SOLUTIONS TO IMPROVING THE ADOLESCENT'S MENTAL HEALTH BY THE IMPACT OF COVID-19 IN GIA LAI, VIETNAM FOLLOWING "STRATIFIED COMMUNICATIONS MODEL"

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Abstract

COVID-19 endangers people's lives and causes many mental health problems for society, especially for young people. Adolescents' awareness of this problem is essential to control the pandemic and improve their mental health. This study aims to apply a stratified communication model to affect knowledge, attitude, and practice (KAP) about COVID-19 and evaluate their effects on adolescents' mental health. A cross-sectional study was conducted before and after the intervention based on questionnaires and online and in-person activities launched in Gia Lai from August to December 2021. Students attending Hung Vuong High School for the Gifted (Ts), a community teen group (Tc), and their parents (Ps and Pc) were invited to participate in this study. Most participants (82.5% of Ts and 52.4% of Tc) comply with the pandemic prevention regulations. COVID-19 affected adolescents' mental health that caused worry, fear, and loss of attention in 76.1% of Ts and 80% of Tc. The results also illustrated that the KAP of Tc was lower than that of Ts, and their academic level influenced the KAP. After the stratified communication intervention, the KAP of the participants, as well as their mental health improved. This model offers a solution to the minimal impact of COVID-19 on young people and the control of this pandemic.

Keywords: Adolescents, Awareness, COVID-19, Pandemic, Mental health, Interventions.

INTRODUCTION

Since 2019, COVID-19 has affected people's lives worldwide. Schools have closed, and most activities for teenagers have been canceled. Adolescents experience long-term physical isolation from friends, teachers, and the community, and concurrently increases time spent on social media, which exacerbates their mental health problems. School and community activities are essential activities for young people. When schools, recreational facilities, and child services stop functioning due to lockdown, the students lost social-emotional support and thereby develop symptoms of stress (Brooks et al., 2020). A previous investigation studying 608 adolescents between the ages of 15–17 in Gia Lai province showed that COVID-19 affected their mental

health, so they always felt (56.75%) or sometimes felt (15.25%) nervous and stressed (Le Nhat Minh et al., 2021). On this account, many face-to-face or telephone support services are operated to solve this problem (Lee et al., 2020). Many organizations have developed online tools and intervention measures to improve adolescents' mental health. One of the most effective tools is "Helping Children Cope with Stress from the COVID-19 Outbreak" (WHO, 2021). However, in Gia Lai, Vietnam, face-to-face mental support services exist with many limitations, and knowledge absorption from social media is ineffective. The study of Le Nhat Minh also reflected that 90% of adolescents wanted to have support to be more confident (Le Nhat Minh et al., 2021); this result was obtained immediately after the communication mobilization of the Ministry of Health and the Ministry of Education and Training of Vietnam on supporting activities for adolescents. However, in the current situation, mental health support for young people here remains a dilemma due to a lack of resources and limited people with deep expertise.

Our previous study determined that the KAP of adolescents was limited due to a crowded amount of false information spreading on social media, and they lack abilities to find reliable sources of information. At the same time, the family background, culture, and the impact of family members contributed to the severity of the problem (Le Nhat Minh et al., 2021). The national distribution of vaccines remains a dilemma and students in Gia Lai only received their first dose of the vaccine. Parents' anxiety affected their children's mental health in the 'new normal state' of the COVID-19 pandemic. It is clear that direct or indirect influences of COVID-19 on adolescents' psychology have been insidious and affected their mental health now and in the future.

However, no publications on the same topic were conducted in Gia Lai, Vietnam. Furthermore, existing interventions have not focused on promoting the mental health of teenagers during the pandemic. Additionally, adolescents are the top concern in every family and are the foundation for the development of society (Sharma, 2020). They also play an essential role in pandemic prevention because they retain high creativity and

dynamicity with their 'pioneer' position and strong determination. More than that, they can perform effective communications to the community once having enough knowledge and awareness.

Therefore, in this study, a few questions have been posed, including what intervention measures are effective, sustainable, and scalable? Whether knowledge education about COVID-19, expert's psychological counseling to adolescents, and helping them get knowledge most understandably, have confidence in themselves and promote themselves to communicate what they are aware of their family members and community to reduce stress, is it feasible? To resolve this question, a study was carried out with the aim of determining the impact of the pandemic on adolescents' mental health, as well as intervening in the 'stratified communication model' to engage this age group in disease control activities, in addition to developing KAP and raising awareness of COVID-19 prevention, it also has the effect of reducing the impact and improving their mental health as the pandemic continues, but is a way to help them improve their mental health outcomes now and in the future.

2. RESEARCH SUBJECTS AND METHODS

Research subjects

The study was carried out for students (Ts) at Hung Vuong High School for the Gifted Gia Lai in Vietnam and teenagers in the community (Tc) in Chu Puh and Pleiku city in Gia Lai, Vietnam, where the risk of COVID-19 infections was high at the time of the survey. This school was chosen because it was the only school with enrolled students living distributedly in different districts in the province, so a random sample between Ts and Tc was guaranteed. Study sites in urban and rural communities were selected for non-student volunteers, whose primary job was to support the family, small business, farming, and self-employed. The percentage of literacy was 74.8% for females and 65.3% for males.

Research Design

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Before the intervention, a cross-sectional study was conducted to investigate the KAP of 650 Tc and 600 Ts with 1,250 parents of these adolescents (each teenager necessarily participated with one parent). The study was launched with high security. In particular, the list of participants was provided by the school (with the support of school leaders, teachers, and class monitors) and the locality (with the support of neighborhood leaders, youth volunteers, and village and commune healthcare).

The students in 18 classes were randomly separated into two groups, in which 9 classes with COVID-19 training, communication, and consultation were in the experimental group (E) and the other 9 classes were in the control group (C)). In the community, 650 teenagers living in Nhon Hoa, Ia Hru, Yen Do, and Yen The were intervened to encourage participation and acceptance of the community, based on the "stratified communication" model with measures of educational communication about COVID-19 and its impacts on behavioral psychology (experimental group (E)). Teenagers in Ia Phang, Ia Dreng, Hoi Phu, and Dien Hong were in the control group who did not receive any communication and consultation intervention (control group (C)).

Before intervention, COVID-19 KAP questionnaires and a survey about adolescents' mental health under the pandemic impact (in the age of 15–17) in investigation sites were given to both adolescents and their parents. Based on the information collected, the orientation for intervention was determined. After the intervention, the responses were collected to analyze. E1 stands for the experimental group, and C1 stands for the control group.

