

## Effect of Bio-psycho-educational health Program on Adolescents' Knowledge, Anxiety and Coping toward COVID-19 Pandemic Induced Stress

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### Abstract

**Background:** Adolescence is a crucial phase of human life. They are more vulnerable to the psychological effect of COVID-19 epidemic than adults because of their immature cognitive and emotional regulation systems and tend to show more negative outcomes. **Aim of study:** to investigate the effect of Bio-Psycho-Educational health program on adolescents' knowledge, anxiety and coping toward COVID-19 pandemic induced stress. **Research design:** comparative quasi experimental research design was used. **Setting:** The study was conducted through online educational channels for preparatory and secondary school adolescent girls at El-Monoufia governorate- Egypt and Yanbau governorate, Saudi Arabia. **Sample:** A multistage cluster sampling for selecting schools then a stratified random sample for selecting 400 adolescent students' girls (200 Egyptian and 200 Saudi) was drawn. **Tools:** online questionnaire was designed and involved the followings, **Tool one:** A structured interview questionnaire was designed by the investigator and consisted of two parts; (1) socio-demographic characteristics of studied adolescents and (2) adolescents' knowledge about COVID-19 pandemic. **Tool Two:** State- Anxiety Inventory for Adults. **Tool Three:** Coping Inventory for Stressful Situation. **Results:** There was a statistical significant improvement among studied Egyptian and Saudi adolescents regarding their knowledge, anxiety and coping regarding COVID-19 induced stress before and after the program ( $P < 0.001$ ). **Conclusion:** the implementation of the Bio-psycho-educational program improved adolescents' knowledge, decreased their anxiety, and promoted their effective coping regarding COVID-19 pandemic induced stress. **Recommendations:** Bio-psycho-educational health programs should be importantly designed and implemented for adolescent students to improve their knowledge, alleviating their anxiety and promote their coping on the basis of actual physical and mental needs in facing COVID-19 Pandemic and other similar health crisis.

**Key Words:** knowledge, Anxiety, coping, COVID-19 Pandemic and Bio-Psycho-Educational programs.

### Introduction:

Adolescence is a crucial phase of human life characterized by enhanced exposure and vulnerability to various stressful stimuli (Moksnes UK., 2011). Adolescence is a transitional period between childhood and adulthood in which rapid physical and psychological growth. (Sigfusdottir ID et al., 2017). Stress is extremely common among adolescents. They are vulnerable more than young children to be stressed by events or social issues. Approximately, 25% of adolescents will experience at least one significant stressor during this period of life (Henry BM et al., 2020).

COVID-19 pandemic is globally health problems that emerged rapidly and causes alterations in homeostasis to life-threatening effects and death (Zhou P et al., 2020) Adolescents are more vulnerable to the psychological effect of COVID-19 epidemic than adults because of their immature cognitive and emotional regulation systems and tend to show more negative outcomes (Zhou X., 2020). Unfortunately, Adolescents experienced during this pandemic many stressors, such as having parents work on the frontline in COVID-19 settings, parents were enforced for working from home or other parents terminated from their employment. Some families with resources are able to insure adequate supplies, while others struggle to feed their children. Furthermore adolescents were confined at home, physical exercises has been reduced or suppressed, all of these may create negative emotions among adolescents, and exposure to psychological trauma. (Wagner KD., 2020) .

Similarly in the schools, where teachers and students may affected by the corona virus and experienced psychological distress, that makes teacher

– students and peer – peer interaction more stressed (Zhou X., 2020) . In the same line, the governments around the world applied distance learning, through online studying (course were delivered by TV, broadcasts and the internet have been opened gradually for students to guarantee their need of learning. However due to lack of monitoring and evaluation of students participating in one line courses, inefficiency of the experiences of these courses, unstable network signal, and often no networks in remote rural area, . All of these resulted worsening school performance, and poor academic achievement (Duan I et al., 2020). In these scenarios, the environment that was surrounding adolescents is more stressful. Adolescents may feel frustrated with event that unable to control and heightened feel of anxiety, loneliness and depression (Miranda D et al., 2020).

Coronavirus disease is known as has respiratory symptoms including fever, and coughing. (Huang C et al., 2020). It is also widely known with higher mortality than common influenza (Chen N et al., 2020). The COVID-19 virus spread primary through droplets of saliva or discharge from the nose of an infected person by coughs or sneezes. The severity of COVI-19 symptoms can be ranged from very mild to severe. Some people may have only a few symptoms, and some people may have no symptoms at all, and others may experience worsened symptoms. Those who are older and having existing chronic medical conditions are a higher risk of serious illness or death. (Huang C et al., 2020).

However, it was found that many patients had neurological symptoms in their early stages (Li Y et al., 2020), and ischemic stroke often happened around two weeks after the onset of infection

(Yan CH et al., 2020). The common neurological complaints include headache, dizziness, confusion, mild cognitive impairment, loss of smelling, altered taste, blurred vision, muscle pain, nerve pain, and ataxia (Zhou P et al., 2020).

Indeed, COVID-19 disorder characterized by two phases, the *incubation phase*, and the *clinical symptomatic phase*. The first phase takes around 3-5 days, during which the virus attempts to seed at the most peripheral and inferior areas of the lung, it may take several days to replicate and cause organ damage (Hamming I et al., 2004). Once a clinical symptom phase is begins, the patients have neurological symptoms. Mucosa is rich in angiotensin - covering enzyme2 and the virus enters the host via eyes, nose, and mouth (Zhang Z et al., 2019).

After the initial phase, if the virus replication is controlled the patients' symptoms may improve. However, if not controlled, the disease will progress to the second phase, or badly infected stage. The lung is damage, and shortness of breath will developed, the patient is trouble, and ventilator support may be needed (Zhou X et al., 2020). According to (Huang C et al., 2020). The best ways to prevent disease transmission is to inform public about COVID-19 nature, causes, mode of transmission, and the safety measures to protect themselves.

Imran N et al., (2020) conducted a rapid review of the literature on the impact of Quarantine on the mental health of adolescents; their findings suggested that quarantine is associated with a significant negative impact on the psychological well-being of adolescents. In this context online study conducted in China during February 2020, indicated

that the most common psychological and behavioural problems among 320 youth were clinginess distraction, irritability, and fear of asking questions about the epidemic (Jiao WY et al., 2020). Another online survey completed by nearly 1,500 parents of adolescents in Italian Spanish & Portuguese, they reported the most frequent symptoms among their children was difficulty concentrated, followed by boredom, irritability, restlessness, nervousness, uneasiness, feeling of loneliness, and worry during time of pandemic (Orgiles M et al., 2020).

