activities in pagodas and churches (Coef. = 1.79; 95% CI = 0.99; 2.58). The participants residing in the South assessed the capacity of their local authority with lower scores than those in the North of Vietnam (Coef. = -0.89; 95% CI = -1.75; −0.02). Community adaptive capacity was rated higher by respondents accessing information on preventing disease from relatives (Coef. = 1.13; 95% CI = 0.24; 2.02) and religious activities in pagodas and churches (Coef. = 0.48; 95% CI = 0.06; 0.91). In contrast, people living in the Central gave lower scores for community adaptive capacity on epidemics and disasters (Coef. = -1.03; 95% CI = -1.75; −0.30).

4. Discussion

This study was conducted right after the COVID-19 outbreak occurred in China, to effectively respond to the epidemic, we consider it a reinforcing factor to natural disasters that is recently more frequent in various areas of Vietnam. In general, the policy of the Vietnamese government on disaster preparedness and response requires the “four on-spot”, including on-spot command, on-spot forces, on-spot supplies and on-spot logistics (The Joint Advocacy Network Initiative, 2011; The Prime Minister of Government, 2007; The Vietnamese Government, 2020). This principle generally means “Every household or locality should plan all necessary things for the prevention and response to natural disasters that can occur at any time. The prepared items should meet the household or locality’s emergency relief criteria and ensure that they are able to support other households or other localities prior to external forces are requested to provide assistance”. In the past, the “four on-spot” motto was employed in confronting several infectious diseases, for example, cholera, bird flu, influenza A and proved its effectiveness (The Joint Advocacy Network Initiative, 2011).

Our research depicted the overall responses by local authority and community on epidemics and disasters in Vietnam was still moderate, and there were differences between rural and urban in multiple criteria, including equipment and policy supporting people experiencing these extreme events. We also found the primary sources that health professionals, medical students, and community workers accessed to get information on disease prevention and some factors which significantly associated with their perception on local authority and community adaptive capacity on epidemics and disasters. In the urgent response to COVID-19 epidemics, the empirical findings of our research suggested important implications to strengthen community resilience and

Table 3
Assessment of local authority and community adaptive capacity on epidemics and disasters.

Perceive and evaluation of respondents on	Urban		Rural		Total		p value
	Mean	SD	Mean	SD	Mean	SD	
Local authority capacity on epidemics and disasters	6.2	2.0	5.9	1.9	6.2	2.0	0.08
Adequate capacity of health workers to effectively control epidemics and disasters	6.4	2.1	6.0	2.0	6.3	2.1	0.08
Sufficient number of staff for disease control	6.2	2.1	6.0	2.0	6.2	2.1	0.10
Effective coordination of local organizations to respond to epidemics and disaster	6.2	2.1	5.9	2.0	6.2	2.1	0.11
Adequate equipment, infrastructure and funding for disease prevention	6.2	2.1	5.7	2.3	6.1	2.1	0.10
Community adaptive capacity on epidemics and disasters	6.1	1.8	5.6	1.7	6.0	1.8	0.01
Adequate measures to avoid extreme weather	6.8	2.1	6.0	1.9	6.7	2.1	< 0.01
Adequate access to clean water and food during disasters and epidemics	6.1	2.2	5.9	1.9	6.1	2.2	0.21
Sufficient equipment at home to cope with storms and floods	6.1	2.2	5.6	2.0	6.0	2.2	0.03
Appropriate support of local policies for people experiencing disasters and epidemics	6.1	2.1	5.6	1.9	6.0	2.1	0.03
Periodic training, equipment and drills to prepare for epidemic and disaster response	5.2	2.6	4.7	2.4	5.2	2.5	0.07
Band score: 0–10							

Table 4
Associated factors with local authority's responses and community adaptive capacity on epidemics and disasters.

	Local authority's responses on epidemics and disasters		Community adaptive capacity on epidemics and disasters	
	Coef.	95% CI	Coef.	95% CI
Living area (Rural vs urban)	−0.78	−1.80; 0.25	−0.40	−0.91; 0.11
Participated in community activities (Yes vs no)			0.20*	−0.01; 0.41
Region (vs North)				
Central	−0.19	−1.20; 0.83	−1.03***	−1.75; −0.30
South	−0.89**	−1.75; −0.02	−0.01	−0.39; 0.36
Sources of information (Yes vs no)				
Training programs at the college/university			1.08*	−0.01; 2.17
Information, instructions in residential areas			0.45	−0.21; 1.11
Traditional newspapers			−0.78*	−1.56; 0.00
Relatives			1.13**	0.24; 2.02
Religious activities in pagodas and churches	1.79***	0.99; 2.58	0.48**	0.06; 0.91

*** p < 0.01.
** p < 0.05.
* p < 0.1.

capacity of health and intersectoral system at the grassroots level.