When intervening, according to the results obtained before the intervention, it is necessary to intervene in the weak aspects of the knowledge of teenagers, regulate their attitude, and guide them on how to practice and prevent the COVID-19 pandemic by health experts and trained teachers to impart knowledge to the youth. The COVID-19 awareness education and psychological consultation were conducted for adolescents with feedback from psychologists. This process was repeated 3 times until Ts and Tc met the acceptable level of KAP, and the communication activity for their parents was conducted.

The KAP of parents and adolescents and relevant surveys about their mental health was investigated after the intervention to assess the effectiveness of the model. The process was repeated 3 times both before and after the intervention of the experimental and control groups.

Organizing to Design KAP Content

The KAP questionnaires were built according to the World Health Organization guidelines (WHO, 2020). The content includes 2 sections: the first section contains demographic information, and the second section contains questions about the KAP and related impacts of the COVID-19 pandemic on adolescents' mental health. The second section includes 16 statements to examine the knowledge about COVID-19 of the participants. The maximum points for this section are 16 points (Table 2.1). With each correct statement, the participant will get 1 point and 0 point for the wrong or skipped answer.

Table 2.1. Assessment criteria on the knowledge of adolescents and their family members about COVID-19 prevention.

KH	Content	KH	Content
K1	Common symptoms of COVID-19 are fever, fatigue, cough, and muscle soreness.	K9	COVID-19 spreads out through droplets from the respiratory system of the patients.
K2	COVID-19 is different from the common flu with lighter symptoms of sneezing and a stuffy nose.	K10	Can use normal medical face mask to prevent the infection of COVID-19

K3	Confusing COVID-19 with the flu, so it is important to get tested as soon as possible after having suspicious symptoms.	K11	Should not come to crowded places to prevent COVID-19 from spreading.
K4	Incubation time after infection of SARS-CoV-2 is about 2-14 days.	K12	Test, monitoring, and quarantine are effective methods to reduce the spread of COVID-19.
K5	Support and early symptom treatments help patients recover soon.	K13	People directly interacting with COVID-19 patients must immediately be in quarantine for 14-21 days.
K6	Elderly, underlying medical conditions, and immunosuppressed people are often treated with COVID-19.	K14	An effective COVID-19 prevention measure is to improve the immune response.
K7	Herbal products and safe traditional medicine can prevent and cure COVID-19.	K15	Only COVID-19 patients with symptoms can transmit the disease to other people.
K8	Adolescents with strong immune system do not need to implement COVID-19 prevention measures.	K16	There is no substance to fight COVID-19 directly, but there are some substances that can inhibit viral infection and replication as well as stimulate immunity.

There are 3 questions about attitude (Table 2.2) and 3 questions about practice (Table 2.3) that were designed based on the reality that occurs in the locality in the 'new normal state' to determine the awareness and attitude of adolescents about the prevention of COVID-19.

Table 2.2. Assessment criteria on the attitude of adolescents and their family members to COVID-19 prevention.

KH	Content
A1	In your opinion, 5K are effective measures to reduce the spread of COVID-19.
A2	In your opinion, it is necessary to get the vaccination and later people will not be infected by COVID-19.
A3	In your opinion, the positive impacts on mental and physical health can enhance the immune system to prevent COVID-19.

Table 2.3. Assessment criteria on the practice of adolescents and their family members to COVID-19 prevention.

KH	Content
P1	You strictly follow and implement 5K measures to prevent the spread of COVID-19.
P2	You improve your mental and physical health to enhance immunity to prevent COVID-19.
P3	You take action to adapt to the 'new normal state' related to COVID-19.

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Three questions were used to assess the impacts of COVID-19 on the mental health of adolescents (Table 2.4).

Table 2.4. Assessment criteria for the impacts of COVID-19 on adolescents' mental health.

KH	Content
M1	You usually feel nervous, stressed, and less focused during COVID-19.
M2	You take less care of other people, work, and study during COVID-19.
M3	You need help, guidance, and consultation to be more confident during COVID-19.

The communication content and the detailed description of the content in the KAP reached the consensus of the research team and was evaluated by the scientific council of the Institute of Health Research and Educational Development in the Central Highlands in July 2021.

Design the stratified communication model

The stratified communication model organized in Gia Lai province – Vietnam, included educational, consulting, and communication activities in the blended model of 'Education (School) – Health (Experts) - Government (Neighborhood Group, Local Healthcare Organization). In this model, each citizen, each student was a collaborator, the central force was TTN, the homeroom teacher, the monitor, the leader of the neighborhood group, the local volunteers, local healthcare organizations were responsible for supporting communication and guiding COVID-19 prevention measures for students and households. All students, teachers, and households were at the forefront to practice COVID-19 prevention and spread awareness to the community with practical actions.

The local health sector and experts were responsible for ensuring documentation development, supporting professional and communication activities for schools and neighborhood groups, and building a "communication team" to conduct training for Ts and Tc during the study period.

Activities such as training, experts, and teachers involved psychological counseling, awareness-raising communication on COVID-19 prevention, in which the people receiving communication were Ts. Experts and commune health workers conducted communication, training and counseling for Tc and local youth volunteers. All these activities were carried out continuously every week and monitored monthly until both Ts and Tc reached the best level of knowledge. After that, they obtained further training to perfect their knowledge, and these last persons were selected to communicate COVID-19 knowledge to their relatives. After each impact, a course of KAP was performed and repeated at least 3 times.

To increase the feasibility of maintaining and replicating, research intervention activities must be cost-effective and suitable for the actual situation of the school and the locality. The COVID-19 prevention measures applied in this investigation must be developed based on local proposals, which do not affect the professional work of the school and must be improved by supporting the education, health and community sectors.

Manage KAP surveys

To ensure ease of reading and answering the questionnaire, its layout has been tested on different devices, including laptops, tablets, and smartphones. Finally, it converted into an online survey based on the Zalo app for Ts and Tc, and their parents (the parents of Ts and Tc denoted by PHTs and PHTc, respectively). Additionally, it was also performed directly for Ts and Tc who did not have online devices. Before conducting an investigation, the Zalo-based survey was tested to ensure its effectiveness. A list of grouping

information was sent back from the school and local leaders to establish communication. A text message with a survey link was sent to the monitor of each class and the local neighborhood group to invite all registered members to join the experimental group. An invitation to create groups was sent via Zalo to all 18 monitors (6 of 10th-grade classes, 6 of 11th-grade classes and 6 of 12th-grade classes) and 18 young volunteers (select 1 person for each ward, commune, town, population group). Then, the monitor and young volunteers passed the invitation to members through their Zalo group. The invitation included the purpose of the study, an estimated time for the questionnaire and the answer guide, and a pledge of honesty and transparency. After the initial invitation, 5 reminders were sent to the participants to improve response rates. There were at least 3 KAP surveys for adolescents and their parents before and after the intervention.