In the same line, Buzzi C et al., (2020) in Italy obtained information directly from adolescents via online survey. They found approximately 2/3 of 2,064 participants reported a moderate to severe stressed about the pandemic. Moreover, Cohen C et al., (2020) reported in their study adolescents had lower levels of knowledge, and more likely to engage unhealthy risky behaviours, and non-compliance with wearing mask in public places. Although there is a wide range of recent researches focuses on COVID-19 nature, risk factor and management, there are few studies conducted to evaluate human emotional and psychological state and the valuable management of stressors during COVID-19 pandemic especially among adolescents who are the most vulnerable population (Duan I et al., 2020).

#### **Theoretical background:**

Stressful life experiences, including major events are threatening the well-being of adolescents (Zimmer-Gembeck. MJ & Skinner E., 2008). The impact of stressful events is dependent not only on the nature of stressors themselves, but also on adolescents'

subjective appraisals. Which adolescents evaluate an event's potential impact or threat to well-being (Lazarus RS, 1991). A stressful event can be appraised as a loss, threat or challenge (Skinner EA & Wellborn JG 1994). *Appraisal of loss* refers to a harm that has already happened, whereas appraisal of threat means an anticipation of harm in the future, which situations perceived as more threatening negative emotions such as fear and the coping strategies are used escape, withdrawal and seeking support. *An appraisal of challenge* implies a stressful event that can potentially result in some positive outcome, where situations perceived as more challenging, that is prompt different emotions and coping strategies, such as more interest and helping in problem solving (Skinner EA et al., 2003).

Another important appraisal is the *controllability* of a stressor. Controllability refers to the ability of adolescents to change stress through effort such as academic difficulties, As a result, adolescents respond to them more instrumentally, using active strategies, persistence, efforts, and problem-solving. When stressors are appraised as lower in controllability, such as parental conflict or medical events, they are more likely to withdrawal, use of cognitive distraction, seeking social support, or other responses to reduce emotional distress (Rudolph KD et al., 1995).

Adolescents' stress appraisals are correlates of their mental health (Compas BE et al., 2001). The appraisal of a stressful event as more dangerous has been linked to feeling of anxiety, depression (Sandler LN., 2000). Stressful events induce anxiety because they threaten or challenge sense of competence and control, as well as one's

sense of belonging, and autonomy (Skinner EA & Wellborn JG., 1994). Based on adolescents' appraisal of stressful situations, they begin to cope. Coping with stress describes as a transactional process through which people deal with actual problems in their everyday lives (Skinner EA & Zimmer-Gembeck MJ 2007) Coping also can be defined as intentional and conscious responses to demands and emotions caused by stressful events. The ability to cope with stressful events and regulate emotions can play an important role in explaining why some adolescents develop psychopathological symptoms while others not (Compas BE et al., 2001). Coping involves a variety of emotional regulation strategies, thought processes, and behaviours. This implies that coping is based on an individual's physiological responses to stress, their appraisals of events, their attention, and their goals or desires. Coping also depends on social contexts and interpersonal relationships. (Zimmer-Gembeck MJ., 2008).

Coping behaviours have been divided into four strategies (1) approach-oriented coping, (2) avoid or minimize stress, (3) depend on seeking others for support, and (4) withdrawal or helplessness. The first strategy, approach-oriented coping, has included direct problem-solving and actions taken to increase understanding of the problem. The second strategy involves coping strategies that have a common function of avoiding or minimizing the stress, it also known as emotion- focused efforts trying not to think about the event or distracting oneself. The third strategy of coping is seeking support from other people as resources, either for emotional support or for direct assistance. Finally, the fourth set of strategies includes escaping or becoming helpless and doing nothing.

(Ayers TS., 1996 & Zimmer-Gembeck MJ, et al., 2007).

Some coping strategies helped to healthier functioning, such as problem solving, taking action to solve problems, and information-seeking. These active coping behaviours associated with higher competence, positive functioning, and good health. Other coping strategies, such as helplessness, passivity, escape and opposition, were associated with poorer functioning, less competence and poorer adaptation (Compas BE et al., 2001).

The other unhealthy coping strategies are rumination and distraction, its result in mental health problems. Rumination is focusing on the negative and anxiety-provoking aspects of stressful events, which draws attention to negative emotions. This is more common among adolescents as compared to pre-adolescents. (José P & Brown T., 2008).

#### **Significant of the study:**

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COVID-19 pandemic resulted in quarantine-lockdown in most countries. Quarantine may create intense psychological problems especially for the vulnerable critically developing children and adolescents. Promoting knowledge, alleviating anxiety, and enhancing healthy coping behaviours among adolescents can reduce the risk of future biological and psychological problems (Jiao WY et al., 2020). Although, the strategies of adolescents to cope with numerous stressful situations are known, there is an intense need to determine how they are coping with the COVID-19 pandemic induced stress. Coping behaviours may significantly affect mental health when facing the stress derived from the pandemic. Therefore improving adolescents' knowledge and

enhancing their coping strategies regarding COVID-19 pandemic will intern decrease or prevent physical and mental health problems.

#### **Operational definition:**

**Bio- psycho- educational program:** it is an intervention with systematic structural plan involved information about COVID-19, nature. The effective and ineffective coping strategies with COVID-19 induced stress. Managing emotional reaction, improving healthy life style, building hope, create life goal for studied participants.

#### **Aim of the study:**

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This study aimed to investigate the effect of Bio-Psycho-Educational program on adolescents' knowledge, anxiety and coping toward COVID-19 pandemic induced stress.

#### **Hypothesis:**

Online Bio-psycho-educational health program has positive effect on adolescents' knowledge, anxiety and coping toward COVID-19 pandemic induced stress.

#### **Materials and Methods:**

##### **Research Design**

A comparative quasi experimental research design (pre and post-test) was used for two study samples.

##### **Setting**

The present study was conducted in two settings; the first setting was one preparatory & one secondary schools for adolescent girls in Shebein Elkom town, El-Monoufia governorate - Egypt. The second setting was also one preparatory & one secondary schools for adolescent girls in Yanbau town at Yanbau governorate, Saudi Arabia. A multistage cluster sampling technique was used for the selection of these settings (Figure 1).

### Subjects

A stratified random sample was used to select 400 adolescent girls (200 Egyptian and 200 Saudi) who agreed to participate in the study and meet the criteria of sample selection (figure1). The samples size was calculated by using Epi-Info software statistical package created by World Health Organization and Center

for Disease Control and Prevention, Atlanta, Georgia, USA version 2002. The criteria used for sample size calculation were as follow: confidence level was 95%, error proportion 0.05%, and expected outcome after the program was 70% .The sample size was 197 for the first sitting, and 192 from second setting, it was reached to 200 to achieve more validity of results .

### Inclusion criteria for study sample:

1. Adolescent girls of the age group 12 – 18 years old.
2. Adolescent girls who willing to participate in the study.

### Exclusion criteria for study sample:

Adolescent girls who have history of any psychiatric health problem.