Our findings indicated that the capacity of local authority and community in responding to epidemics and disasters was limited and need to be improved in various aspects, including equipment, funding, continuous professional training and drills for residents. This was consistent with the results of research in the United States which concluded 57% of participant answered that they had little or no personal preparedness for potential disasters; 76% reported little to no awareness on local emergency systems, and 52% indicated that they did not know how to access information on public health emergencies like evacuation response and pandemic flu. (Shannon, 2015). In our study, local authority and community in rural areas were believed to have a lower capacity to respond to epidemics and disasters than those in urban areas. This can be explained by the lack of infrastructure, funding and support policy in resource-scarce settings. A study by Katz A et al. also emphasized the ongoing challenges for community preparedness included funding restraints, insufficient health workforce, competing priorities, and authoritative issues (Katz et al., 2006). This evidence called for more investments and capacity building for the general public, especially in rural areas.

The participants in our research play a key role in orienting the actions of people on the crisis, which requires health professionals, medical students, and community workers to frequently update the real-time news and control strategies. Understanding the primary information sources of disease prevention that they usually access will facilitate more effective communication strategies targeting these subjects, enable them to have adequate and accurate knowledge aiming to reduce the misleading thinking in local citizens. The three most common channels that the respondents approached to get health information in our study were online newspapers, internet, social networks; training programs at the college/university; and relatives. In the context of COVID-19 in Vietnam, government agencies have made huge efforts to verify and control the quality of information on online sources. Some people spreading fake news or rumors of COVID-19 on social media have been sanctioned following the Law on cybersecurity (Vietnam Law and Legal Forum Magazine, 2020). This strategy should be maintained and reinforced in addition to providing timely, accurate information on epidemics for people to act appropriately. As medical students accounted for a large proportion (86.4%) in our study, it is understandable why the "training programs at the college/university" ranked the second position among the top three primary information sources of disease prevention. Moreover, to slow the spread of COVID-19, social distancing was strictly implemented in Vietnam (Vien Nhu, 2020), therefore, the interpersonal interaction between family members is among one of the most common channels to get health information.

Several applications revealed from this study are worthy for practice to cope with COVID-19 and future research. Firstly, because of the difference in community adaptive capacity on epidemics and disasters between urban and rural areas, it is critically necessary to develop the action plan and response scenario for each setting. However, since the resources are limited, not only we provide the grassroots level with sufficient equipment, it is important to also think about allocative strategies that maximize the use of equipment and human resources in this stage of the epidemics in each area. Secondly, the coordination between local organizations was still moderate, which called for more appropriate operating and collaborative mechanisms in order to improve the effectiveness of system responses on extreme events. Thirdly, as the respondents of this assessment are the core workforce at the

frontline against outbreak and they were aware of the lack in period training and drills, they should be the first subjects receiving immediate training to be involved in the disease control process. Finally, to fully understand the capacity of the system and the local community to respond to COVID-19 epidemics, household surveys will supplement other information about the behaviors of people, their attitude and practice in response to epidemics.

Our study has some limitations that should be acknowledged. The substantial difference between sample sizes of three subjects including health professionals, medical students, and community workers restricted the ability to compare their perspectives at the significance level. The cross-sectional design restrained the causal relationship between assessment of local authority and community adaptive capacity on epidemics and disasters and their determinants. In a resource-scarce setting like Vietnam, the online survey could be seen as one of the optimal approaches to collect data with a large sample, however, data obtained through this method may encounter reporting bias since the participants answered the questions on their own without any assistance or supervision of investigators. However, the research team made efforts to improve the validity of the findings by piloting and carefully revising the online questionnaire before implementing data accumulation. We also collected data in both urban and rural areas in all regions of Vietnam, which improved the divergency of participants in our study.

5. Conclusion

This study indicated the moderate capacity of the local authority and community adaptation on epidemics and disasters in Vietnam. Given the differences in response capability between urban and rural areas, it is critically necessary to develop the action plan, response scenario and strategies to optimize the utilization of equipment and human resources in combating epidemics for each setting. Immediate training for health professionals, medical students, and community workers is extremely important at this stage of the outbreak. The household survey should be conducted to fully understand the capacity of the system and the local community to respond to COVID-19 epidemics. Since COVID-19 pandemic is still spreading all over the world, nationwide strict measures such as lockdown or large-scale quarantine were not technically possible and politically feasible. Our findings emphasize the importance of building capacity for communities and subnational clusters, addressing health and socioeconomic inequalities, and developing collaborative multisectoral mechanisms to optimize efforts to control COVID-19 in Vietnam. This could also be a timely reference for other countries in the world.

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Declaration of Competing Interest

None.

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