Data Management and Statistical Analysis

Statistical analysis (data screening, descriptive and inferential analysis) was performed using IBM-SPSS 20.0 statistics. Statistics were used to determine the association of demographics and KAP between Tc, Ts, and controls, each criterion in the KAP of Tc, Ts, and their parents before and after the intervention. Descriptive statistics were used, including frequency, percentage, and standard deviation of parameters related to KAP. The P-value < 0.05 was considered statistically significant.

3. RESULTS AND DISCUSSION

3.1. Demographics of the Participants

A total of participation included 305 Ts and 303 Tc (response rate was 50.8% and 46.6% in Ts and Tc, respectively). Their mean age was 16, the majority were women (n = 395; 65.0%). All the Ts are high school students and there is no difference in 3 grades. Most of the Tc left high school, the literacy rate is 100%, and they are self-employed. Their parents are mainly primary and high schools, and their literacy rate is 4.6% in PHTc. Demographic details of the participants are detailed in Table 3.1.

Table 3.1. Gender, age, and qualifications of study participants

Characteristics	Ts (%, N=305)	PHTs	Tc (%, N=303)	PHTc
Gender				
Female	60.7 (n =185)	34.4 (n =105)	69.3 (n=210)	58.7 (n =178)
Male	39.3 (n =120)	65.6 (n =200)	30.7 (n= 93)	41.3 (n =125)
Age				
15	34.4 (n=105)		32.0 (n=97)	
16	32.8 (n=100)		39.0 (n=108)	
17	32.8 (n=100)		29.0 (n=88)	
35-50	0	93.4 (n=285)	0	98.3 (n=298)
50-65	0	6.6 (n=20)	0	1.7 (n=5)
Qualifications				
None	0	0	0	4.60 (n=14)
Primary school	0	35.40 (n=108)	26.0 (n=79)	50.5 (n=153)

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Junior high school	0	21.63 (n=66)	73.9 (n=224)	33.0 (n=100)
High school	100 (305)	22.29 (n=68)	0	6.27 (n=19)
University and above	0	20.65 (n=63)		5.61 (n=17)

3.2. Knowledge, attitude and practice (KAP) toward COVID-19 before and after the intervention

3.2.1. Knowledge of COVID-19 by participants before and after the intervention

Before the intervention, the average total knowledge score in each group of participants was 10.35 and 8.46 in Ts and Tc; 9.85 and 8.58 in PHTs and PHTc, respectively. These scores per maximum total score of 16 compared to the pre-intervention and control groups were P>0.05 (Table 3.2).

Table 3.2. Knowledge of adolescent COVID-19 in Gia Lai province (N = 608)

Study participants		Before the intervention		After the intervention	
		Intervention group	Control group	Intervention group	Control group
Adolescent	**Ts**	10.35 ± 2.5	10.11 ± 2.9	15.75* ± 1.5	10.72 ± 2.0
	Tc	8.46 ± 1.4	8.30 ± 0.8	12.13* ± 1.8	8.43 ± 1.8
Adolescent's parents	**PHTs**	9.85 ± 2.2	9.92 ± 2.4	15.22* ± 2.1	10.12 ± 0.9
	PHTc	8.58 ± 1.6	8.52 ± 1.8	11.29 ± 1.3	8.55 ± 0.8

represents the statistically significant difference (P<0.05); the cumulative percentages may differ from 100% due to rounding errors.

Before the intervention, TTN's misleading knowledge suggested that COVID-19 infected people did not transmit the virus to others when they had no symptoms (17.6% Ts; 44.6 Tc). The misconceptions are that TTN has good immunity, so it is not necessary to prevent the infection of the COVID-19 virus (9.9% Ts and 32.3% Tc). This said that functional organizations need more attention although this is the 4th wave of the epidemic, COVID-19 has lasted since the end of 2019, and social media are continuously updated. The investigation results showed that 28.5% of Ts and 44.2% of Tc incorrectly determined symptoms of COVID-19; 54.1% of Ts and 34.7% of Tcs did not know the main symptom of COVID-19, 27.6% of Ts and 32.5% of Tcs did not know that COVID-19 is different from the common flu. The results show that many adolescents seriously lack knowledge of COVID-19 compared to some parts of the world. In Shaanxi province, China, 82.3% of students have good knowledge (Peng et al., 2020). In an important criterion, "Safe use of herbal products and traditional medicine to enhance the ability to prevent and support the treatment of COVID-19", there were 89.8% Ts and 76.6% Tc responses correct. Therefore, it shows that adolescents do not have complete knowledge of COVID-19, or maybe they think about it but do not understand the nature of what they do.

After the intervention, most of the above problems have been improved, especially the total knowledge in the participating groups has increased significantly: 15.75 and 12.13 in Ts and Tc, respectively. These scores per maximum total score of 16 compared to the pre-intervention (increase 5.4 in Ts and 3.67 in Tc) and compared to the control group. Both differences have a significant value (P<0.05) (Fig. 3.1). It means that

the intervention effect of the "stratified communication" model has brought a high efficiency in equipping children and their parents with knowledge about COVID-19. Carbonero's research notes that TTN who have more responsible, will have better learning attitudes (Carbonero et al., 2017). Responsibility is the ability of people to respond effectively and satisfactorily to their behaviors. When TTN are educated about responsibility, it will change their behavior more responsibly. Therefore, in this study, we want to change the behavior of TTN by connecting with school education and entrusting them with responsibility so that they actively seek knowledge, actively listen, and discuss the acquisition of COVID-19 knowledge better. In this case, the responsibility of TTN is to communicate such knowledge to their families and protect themselves better against COVID-19. Then, a survey of one of their relatives was conducted. There was a significant difference in PHTs (15.81) compared to the control group and