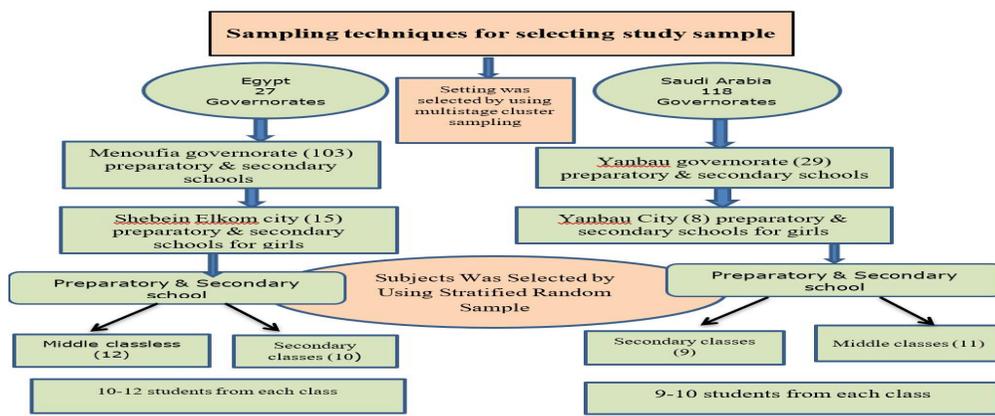


Figure (1): sampling technique for the selection of study sample.

### Tools of Data Collection:

Online interview questionnaire was designed and involved the followings,

**Tool one:** A structured interview questionnaire, it was developed by

researchers after review of related literature. (Huang C., 2019), (Chen. N., 2020), (Li Y., 2020) & (Zhang.Z.,2019). It was divided in two parts:

**Part 1:** Socio-demographic interview questionnaire included

information about adolescents' age, educational grade, their parents occupations, and levels of income.

**Part 2:** adolescents' knowledge about COVID-19 pandemic. It consisted of 12 multiple choice questions about COVID-19 nature of disease, its clinical manifestations, disease process and prognosis. Proper management, safety precautions for protect self, family members, and other people in public place. The correct and complete answer was given score (3), the correct and incomplete answer was given score (2), and the wrong answer was given score (1). Then the total score was summed, and the higher score means having good knowledge.

**Tool two: State - Trait Anxiety Inventory for Adults.** It developed by **Spielberger CD, 1983**. It consisted of two subscale "20 items for each", one of them measure state anxiety that experienced by person when faced stressful situation and other subscale measure trait anxiety that characterized by person as personality trait. Items of two subscales were scored on four likert scale from almost never =1 to almost always = 4. The total score of each subscale was summed, and ranged from 20 to 80. The higher score mean higher levels of anxiety. The present study used one subscale "State anxiety" to measure anxiety level among adolescents when faced stressful situation associated with COVID- 19 pandemic.

**Tool Three: Coping Inventory for Stressful Situation (CISS).** It was developed by **Endler .S & Parker A (1990)**. It used to assess three coping strategies that used for dealing with stressful situations "7 items for each": Task oriented coping, emotional focused

coping, avoidance coping. Task oriented coping was defined as making effort to purposefully resolve the stressful situations (e.g. Thinking about solutions for similar stressful situations, and engaging in corrective actions). Emotion-oriented coping was defined as focusing on decreasing feeling of stress and concentrated on one's own feelings (e.g . self - blame, feeling of upset). Avoidance – oriented coping refer to behaviours such as distraction (e.g. buying something, eating sank, watching TV, or playing gam on smartphone) that aims to avoid dealing with stressful situations. The items of this tool were scored on five point likert scale from 1= not at all to 5= very much. The total score for each subscale ranged from 7 to 35. The higher score for each subscale indicate to higher use of this coping strategy. The total score of this tool was summated and ranged from 21 - to 105. The two subscales (emotional oriented and avoidance coping have reverse score. The higher scored means higher of effective coping strategies.

#### **Validity and reliability of tools:**

Tool one was developed by researcher after reviewing related literature. Tool two and three were translated into Arabic language before submission for data collection. The study tools were reviewed by five experts (two experts in pediatric nursing, one expert in virology, and two experts in psychiatric mental health nursing) to test the content validity, relevance, and clarity of the tools. The required modifications were performed accordingly. The reliability of tools was tested using Cronbach's alpha test and the result was highly reliable (0.89 for tools 2), (0.82, 0.87, & 79 for three subscales of tool 3 (task oriented coping, emotional oriented and avoidance coping) respectively.

### Methods

An official permission to carry out the study was obtained from the director who responsible authorities of preparatory and secondary schools of girls at Yanbauh town, KSA and Shebein Elkom town, Egypt. Explaining the purposes of the study and methods of data collection were provided.

### Ethical Consideration:

The study was approved from ethical committee of faculty of medical science Taibah University Saudi Arabia and the Faculty of Nursing Monoufia University Egypt. For protection of human rights, an informed oral consent was obtained from student girls to obtain their permission to share in the study. This study was carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans. Therefore, nature of the study, objectives, its importance safety and confidentiality were explained. All subjects were informed that their participation in the study is voluntary, and confidentiality for each participant will be protected by the allocation of a code number to the questionnaire sheet.

### Pilot Study

A Pilot study was carried out on 10% of the total sample size to test the clarity and applicability of the tools. It was not included in the total sample size and the required modifications were done.

### Actual study:

The present study began in April 2020, and ended in March 2021, The

duration of data collection was six months from July to December 2020.

### Procedure of Data Collection:

#### Preparation and Assessment Phase:

Tools were prepared, tool one constructed by the researcher, tools two and three were translated into Arabic language and were designed on Google form.. Also, tools were sent to the participants through online submission during the first online meeting for pre-test. The related link was

([https://docs.google.com/forms/d/e/1FAIpQLSfoPCV8moH9iSXXzaOi5xyF1-eoIIw\\_TBCreHTIZgpoEnZ-hA/viewform](https://docs.google.com/forms/d/e/1FAIpQLSfoPCV8moH9iSXXzaOi5xyF1-eoIIw_TBCreHTIZgpoEnZ-hA/viewform)).

Based on the results of study tools the Bio-Psycho-Educational program was prepared after reviewing the related literature (Duan. L et al., 2020, Lafferly .M et al., 2020, Smith M et al., 2016). Three stories about stress induced by COVID- 19 pandemic were developed, designed in scenarios and acting by voluntaries adolescents and presented in videos during session.

### Implementing Phase

The philosophy of the intervention is that of a self-directed, self-controlled to enhance healthy behaviours, stress management and emotional stability among studied adolescents. The two main study groups were divided in to small

subgroups for the number of 10-15 girl students in each group as regard to their educational grade. Each group attended nine sessions, three sessions per week. The duration of each session was one and half an hour. The meeting was conducted through online Zoom program. In addition, the researcher developed online what's app groups for each subgroup to ensure competency of follow-up and to share program schedule, activities, videos and duties of each program session. The psycho-educational program was explained as follows:

#### **The first session: introduction and information about COVID-19**

An initial online interview was started by introducing the researcher himself to the student then explaining the purpose of the study in order to gain her co-operation. General orientation about Bio-Pscho- Educational program was done. Schedule and rules that should be followed during sessions were stated. The researcher explained information about COVID-19 through power point presentation and illustrated pictures regarding coronavirus nature, ways of transmission, clinical manifestations, progress and prognoses of the disease, proper and available treatment. Discussion and interaction among researcher and studied adolescents were enhanced. Participants were informed about the importance of taking action to stop spread of infection, and the necessities to protect themselves and others.

#### **The second session: healthy life style**

This session emphasis on the healthy practices regarding COVID-19 pandemic is given that people must be applied to protect themselves and others

such as: personal hygiene, hand washing techniques, wearing mask in public, sanitary measures while using toilet, type of safe disinfectants that used in home, safe anti-septic agents, and safety measures that must be applied outside the home, the important of social distance, and protective measures while dealing with infected person, the healthy diet , important of maintaining regular exercise with maintain social distance, getting rest and enough sleep time, and the benefits of practicing popular recreational activities. The researchers used power point and pictures for clarified knowledge and presented videos about practicing relaxation techniques to relive tension and alleviate stress. They received feedback from participants to ensure their understanding.

#### **The third session:" the nature of existing stress"**

At the beginning of this session the researcher asked the participants some specific questions. The first one is: how COVID- 19 affects your lives? Thoroughly discussion, the researcher acknowledged that most of the studied adolescent girls reached to different types of stressors such as: social isolation, difficult of academic achievement, fear from loss of infected loved one, financial problems, restricted of hobbies and disturbance of life routine. The researcher concluded from this discussion that stress is consider a disturbance of human homeostasis may occur sudden or expected, and exceed personal resources. Another question was asked "what is your feeling toward these stressors, and what are you doing to decrease your emotions?" The adolescents explored that, the most negative emotions were anxiety, anger, fear, frustration, depression. These emotions sometimes overwhelming, they

may loss of control, and other time seeks support from family members, friends, or distracted these feelings by doing anything. The researcher revealed the first step to deal with stress is recognize and monitoring the negative emotions. The researcher gave training exercise for rating their emotions, and advised adolescents for monitoring their emotions by using different coping strategies at time of stress to control it. The researcher explored that the arousal emotions compromise the person ability to cope effectively with life problems.

#### **The fourth session: effective coping with COVID-19 induced stress:**

At the beginning of this session the researcher presented video about adolescent girl faced stressful situation which the school was closed and the girl was received a distance learning by online channels and conducted her exam also by the same way. The video present more difficulties that hero faced during her academic course, but the hero insist on to learn this new way and cope effectively with this stress and finally she successes. Following presentation the researcher simulated discussion by question "why the hero successes and overcome of this problem? Thoroughly interaction between the participants, they concluded that the effective coping is personal ability to deal with external and internal requirements, which are beyond own resources. This can be done by persistently changing person cognitive and behavior efforts. The researcher asked another questions "what the steps that hero in the story passes to cope effectively with stress situation? Adolescents tried together to reach to the suitable answer and mentioned that the following steps: first; the hero controlled her feeling, which associated with

stressful situations. Second the hero assessed the stressful events accurately. Third; evaluate the available resources, and her abilities, planning for action, fourth and finally; applied these actions and positive reappraisal. At the end of this session the researcher gave exercise about life stress situation for adolescents to write how to cope with it effectively.

#### **The fifth session: infective coping with COVID-19 induced stress: (emotional coping)**

At the beginning of session the researcher presented video about a girl adolescent her mother infected with corona virus, and the hero failed to cope with this stressful event. After presentation the researcher asked "why the girl in the story failed to cope effectively? Through discussion the participants reached to that the hero unable to control her painful emotion, her fear, anxiety, negative thought and self - balm, This hinders her ability to cope effectively with stress. The researcher focused on the point if the hero engaging conscious activities related to emotional regulation such as emotional disclosure, seeking social support, this may be helpful for coping. But the hero focused on her negative emotions. The researcher asked the participants what your suggestions to dealing with this stressful situation? They reached to steps of tasks. They answered that the hero should using oriented coping strategies which they learned it from previous session. The hero should controlled her emotions and try to give emotional support for her ill mother. She should also try to use all of the available resources such as proper medication, using safety precautions, good nutrition, enough sleep time, and quit atmosphere and hope for recovery.

**The six session: infective coping with COVID-19 induced stress (avoidance coping)**

At the begging of this session the researchers told a story about a girl student has low grade in final exam. She cried a lot, and isolated herself in her room, stay in bed most of day, and using smart phone game most of time, she refused to study again. The researchers asked the participants to give comments. All audience disagreed about the hero behaviours. The researcher explained this coping strategies is avoidance coping, although this coping reduce stress and anxiety in the short run , soon after the stress occur, but it is less adaptive for long run and not solve the problem, further more leading to more psychological problems. The researchers asked the adolescents to put themselves in the same situation, what they will be doing? Thoroughly discussion they plan effective action to cope effectively with academic deterioration.

**The eight session: Managing emotional reaction**

During this session the researcher learned adolescents how to manage their negative emotion through practicing deep breathing exercise, using relaxation imagery, engage in mindfulness or meditation, listen to music, write own thoughts, and feeling and down regularly, put body in relaxed position, take time point for yourself, enjoy hobbies. The session illustrated by video and pictures about these activates to simplified knowledge and ensure adolescents good understanding and acquired these skills.

**The ninth session: Hope and sit goal for life**

The researcher introduced session with statements "Hope give meaning and worth for the life, Hope creates motivation. Motivation give energy and power, if you able to put this power in goal, you without doubt will success ". The researcher asked the adolescents to write their own goals for life, and their steps to reach it. Thorough discussion the researcher found that the participants exchanged their experiences, ideas, and motivation for reaching their goals. The researcher helped adolescents for reaching to the specific characteristics of effective goals which are "specific, measurable, attainable, recorded, and time framed". The researcher emphasized on the importance of promoting their self - confidence, using the effective coping strategies that learned previously within the program's scientific sessions. Also, instruct them to use their supportive surrounding system for reaching their goals. At the end of this session the researcher received feedback from all participants about their benefits and satisfaction regarding Bio-Psychological-Educational program's scientific sessions and elicit the valuable recommendations

**Evaluation phase:**

Online reassessment was done for each group using the same instruments (posttest) :by using the same link:([https://docs.google.com/forms/d/e/1FAIpQLSfoPCV8moH9iSXXzaOi5xyF1-eoIIw\\_TBCreHTlZgpoEnZ-hA/viewform](https://docs.google.com/forms/d/e/1FAIpQLSfoPCV8moH9iSXXzaOi5xyF1-eoIIw_TBCreHTlZgpoEnZ-hA/viewform)).