before the intervention, but not significantly different in PHTc (11.29). According to demographics, Tc has a lower secondary school education, and their parents have an illiteracy rate of 4.6% and a primary school level of 50.5%, which means that their academic level correlated with participants' knowledge scores about COVID-19 (Figure 3.1). This correlation is also reflected in the difference in knowledge scores, each criterion related to the attitude and practice of Ts compared to Tc in the whole experimental process ($P<0.05$), this is explained consistently with the reasoning of published research, people with low education tend to have more difficulty updating knowledge than those with high education levels (Fang et al., 2021). Even when Tc directly affects PHTc, the effect is lower than Ts on PHTs. This is a remarkable thing when implementing this model in the future, and it is necessary to have a suitable plan for localities with low literacy levels.
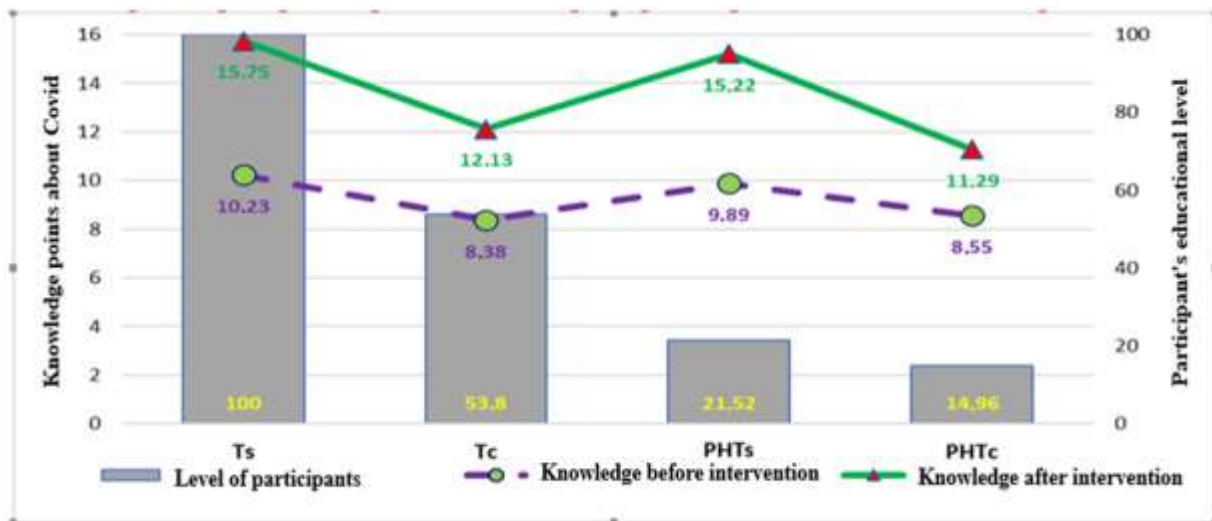

Figure 3.1. Correlation between knowledge and educational level in adolescents and their families before intervention

Participants' attitudes about COVID-19

To clarify the improvement of knowledge affects participants' attitudes, an assessment was conducted on 608 TTNs along with 608 of their relatives. The results showed that before the intervention, most Ts strongly agreed with the 5K rule (82.5%) while Tc only responded 52.4% (Table 3.3). Most of these people (66.2% Ts and

78.3% Tc) think that they will not be infected with COVID-19 after full vaccination. Enhancing physical and mental health is an effective way to strengthen the immune system with diet, exercise, sleep, stress reduction; they responded 35.7% in Ts and 23.0% in Tc. However, after the intervention with the "stratified communication" model, the number of participants who agreed to

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the 5K rule increased strongly (98% and 83.2% in Ts and Tc, respectively). Most of these people (94.77% Ts and 80.9% Tc) are aware of the need for vaccination, but will still be infected with COVID-19 after injection. Therefore, item 'promoting physical and mental health' effectively strengthens the immune system with diet; exercise, get enough sleep and reduce stress' was highly selected (93.5% in Ts and 84.9% in Tc). However, the levels of Ts and Tc in the control group that did not receive the were unchanged compared to before the intervention (Table 3.3).

Table 3.3. Attitudes to prevent COVID-19 among adolescents and their families

Participants	Survey content	Before the intervention (N=608)		After the intervention (N=608)	
		Intervention group (n,%)	Control group (n,%)	Intervention group (n,%)	Control group (n,%)
Ts	A1	124 (81.0 ± 8.5)	128 (84.2 ± 4.6)	150 (98.0 ± 8.5)	132 (68.4 ± 5.9)
	A2	101 (66.0 ± 2.9)	101 (66.4 ± 3.7)	08 (5.23 * ± 1.1)	105 (69.1 ± 4.6)
	A3	55 (35.9 ± 5.6)	54 (35.5 ± 6.6)	143 (93.5* ± 8.8)	60 (39.5 ± 3.5)
Tc	A1	80 (52.6 ± 3.6)	79 (52.3 ± 4.5)	125 (83.2 *± 7.9)	83 (55.0 ± 5.4)
	A2	122 (79.7 ± 8.2)	117 (77.0 ± 7.3)	29 (19.1* ± 2.1)	117 (77.0 ± 6.5)
	A3	37 (24.3 ± 1.5)	33 (21.7 ± 2.4)	129 (84.9*± 9.1)	39 (25.8 ± 2.7)
PHTs	A1	130 (85.1 ± 5.5)	126 (82.9 ± 7.7)	151 (98.7*± 6.5)	126 (82.9 ± 6.9)
	A2	105 (68.6± 6.1)	100 (65.8 ± 4.7)	12 (7.84* ± 1.4)	103 (67.8 ± 8.3)
	A3	58 (37.9 ± 2.5)	60 (39.4 ± 4.2)	135 (88.8* ± 8.3)	65 (42.8 ± 4.5)
PHTc	A1	81 (53.3 ± 4.1)	80 (53.0 ± 4.6)	105 (88.8* ± 6.9)	82 (54.3± 5.5)
	A2	115 (76.7 ± 6.5)	106 (70.2 ± 5.5)	86 (56.6 ± 2.4)	108 (71.5 ± 6.7)
	A3	35 (23.0 ± 3.9)	36 (23.8 ± 3.5)	130 (85.5* ± 9.1)	39 (25.8 ± 3.7)

Value (P<0.05), the ratio is determined based on the number of people with the right attitude, the wrong attitude is not statistically, n is the number of participants