**Statistical analysis:**

Data were collected, tabulated, statistically analyzed using an IBM personal computer with Statistical Package of Social Science (SPSS) version 19 (SPSS, Inc, Chicago, Illinois,

USA).where the following statistics were applied:

- **Descriptive statistics:** in which quantitative data were presented in the form of mean, standard deviation (SD), range, and qualitative data were presented in the form numbers and percentages.
- **Analytical statistics:** used to find out the possible association between studied factors and the targeted disease. The used tests of significance included:
- **Shapiro Wilk test of normality** was used to determine if the data normally distributed r not
- **Chi squared test:** is a test of significance used for comparison between two groups having qualitative variables.
- **Spearman's correlation:** Used for correlation of two quantitative variables not normally distributed.

**Wilcoxon signed rank test (nonparametric test):** is a test of significance used for comparison between two related groups not normally distributed having quantitative variables

**Marginal homogeneity test** assess the significance of the difference between three correlated proportions' value of  $>0.05$  was considered statistically non-significant. P value of  $<0.05$  was considered statistically significant. P value of  $<0.001$  was considered statistically highly significant.

**Also, effect size** was used to measure the effectiveness of the study program on dependent variables

(knowledge, anxiety and coping). It considered as follow:

$$\text{Cohen } d = z/\sqrt{n}$$

**Effect size Cohen's D**

Small	0.20
Medium	0.50
Large	0.80

**Table (1): socio-demographic characteristics of the studied adolescents.**

Table one shows socio-demographic characteristic of studied adolescents. The age of Egyptian and Saudi adolescents are ranged from 12 to 18 years old. The around half of them (48.0%) aged 12 to 16 years and (55.0%) aged 16 to 18 years. Regarding to adolescents' educational levels, the most Egyptian adolescents (79.5%) and Saudi adolescents (72.0%) are students in secondary schools. (20.5%, 38.0%) are students in primary school. Regarding, Father occupation for Egyptian and Saudi adolescents 54%, and 58% have parents that occupied employees respectively, For mothers occupation 45 % and 41.5% were employees respectively. Regarding level of income, the majority of the studied sample reported their families have enough income (81%). This table also indicates that, no statistical significant difference between Egyptian and Saudi adolescents regarding their socio- demographic characteristics.

**Table (2): adolescents' Knowledge regarding healthy measures towards COVID-19 pandemic before and after the program (No=400).**

Table two reveals adolescents' knowledge about COVID-19 pandemic and healthy behaviors pre and post the

program. This table shows that, the numbers of Egyptian and Saudi adolescents who give correct and incomplete answers about nature of corona virus, clinical manifestations COVID-19, disease progress, and its proper treatment are increased after the program than before, and there are a highly statistically significant difference before and after the program ( $P = <0.001$ ). In addition the number of studied adolescents who reported a correct answer about their healthy behaviors against spread of corona virus are increased post the program than before, There is a highly statistically significant difference regarding their health behaviors that reported by Egyptian and Saudi adolescents' in pre and post the educational program ( $P = <0.001$ ).

**Table (3): Total Mean score of adolescents' knowledge and healthy measures towards COVID-19 pandemic before and after the program.**

The table three indicates that, the means score of knowledge among Egyptian adolescents in pre and post the program were  $9.25 \pm 3.62$  &  $12.8 \pm 4.87$  respectively, and the means score of knowledge of Saudi adolescents pre and post the program were  $9.09 \pm 3.56$  &  $13.4 \pm 5.15$  respectively. The total mean knowledge score of the studied samples was improved after the program than before ( $9.17 \pm 3.59$  &  $13.1 \pm 5.01$ ) respectively. There are highly statistically significant differences in before and after the program regarding their knowledge among studied Egyptian and Saudi adolescents ( $P = <0.001$ ).

**Table (4): Total means score of adolescents' anxiety before and after the program.**

Table four explores mean score of adolescents' anxiety pre and post program. It shows similarities between Egyptian and Saudi adolescents' after the program ( $41.3 \pm 9.58$ ,  $41.3 \pm 9.26$ ) respectively. The total mean score of anxiety among all adolescents are also decreased post the program compared with before ( $41.3 \pm 9.42$ , &  $49.1 \pm 8.70$  respectively). There are a highly statistically significant difference among studied adolescents regarding their anxiety pre and post intervention ( $P = <0.001$ ).

**Table (5): Total mean score of coping strategies with COVID-19 pandemic among studied adolescents before and after the program.**

Table five represents coping strategies with Covid-19 pandemic used by adolescents in before and after the program. The mean score of task coping was improved after the program than before ( $23.6 \pm 6.84$ , &  $20.8 \pm 3.78$ ) respectively. While mean score of emotional coping and avoidance coping were decreased after the program ( $13.0 \pm 2.97$ , &  $16.8 \pm 5.84$ ) respectively. Total mean score of effective coping strategies with COVID -19 pandemic is improved after the program ( $58.4 \pm 12.1$ ). There is a statistical significant difference among studied adolescents regarding their coping strategies pre and post intervention ( $P = <0.001$ ).

**Table six: total mean score of adolescents' coping strategies with COVID-19 pandemic before and after the program**

Table six shows total mean score of studied adolescents' coping strategies with COVI-19 pandemic pre and post the intervention. This table shows that. there is a great improvement in coping

strategies of Egyptian and Saudi adolescents' post intervention than pre intervention ( $54.0 \pm 8.18$  &  $58.3 \pm 11.9$ ) and ( $53.4 \pm 7.49$  &  $58.4 \pm 12.2$ ) respectively. The total mean score of both Egyptian and Saudi adolescents regarding their effective coping strategies was ( $53.6 \pm 7.85$ ) pre intervention and ( $58.4 \pm 12.1$ ) post intervention respectively. There are a highly statistically significant difference regarding effective coping with Covid-19 pandemic of studied Egyptian and Saudi adolescents pre and post intervention ( $P < 0.001$ ).

**Table (7): Correlation between total adolescents' Knowledge, anxiety and coping after the program.**

Table seven explains the correlation between knowledge, anxiety, and coping strategies of studied adolescents about COVID-19 pandemic after the program. There is a negative correlation between knowledge and anxiety ( $-0.216$ ,  $P=0.002$ ). It means that improved adolescents' knowledge lead to decrease their anxiety. Furthermore, there is a positive correlation between adolescents' knowledge and their ways of coping with COVID-19 pandemic ( $0.170$ ,  $P=0.020$ ), it means that improve knowledge lead to effective coping ways. In addition, there is a negative correlation between effective coping and anxiety of studied adolescents after the intervention

( $0.290$ ,  $P=0.001$ ), it means that the healthy coping strategy leads to decreased anxiety level of studied adolescents.

**Table (8): Correlation between socio-demographic characteristics of the studied adolescents and their knowledge, anxiety and coping strategies before the program (n= 400).**

Table eight indicates correlation between socio-demographic characters of the studied adolescents and their knowledge, anxiety and coping strategies post the program. There are no statistical significant relations between studied adolescents' characteristics and their knowledge, anxiety, and coping strategies for both groups.

**Figure (2): Effect size of Bio-Psycho-Educational program on knowledge, anxiety and coping strategies of studied adolescents**

Figure one reveals the effect size of the program on knowledge, anxiety and coping strategies of studied adolescents. It was obvious that, the program was highly effective on enhancing coping strategies of the participants and on decreasing their level of anxiety, while the program has medium effect on participants' knowledge ( $0.862$ ,  $0.859$ , and  $0.471$ ) respectively.

**Table (1):** Socio-demographic characterises of the studied adolescents (no= 400).

characterises	Egyptian Adolescents (N=200)		Saudi Adolescents (N=200)		X <sup>2</sup>	P- value
	No	%	No	%		
<b>Age / years</b>						
12 <16	96	48.0	110	55.0	1.96	0.161
16 - 18	104	52.0	90	45.0		
<b>Educational grade</b>						
preparatory school	41	20.5	56	38.0	3.15	0.369
Second school	159	79.5	144	72.0		
<b>Father occupation</b>						
academic work	4	2.00	2	1.0		
Skilled work	30	15.0	26	13.0	1.39	0.707
Employee	108	54.0	117	58.5		
manual work	58	29.0	55	27.5		
<b>Mother occupation</b>						
Academic work	20	10.0	18	9.00		
Skilled work	11	5.50	21	10.5		
Employee	90	45.0	83	41.5	3.52	0.318
House wife	79	39.5	78	39.0		
<b>Income level</b>						
Not enough	24	12.0	20	10.0		
Enough	162	81.0	162	81.0	0.864	0.469
Enough and safe	14	7.00	18	9.00		

\* Statistically Significant P &lt; 0.05

**Table (2):** Distribution of adolescents' knowledge about healthy measures regarding COVID-19 pandemic before and after the program (No=400).

Adolescents' Knowledge	Egyptian Adolescents (N0=200)				Marginal Homogeneity test P value	Saudi Adolescents (N0=200)				Marginal homogeneity test P value
	Pre		Post			Pre		Post		
	N	%	N	%		N	%	N	%	
<b>Nature of Corona virus</b>										
1-Correct and complete answer	22	11.0	85	42.5	68.4	20	10.0	91	45.5	67.7
2-Correct and incomplete	133	66.5	68	34.0	<0.001**	135	67.5	68	34.0	<0.001**
3-Incorrect answer	45	22.5	47	23.5		45	22.5	41	20.5	
<b>Clinical manifestation of COVID-19</b>										
1-Correct and complete answer	13	6.50	69	34.5		20	10.0	75	37.5	42.6
2-Correct and incomplete	183	91.5	127	63.5	56.3	174	87.0	123	61.5	<0.001**
3-Incorrect answer	4	2.00	4	2.00	<0.001**	6	3.00	2	1.00	
<b>Disease process &amp; progress</b>										
1-Correct and complete answer	11	5.50	47	23.5	29.5	18	9.00	59	29.5	29.1
2-Correct and incomplete	142	71.0	101	50.5	<0.001**	131	65.5	91	45.5	<0.001**
3-Incorrect answer	47	23.5	52	26.0		51	25.5	50	25.0	
<b>Proper treatment</b>										
1-Correct and complete answer	17	8.50	82	41.0		10	5.00	94	47.0	
2-Correct and incomplete	53	26.5	93	46.5	124.5	60	30.0	71	35.5	123.5
3-Incorrect answer	130	65.0	25	12.5	<0.001**	130	65.0	35	17.5	<0.001**
<b>hand washing technique</b>										
1-Correct and complete answer	14	7.00	71	35.5	50.1	18	9.00	75	37.5	45.5
2-Correct and incomplete	155	77.5	115	57.5	<0.001**	149	74.5	103	51.5	<0.001**
3-Incorrect answer	31	15.5	14	7.00		33	16.5	22	11.0	
<b>healthy ways to contact others</b>										
1-Correct and complete answer	24	12.0	47	23.5	27.3	26	13.0	59	29.5	37.4
2-Correct and incomplete answer	146	73.0	149	74.5	<0.001**	144	72.0	139	69.5	<0.001**
3-Incorrect answer	30	15.0	4	2.00		30	15.0	2	1.00	
<b>Safe Personal hygiene</b>										
1-Correct and complete answer	21	10.5	27	13.5		20	10.0	29	14.5	
2-Correct and incomplete	130	65.0	152	76.0	67.9	145	72.5	156	78.0	10.1
3-Incorrect answer	49	24.5	21	10.5	<0.001**	35	17.5	15	7.50	0.006**
<b>protective sanitary measures while using toilet</b>										
1-Correct and complete answer	9	4.50	58	29.0	44.3	7	3.50	72	36.0	66.9
2-Correct and incomplete	105	52.5	69	34.5	<0.001**	101	50.5	63	31.5	<0.001**
3-Incorrect answer	86	43.0	73	36.5		92	46.0	65	32.5	
<b>protective sanitary measures outside home</b>										
1-Correct and complete answer	35	17.5	91	45.5		45	22.5	86	43.0	20.1
2-Correct and incomplete	143	71.5	97	48.5	36.6	129	64.5	100	50.0	<0.001**
3-Incorrect answer	22	11.0	12	6.00	<0.001**	26	13.0	14	7.00	
<b>Protective precautions while dealing with infected case</b>										
1-Correct and complete answer	26	13.0	74	37.0	40.4	36	18.0	88	44.0	46.6
2-Correct and incomplete	90	45.0	88	44.0	<0.001**	98	49.0	92	46.0	<0.001**
3-Incorrect answer	84	42.0	38	19.0		66	32.0	20	10.0	
<b>protect self and your family</b>										
1-Correct and complete answer	19	9.50	84	42.0	55.5	17	8.50	82	41.0	57.6
2-Correct and incomplete	148	74.0	98	49.0	<0.001**	152	76.0	94	47.0	<0.001**
3-Incorrect answer	33	16.5	18	9.00		31	15.5	24	12.0	

\* Statistically Significant

P &lt; 0.05, \*\*High Statistically significant &lt;0.001\*\*

**Table (3):** total Mean score of adolescents' knowledge and healthy behaviours regarding COVID-19, before and after the program (No. = 400).