Korda and Itani argue that communication has an impact on knowledge and behavior and can be effective in meeting individual health needs (Korda and Itani, 2013). Communication platforms organized worldwide that are deployed to solve public health problems (Benetoli et al., 2018), supported the prevention and control of infectious diseases, and save costs (Al-Surimi et al., 2017), positively affect their perception and behavioral change against COVID-19 (Al-Dmour et al., 2020). However, for people with low education, such as Tc and PHTc, acquiring knowledge through COVID-19 related social media is not easy (Table 3.1).
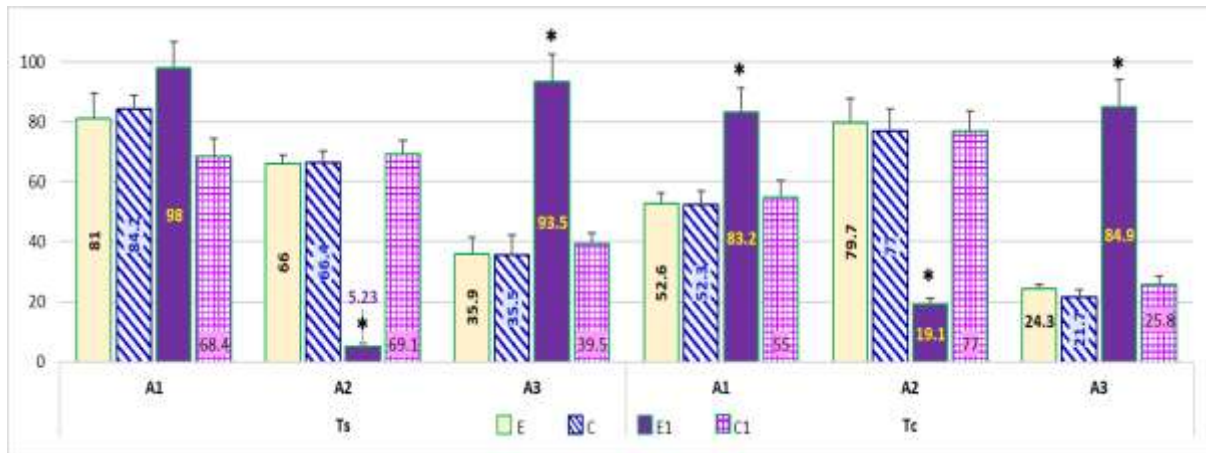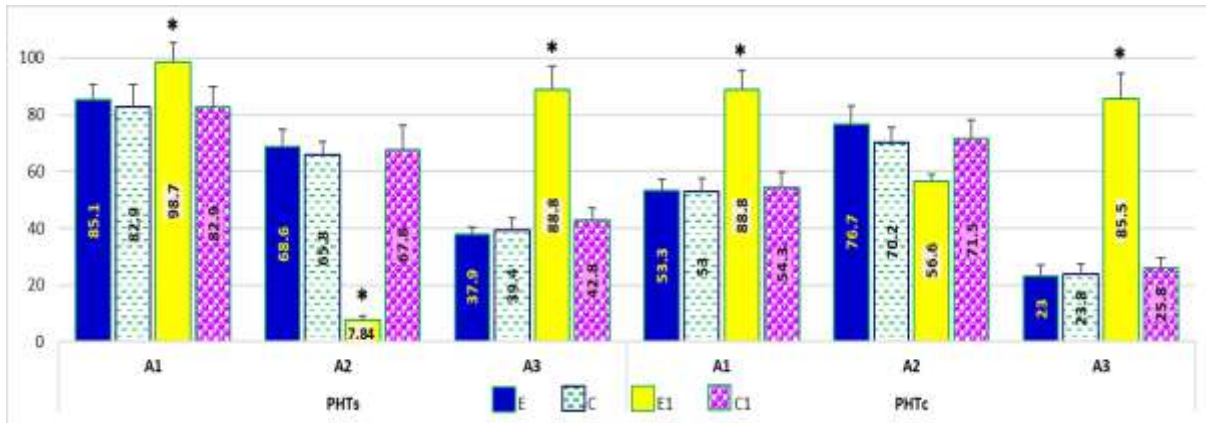
* Value (P<0.05), ** Value (P<0.01), E is the intervention group, C is the control group before impact; and E1 in the intervention group, C1 in the post-operative control group

Figure 3.2. Attitudes toward the prevention of COVID-19 in adolescents before and after the intervention compared to controls

Participants are completely unlimited in their access to social networks, an epidemic prevention measure of government. The finding indicated that their attitudes towards each group criterion before the intervention and some criteria (A2) after the intervention were not good, while in the Ts and PHTs, there was a significant difference between the pre-intervention group and the non-intervention group (P<0.05) (Figure 3.2). Tripathi et al. have found that highly educated individuals have better knowledge and awareness of the symptoms and complications of COVID-19, as well as adhere to preventive measures (Tripathi et al., 2020). Furthermore, they also understand the specific problems related to their health, so they can change their lifestyle and behavior when they feel threatened by an infectious disease (Al-Dmour et al., 2020). Therefore, the "stratified communication" model has solved direct communication. In addition, communicators have a positive influence on adolescents, such as consultants, teachers, and local leaders. They clarified the knowledge gaps and strongly intervened in the specific problems of each of the adolescents. Therefore, they effectively affect the participants' consciousness and change adolescents perception in a positive direction. Once the adolescents have full knowledge, they will be confident expressing themselves. They want to help others with all their responsibilities leading to a change in behavior.

Through this study, it has been proven that each of the PHTs and PHTc received significant influences from their children to change their own perception of COVID-19 compared to the before intervention and control groups. Adolescents have successfully influenced parents' awareness of the criteria for promoting physical and mental health to strengthen the immune system to better prevent COVID-19. Their parents responded to the maximum extent, compared to the group without intervention or control (Figure 3.3).

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* Value (P<0.05), ** Value (P<0.01), E is the intervention group, C is the control group before impact;
and E1 in the intervention group, C1 in the post-operative control group

Figure 3.3. Attitudes toward the prevention of COVID-19 in adolescents' parents before and after
intervention compared with controls

COVID-19 prevention practice in adolescents

Before the intervention, most adolescents (90.2% Ts and 65.0% Tc) reported following the authorities' rules to prevent COVID-19 infection. However, they have not performed well, such as taking care of their mental and physical health to strengthen their ability to fight against COVID-19 (36.1% Ts and 23.1% Tc); this phenomenon also occurs in their parents (Table 3.4).

Table 3.4. COVID-19 prevention practices in adolescents and their families before and after intervention

Participants	Survey content	Before the intervention (N=608)		After the intervention (N=608)	
		Intervention group (n,%)	Control group (n,%)	Intervention group (n,%)	Control group (n,%)
Ts	**P1**	140 (90.5 ± 8.5)	135 (88.8 ± 4.9)	152 (99.3 ± 4.9)	133 (87.5 ± 4.5)
	P2	56 (36.6 ± 3.7)	54 (35.5 ± 2.5)	136 (89.5 ± 6.5)	57 (37.5 ± 3.7)
	P3	50 (32.7 ± 2.2)	48 (31.6 ± 2.9)	150 (98.0 ± 6.8)	52 (34.2 ± 2.5)
Tc	**P1**	100 (65.4 ± 7.2)	97 (63.8 ± 5.1)	125 (82.2 ± 5.9)	99 (65.1 ± 6.1)
	P2	34 (22.2 ± 2.5)	36 (23.7 ± 2.0)	104 (68.4 ± 3.5)	38 (25.0 ± 2.5)
	P3	12 (7.8 ± 0.5)	11 (7.2 ± 1.1)	101 (66.4 ± 4.8)	15 (9.90 ± 1.9)

PHTs	P1	141 (92.2 ± 6.8)	139 (91.4 ± 6.5)	150 (98.0 ± 7.5)	137 (90.1 ± 6.5)
	P2	54 (35.3 ± 3.5)	57 (37.5 ± 3.5)	146 (95.4 ± 8.1)	59 (38.8 ± 3.3)
	P3	53 (34.6 ± 2.8)	50 (32.8 ± 4.2)	151 (98.7 ± 7.4)	52 (34.2 ± 2.8)
PHTc	P1	105 (68.6 ± 4.5)	99 (65.1 ± 5.5)	127 (83.6 ± 4.9)	100 (66.2 ± 4.4)
	P2	35 (23.0 ± 2.4)	37 (24.3 ± 3.6)	124 (81.6 ± 7.2)	39 (25.8 ± 2.5)
	P3	15 (9.8 ± 1.2)	13 (8.5 ± 1.3)	131 (85.5 ± 5.5)	15 (9.9 ± 0.9)