Adolescents' knowledge among	Pre intervention		Post intervention		Wilcoxon test	P- value
	Mean±SD	Range	Mean±SD	Range		
Egyptian Adolescents'	9.25±3.62	0 - 18	12.8±4.87	5 - 20	6.96	<0.001**
Saudi Adolescents'	9.09±3.56	0 - 17	13.4±5.15	5 - 20	7.78	<0.001**
<b>Total Adolescents' knowledge</b>	9.17±3.59	0 - 18	13.1±5.01	5 - 20	10.4	<0.001**

\* Statistically Significant

P &lt; 0.05, \*\*High Statistically significant P &lt; 0.001\*\*

**Table (4):** total Mean score of anxiety level among studied adolescents before and after the program (No=400).

Anxiety level among	Pre intervention		Post intervention		Wilcoxon test	P- value
	Mean±SD	Range	Mean±SD	Range		
Egyptian adolescents	47.6±8.65	29 - 67	41.3±9.58	30 - 59	5.96	<0.001**
Saudi adolescents	50.5±8.51	29 - 68	41.3±9.26	30 - 59	8.71	<0.001**
<b>Total Adolescents' anxiety</b>	49.1±8.70	29 - 68	41.3±9.42	29 - 58	7.04	<0.001**

\* Statistically Significant

P &lt; 0.05, \*\*High Statistically significant P &lt; 0.001\*\*

**Table (5):** Total mean score of coping strategies with COVID-19 pandemic among studied adolescents before and after the program.

Coping strategies	Pre intervention		Post intervention		Wilcoxon test	P value
	Mean±SD	Range	Mean ±SD	Range		
Task coping	20.8±3.78	13 - 29	23.6±6.84	9 - 31	4.76	<0.001**
Emotional coping	16.2±4.09	5 - 20	13.0±2.97	5 - 20	5.43	<0.001**
Avoidance coping	19.8±4.31	8 - 23	16.8±5.84	12 - 32	5.87	<0.001**
Total mean score of effective coping	53.6±7.85	32 - 73	58.4±12.1	37 - 75	4.94	<0.001**

\* Statistically Significant

P &lt; 0.05, \*\*High Statistically significant P &lt; 0.001\*\*

**Table (6):** total mean score of coping strategies among studied adolescents with COVID-19 pandemic before and after the program.

coping strategies among	Pre intervention		Post intervention		Wilcoxon test	P value
	Mean $\pm$ SD	Range	Mean $\pm$ SD	Range		
Egyptian adolescents	54.0 $\pm$ 8.18	32 - 73	58.3 $\pm$ 11.9	37 - 75	4.91	<0.001**
Saudi adolescents	53.4 $\pm$ 7.49	32 - 73	58.4 $\pm$ 12.2	37 - 75	5.01	<0.001**
Total Coping mean score	53.6 $\pm$ 7.85	32 - 73	58.4 $\pm$ 12.1	37 - 75	4.94	<0.001**

\* Statistically Significant

P &lt; 0.05, \*\*High Statistically significant P &lt; 0.001\*\*

**Table (7):** Correlation between adolescents' Knowledge , anxiety and coping strategies post the program.

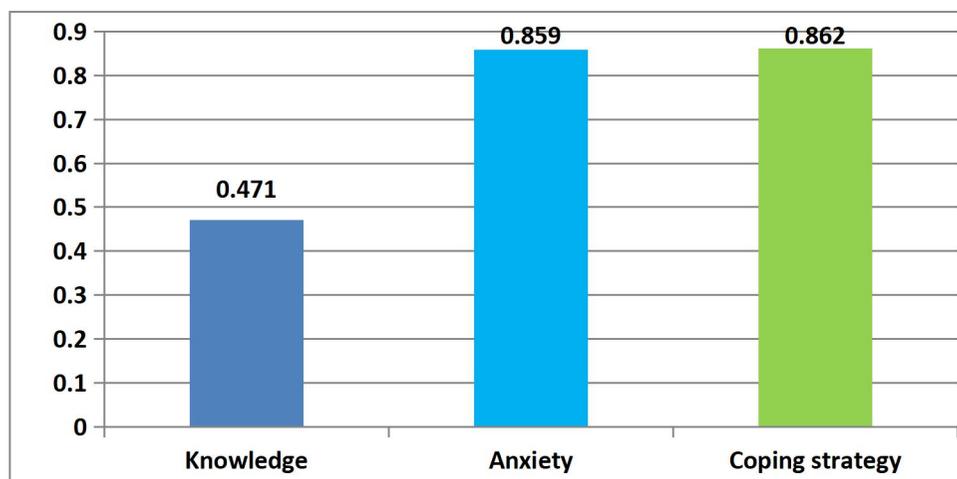
Studied variables	knowledge		Anxiety		Coping	
	r	P value	r	P value	r	P value
<b>Knowledge</b>	-	-	-0.216	0.002**	0.170	0.020*
<b>Anxiety</b>	-0.216	0.002**	-	-	-0.290	0.001**
<b>Coping</b>	0.170	0.020*	-0.290	0.001**	-	-

\* Statistically Significant

P &lt; 0.05, \*\*High Statistically significant P &lt; 0.001\*\*

**Table (8):** Correlation between socio-demographic characterises of the studied adolescents and their knowledge, anxiety and coping strategies after the program (n= 400).

Studied variables	Knowledge	Test of sig. P value	Anxiety	Test of sig. P value	Coping	Test of sig. P value
<b>Age / years</b>		U =		U =		U =
12 <16	12.8 $\pm$ 5.14	1.45	42.9 $\pm$ 10.0	=0.844	58.5 $\pm$ 11.6	=0.048
16 - 18	14.0 $\pm$ 5.14	0.145	41.1 $\pm$ 9.76	0.399	59.6 $\pm$ 10.9	0.962
<b>Nationality</b>		U=		U=		U=
Egyptian	12.8 $\pm$ 4.78	0.681	42.1 $\pm$ 9.41	1.06	58.5 $\pm$ 11.2	0.469
Saudi	13.3 $\pm$ 5.16	0.496	40.9 $\pm$ 9.44	0.289	58.7 $\pm$ 12.1	0.639
<b>Educational grade</b>		K=				
First grade	12.7 $\pm$ 4.71		46.4 $\pm$ 9.54		57.0 $\pm$ 12.4	
Second grade	13.2 $\pm$ 5.65	3.29	40.9 $\pm$ 10.1	K=5.88	61.8 $\pm$ 10.1	K= 3.04
Third grade	7.00 $\pm$ 2.64	0.193	42.0 $\pm$ 12.0	0.117	61.3 $\pm$ 12.2	0.385
University	13.2 $\pm$ 4.88		40.8 $\pm$ 9.11		58.0 $\pm$ 12.1	
<b>Father occupation</b>		K=				
Academic	12.9 $\pm$ 4.50	0.576	40.5 $\pm$ 8.96	K=	58.0 $\pm$ 10.9	K=
Employee	13.4 $\pm$ 4.79	0.902	43.2 $\pm$ 9.93	10.2	57.8 $\pm$ 11.1	5.02
Worker	13.7 $\pm$ 5.03		44.6 $\pm$ 9.45	<b>0.017*</b>	52.0 $\pm$ 18.0	0.170
Others	12.7 $\pm$ 5.51		38.6 $\pm$ 8.22		60.2 $\pm$ 12.8	
<b>Mother occupation</b>		K=		K=		K=
Academic	12.5 $\pm$ 5.03		39.9 $\pm$ 8.59		63.1 $\pm$ 8.16	
Employee	13.1 $\pm$ 5.33	1.21	40.8 $\pm$ 9.44	0.940	58.1 $\pm$ 11.7	2.40
House wife	13.4 $\pm$ 4.79	0.749	41.7 $\pm$ 9.61	0.816	58.1 $\pm$ 12.5	0.493
Others	12.2 $\pm$ 4.87		42.6 $\pm$ 9.60		60.0 $\pm$ 11.0	