Value (P<0.05), the ratio is determined based on the number of people with the right attitude, the wrong attitude is not statistically, n is the number of participants

To assess the relevance of adolescent practices to national policies, a critical issue that we mentioned is "ready to adapt to all circumstances related to COVID-19 in the 'new normal' state (P3)". The results show that up to 68% of Ts and 89.1% of Tc are still not ready. In the epidemic situation, the lockdown to limit the spread of COVID-19 has affected many areas, including economic development. Therefore, the "new normal" statement is the solution for many countries, including Vietnam. Besides the vaccination and compliance with COVID-19 prevention measures, in order to adapt, everyone needs to prepare for physical and mental state to improve the immune system. However, only about one-third of both Ts and Tc exercise, eat healthy meals, get enough sleep, and improve mental health to increase immunity against COVID-19. Knowledge gaps have affected their attitudes and practices about COVID-19. Based on this fact, during the intervention, Ts and Tc were trained in COVID-19-related knowledge, as well as psychological counseling to calm down and control themselves. At the same time, they are directly involved in "stratified communication" activity. The results showed that both Ts and Tc had significant improvements in behavior, compared to before the intervention and the control group after the intervention, their awareness was better and converted into action (Figure 3.4).
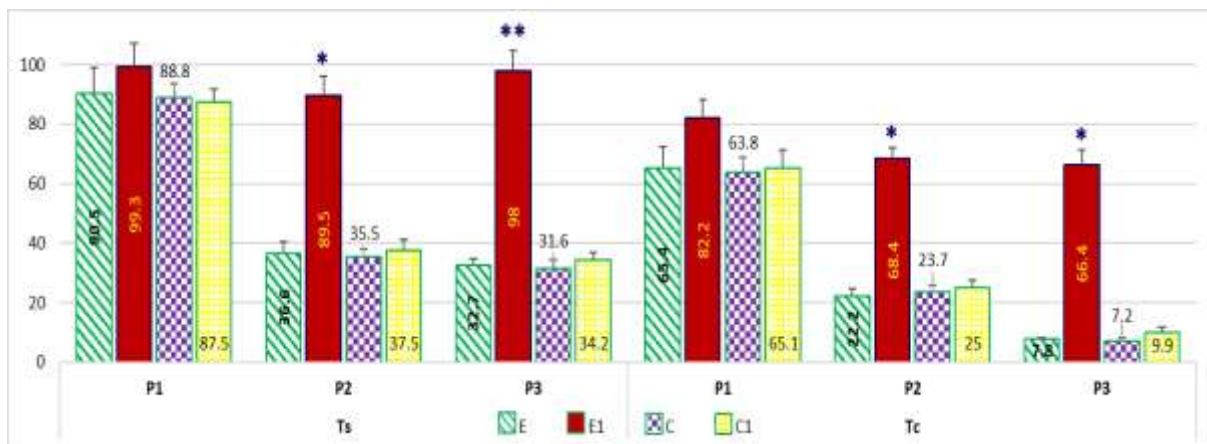
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Figure 3.4. COVID-19 prevention practices in adolescents and their families before and after intervention

* Value (P<0.05), ** Value (P<0.01), E is the intervention group, C is the control group before impact and E1 the intervention group, C1 the control group after impact

Appropriate knowledge and awareness are essential to encourage positive behaviors and promote health (Park et al., 2018). Laverack et al. suggested that changing behavior to improve health by changing lifestyle (Laverack, 2017) and the individual's specific perception of their benefits will improve health status in a positive direction (Laranjo, 2016). Therefore, "stratified communication" has influenced adolescents' perceptions that helped them change from unaware to aware and convert into behavior. When Ts and Tc participated in this activity, experts provided more simple and adequate knowledge about the prevention of COVID-19 compared to information from social networks. Therefore, in addition to gradually changing attitudes, they have transformed into practices to protect their health. Not only that, the fact that they are active in communication actions has changed the awareness and practice of COVID-19

prevention for their relatives, from 35.3% not being aware of mental health care and physical activity to increase the ability to prevent COVID-19 before the intervention, PHTs were shown up to 95.4% after intervention (P<0.05), and had statistical value compared to control (38.8) %), the same for PHTc (Figure 3.5). This is consistent with existing research; if their behaviors, attitudes, and perceptions are controlled, then the COVID-19 prevention campaign aimed at adolescents will be successful (Cavicchiolo et al., 2021).

The results showed that 35.3% of PHTs before the intervention remained unaware of taking care of their mental and physical health to increase their ability to prevent COVID-19. After the intervention, this number increased significantly (95.4%) compared to the control (38.8%). This had similar results for PHTc (Figure 3.5). This is consistent with published research; if their behaviors, attitudes, and perceptions are controlled, then a COVID-19 prevention campaign aimed at adolescents will be successful (Cavicchiolo et al., 2021).
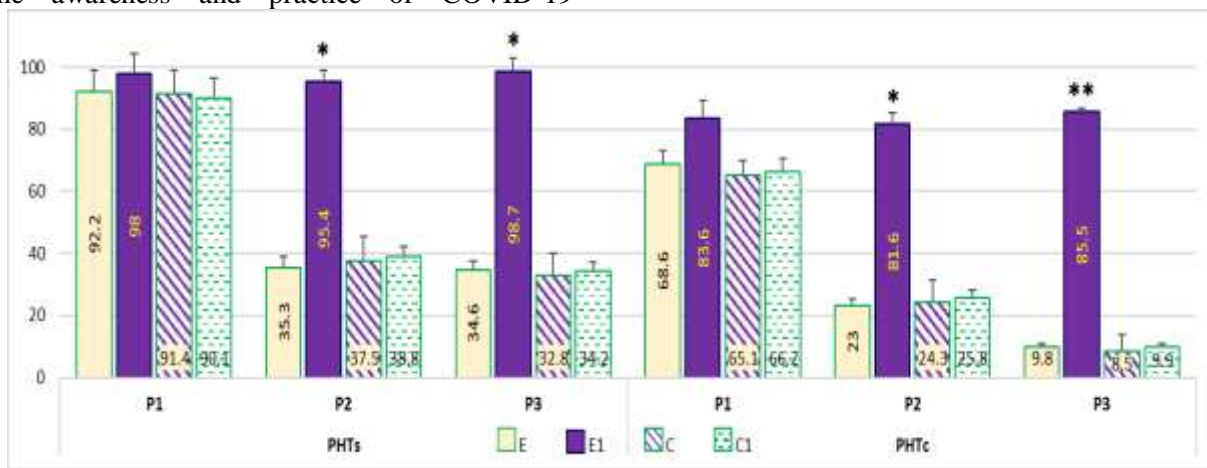

Figure 3.5. Practice of prevention of COVID-19 in relatives of adolescents before and after intervention

* Value (P<0.05), ** Value (P<0.01), E is the intervention group, C is the control group before impact and E1 the intervention group, C1 the control group after impact

Evaluating the effectiveness of this model in Ts and Tc, the results show that the practice of Ts has a higher rate than Tc, in which the P1 criterion in both groups before and after the intervention has P>0.05. In particular, the P2 criterion in Tc did not

change significantly when they received the impact of "stratified communication", while the P3 criterion achieved high efficiency. This problem can be explained that social media and practical local actions in the prevention of COVID-19 have created a spillover in each person's actions when they always perform well the policies (such as 5K). On the other hand, for the P3 criterion, it is also possible that when the community is under lockdown by COVID-19, Tc and PHTc hope to return to the normal activities as before, so as soon as the "new normal" is implemented, they acted quickly to adapt.

3.3. Impact of COVID-19 on adolescents' mental health

The results of Table 3.5 show that, before the intervention, 75.6% of Ts and 80% of Tc felt anxious, nervous, stressed, less focused; 68.7% of TS and 65% of Tc feel less interested in people, in study and work during the COVID-19 period. These could be signs of stress. Therefore, 88.5% of Ts and 75.3% of Tc needed support, guidance, and psychological counseling to be more confident. This result is lower than studies in the US but higher in Ethiopia (Aylie et al., 2020), in Bangladesh (Khan et al., 2020). This is also consistent with research in India that indicated that 66.11% stress, 68.59% anxiety, and 61.98% fear in adolescents when isolated due to COVID-19 (Saurabh et al., 2020). Numerous adolescents in China appeared with depression, anxiety at a very high rate during the COVID-19 outbreak (Chen et al., 2020; Jiao et al., 2020).

Table 3.5. Impact of COVID-19 on adolescent mental health before and after impact

Participants	Survey content	Before the intervention (N=608)		After the intervention (N=608)	
		Intervention group (n,%)	Control group (n,%)	Intervention group (n,%)	Control group (n,%)
Ts	M1	115 (75.2 ± 4.5)	117 (77.0 ± 5.2)	28 (18.3* ± 6.8)	118 (77.0 ± 7.3)
	M2	106 (69.3 ± 2.8)	105 (68.1 ± 2.5)	16 (10.5* ± 2.3)	110 (68.1 ± 3.5)
	M3	136 (88.9 ± 3.6)	134 (88.2 ± 3.5)	32 (20.9* ± 2.8)	141 (92.8 ± 4.9)
Tc	M1	121 (79.6 ± 2.9)	121 (80.1 ± 2.7)	42 (27.6* ± 3.2)	125 (80.1 ± 3.5)
	M2	98 (64.5 ± 5.5)	99.0 (65.6 ± 3.5)	20 (13.1* ± 1.6)	101 (65.6 ± 2.6)
	M3	113 (74.3 ± 7.3)	115 (76.2 ± 6.2)	45 (29.6* ± 2.2)	116 (76.2 ± 5.5)

Value (P<0.05), the ratio is determined based on the number of people with the right attitude, the wrong attitude is not statistically, n is the number of participants

Many reports indicated that the COVID-19 pandemic has affected the mental health of adolescents (Jones et al., 2021). In Gia Lai province, Vietnam, the number of infections since the beginning of the pandemic to date is more than 5,300. This is a poor province with challenging

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economic conditions, low education level, and weak medical resources. Therefore, school closures and lockdowns have been implemented frequently and repeatedly as a necessary measure for disease prevention. From September 2021 until now, students have not been able to go to school and study online at home. This study showed that adolescents have a high rate of psychological abnormalities, they have been affected by the pandemic (Table 3.5). Life stress, family isolation, internet, and social media abuse are all factors that can affect their mental health (Jones et al., 2021). In fact, for most adolescents, school influences their self-concept, happiness, and behavior (Gorrese et al., 2013). When they cannot go to school, which leads to limited interaction with friends, so they spend more time connecting to social networks (Spinelli et al., 2020), they are less active and more dependent on screen-based devices for educational or entertainment purposes (Andriyani et al., 2021). The prolonged COVID-19 pandemic may have exacerbated these trends. In addition, almost of restaurants, entertainment venues, and small business services (which are Tc's main jobs) stopped working. Therefore, adolescents may have spent much time on the Internet, spending 3.6 hours per day on social media (Thomas et al., 2021). Excessive gaming and sleep deprivation can cause depression and impaired learning and less exercise leads to low sleep quality, and reduces mental health (Saunders et al., 2017; Chaput et al., 2020). Kuy et al. (2020) also noted that school closures lead to psychological effects in adolescents. When controlling COVID-19, the lockdown and home isolation may have limited communication; thus, the tendency to increase the time spent on social media and smartphones leads to a decrease in mental health with symptoms of anxiety and depression (Sohn et al.,2019).

Although exercise has been shown to reduce these symptoms (Wang et al., 2020), both Ts and Tc responded with little or no interest in exercise (Table 3.2). The impact of COVID-19 on the psychological health of adolescents may be due to misinformation (Zarocostas, 2020). They may not find information from a reliable source such as the Department of Health or the CDC (Duffy, 2020). Furthermore, children whose parents are under stress due to job loss and income difficulties due to prolonged pandemics are also at increased risk of mental disorders (Maciejewski et al., 2018). Therefore, COVID-19 literacy support and psychological counseling are important for adolescents here, these findings are consistent with studies in the US (Kecojevic et al., 2020). Furthermore, online learning difficulties for Ts can have significant effects on mental health. The sudden transition from traditional learning (face-to-face) to online learning platforms can be especially difficult for students who are used to traditional learning at school (Xu et al., 2014). Furthermore, subjects not suitable for online learning can exacerbate students' mental health status (Jaggars et al., 2014). Tc worried about themselves or their relative's health, or financial difficulties, losing job, reducing salary, reducing working hours (child work) due to COVID-19. As uncertainties about the future continue, worsening mental health may result (Ozamiz-Etxebarria et al., 2020). All of these have implications for management policymaking. Their mission is to come up with creative solutions in the "new normal" period, at the same time, it is necessary to have support policies for the Tcs on the issue of "child employment".

Consequently, the stratified communication model has attracted adolescents who are both influencers and influenced by others. They took advantage of their free time for a responsible job, so they solved their problems. Furthermore, COVID-19 persists, it has led to alarming levels, creating a great source of psychological stress (Wang et al., 2020). When adolescents participated in this model, they realized an effective solution in sight. They thought more optimistic about the outcomes for them or their relatives. Moreover, positive psychology will develop when stress factors are reduced (Ye et al., 2020).
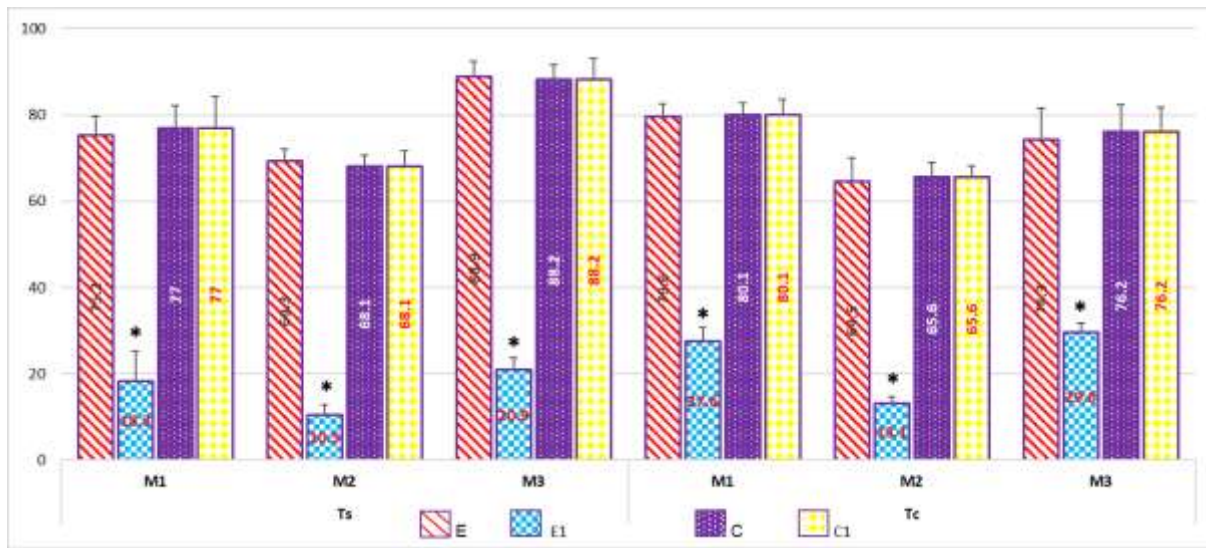
Figure 3.6. Impact of COVID-19 on adolescent mental health before and after impact

* Value (P<0.05), ** Value (P<0.01), E is the intervention group, C is the control group before intervention and E1 the intervention group, C1 the control group after intervention

This has been demonstrated through the results of this study (Figure 3.6). Both Ts and Tc had significant improvements in mental health after the intervention, specifically 18.3% of Ts and 26.7% of Tc felt anxious, nervous, stressed, and less focused in the COVID-19 period. The number of adolescents who lack care for other people, work, or study was 10.5% in Ts and 13.1% in Tc. The degree of dependence on other people also decreased significantly compared to the control and compared to before the intervention (Figure 3.6). In which female adolescents tend to respond better than males, this result is consistent with previous studies (Almutairi et al. 2020). This is also an important situation to keep in mind when expanding this model in the future.

In many countries, including Vietnam, physical distancing is considered one of the best ways to prevent the COVID-19 pandemic. However, it is challenging to ensure that adolescents are physically away from each other. Stress can be one of the factors for neuroinflammation, leading to imbalance or immune signaling in the brain (Jiang et al., 2018), which can lead to psychosis, depression, and confusion anxiety disorders

(Calcia et al., 2016). Furthermore, prolonged periods of social distancing may cause long-lasting effects in adolescents (Lampert et al., 2017; Brooks et al., 2020).

Changes in daily routines are particularly destabilizing in terms of both physical and mental health (Wang et al., 2020). This could become a serious public health problem in the future. Therefore, effective interventions to improve mental health for adolescents are of great importance. Therefore, the stratified communication model has brought specific effects that raised adolescents' awareness of COVID-19 and encouraged them to do valuable things. Moreover, in the "new normal" the opening of cities and the re-establishment of some daily activities limit the ability to control and lead to new cases of diseases, psychological stress, and decrease the human immune system (Morey et al., 2015). Therefore, this model has created a wave of hope, supporting young people to deal with this situation.

Educational and psychological counseling supports and appropriate communication can play an important role in helping adolescents prevent COVID-19, overcoming life's challenges, and improving mental health. Furthermore, this study also shows that effective mechanisms are needed to ensure that adolescents' mental health is not

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affected by the pandemic. Supporting adolescents who struggle with learning, as well as 'child work' during the pandemic, is necessary to reduce the impact of COVID-19 on their mental health (Sharma et al., 2020). We believe that the stratified communication model of this study is an intervention that may be useful to improve the quality of epidemic prevention and the quality of life for adolescents and the community in general during the pandemic. In addition, this can be a useful solution to calm adolescents and reduce anxiety and stress, to stabilize their mental and physical health in the future.

4. CONCLUSION

Before the intervention, both Ts and Tc had low KAP, 608 participants (305 Ts and 303 Tc) had a mean total knowledge score of 10.23 in Ts and 8.38 in Tc per maximum score of 16. They had mistakes such as the COVID-19 incubation period, vaccinated people will not be infected. They had not yet prepared their physical and mental health to adapt to the 'new normal state'. Aldoscents have been affected by COVID-19, leading to a decline in their mental health and making them always feel anxious and stressed (75.6% Ts and 80% Tc). 90% of them want help to be more confident.

Intervention by the stratified communication model not only increases the KAP of adolescents, but also improves the KAP of their relatives. Furthermore, the adolescents were self-aware and improved their mental health status when participating in this model. Therefore, mental health education programs affected by COVID-19 in the adolescent community that need to improve their KAP. It is necessary to organize activities to attract adolescents to psychological support during the COVID-19 period.

5. RECOMMENDATIONS

This study was carried out with Ts from a high school (although the students came from many different localities) and Tc from a district and a city in Gia Lai province. Therefore, it may not be in common with other schools and localities.

Furthermore, this is a combined survey of both direct and online approaches. We relied on the respondents to accurately record their understanding and feelings, but it was less likely to double-check with the online group. However, this still generally applies to all KAP surveys and psychometric tests. However, with appropriate monitoring and design and a repeatable number of interventions and surveys, we believe that this study provides an optimal solution to improving adolescents' mental health. It also provides valuable insights into the psychophysiology of adolescents and improves their KAP. These findings are the basis for providing further guidance to education policymakers and health leaders in the future.

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