**Figure (2):** Effect size of the implemented Bio-Psycho Educational program on knowledge, anxiety and coping strategies among studied adolescents.

## Discussion

Adolescence is marked by stressful experiences and cumulative change. The ability to cope with different type of stressors is critical important for the adolescents' psychological health (Persike M et al., 2012). The COVID-19 pandemic presents tremendous challenges to adolescents' health. It is a crisis that has a major impact on youth well-being (Dvorsky M at al., 2020). For this reason the present study focused on utilizing Bio-Psycho-Educational health program for helping adolescents to cope healthy and effectively with this pandemic, alleviate their anxiety and promote their emotions. The researchers investigate two main cross cultures groups, the Egyptian and the Saudi adolescent's girls then the comparison was drawn. Noticeable, the effect size of the implemented Bio-psycho-educational health program was highly effective on adolescents' anxiety and their coping strategies,

and it has a medium effect on adolescents' knowledge.

Regarding Adolescents' Knowledge about COVID-19 pandemic. The results of the present study indicated that, there was significant improvement in adolescents' knowledge for both Egyptian and Saudi groups after conducting the health program. The adolescents were more knowledgeable about the virus mode of transmission, main symptoms, management, and preventive measures. Oasterhoff B et al., (2020), mention that, although adolescents are less likely to experience sever symptoms of COVID -19, they contribute to the spread of the virus. Therefore there is an intense need to help adolescents be more knowledgeable, cope effectively and healthy during this pandemic Also, this result is supported by Slaughter (2020), who shown that the ability of public to understand and respond to the

information obtained played a key role in stopping the spread of corona virus.

It was worthy to mention that the adolescents in the present study have lower mean score of knowledge regarding to the nature of crone virus and the safety precaution pre the implementation of the psycho educational health program. This finding is congruent with a study by **Naser AY et al., (2020)** that conducted in Jordan, Saudi, and Kuwait for assessing knowledge, and practice during COVID-19 outbreak and revealed that low knowledge score related to disease transmission among participants. Further, a study by **Erfani A et al., (2020)**. In Iran reported lower scored on knowledge and non- compliance with wearing masks in public places among Iranian adolescents. This contrast with the study by **Dardas, LA et al., (2020)**. In Jordan under the title "developing an understanding of adolescents" knowledge, attitude, and practice toward COVID -19", they showed a good base of knowledge regarding COVID-19 among their participants.

The second domain of the findings of the present study was anxiety level among studied adolescents, the study results revealed that, total mean score of anxiety was higher among both Egyptian and Saudi participants pre the program and decreased after the program. School closure, new methods of learning in home, social isolation where the adolescents stay at home for long time and lack of sport or any social activities, all of these factors explained the higher mean score of anxiety among participant's before the program. This

result comes in the same line with **Shah K. et al, (2020)** who stated that, children and adolescents are not left out in the struggles to survive in existing emerging psychological crisis of COVID -19 pandemic. They developed counselling for support adolescents and children during COVID-19 and begin counselling with active listening and an understanding attitude with the children and adolescents because of have difference responses to a difficult situations, their participants responded by feeling less anxious, less agitating, and improved mood changes, the is indicated that counselling process was very active for improve psychological states of their participants. This proven the result of the present study that, interaction and dynamic process of communication which guided by the researchers helped adolescents for explored their negative feeling, and concerns toward CPVID-19 pandemic. Such as fear and anxious from infections and death,

In the researcher's opinion this explained by two main reasons; **first**: the effect of the program while students acquired more insight about their negative emotions, and learned how to deal with it accurately. This done through learning activities and exercise that were applied during the program such as: awareness of their emotion, and regulation, stress management, problem solving skills, self -assertiveness, and building hope for future. **Second**: the educational program gave adolescents accurate and scientific knowledge about corona virus and, safety precaution. It has positive affect on decrease their anxiety about this virus. This supported by other findings of the present study that adolescents' knowledge has negative correlation with their anxiety post the program.

The study conducted by **Sogut S. et al., (2020)** In Turkey about the relation between COVID-19 knowledge and anxiety of midwifery students during the outbreak " who found that, incensement in anxiety level among female adolescents compared with male age mates . Furthermore study by **Merikanges KR., et al (2020)** about lifetime prevalence of mental illness in US adolescents, they found approximately one- third of youth meet the DSM-IV anxiety criteria and the increase frequency of anxiety among adolescents who aged 18 years .

Indeed, Fear and anxiety are the most salient emotions during an influenza outbreak, followed by anger and sadness (**Kim HK & Niederdeppe J. (2013)** [50] Studies on infectious diseases such as the swine flu pandemic, the avian influenza, and the SARS also show that fear, anxiety are associated with attempts to keep free from the disease along with managing the disruptions to normal life (**Karademas et al., 2012**). However, excessive levels of fear can transform into panic and have serious detrimental effects, like the so-called "SARS phobia" (**Cheng C et al., 2004**).The salience of emotions such as anxiety and fear has contributed to negative societal behaviors and serious public mental health concerns linked to COVID-19 (**Shigemura. J et al., 2020**).

Fortunately, the findings of the present study come in the same line with various studies around the world regarding to mental health status of adolescents. In Italy, **Commodari E. et al., (2020)** assessed psychological impact of the Quarantine period on the youth population, and found Italian adolescents

suffered negative feeling especially female adolescents who reside in the red zones. In **China QI M., et al., (2020)** found the prevalence of mild depression and anxiety symptoms in Chinese adolescents aged 14 to 18 years was 44.5 % and 38.0% respectively, this agreement with **Liangl I. et al (2020)** who studied the effect of COVID-19 on youth mental health, and reached to approximately 40.4 % of the participants reported having psychological problems and 14.4% of adolescents with post-traumatic stress disorders. They interpret this finding by that the study was a survey conducted two weeks after COVID-19 in china. In the same line, **Duan .L et al., (2020)** in their study about " An investigation of mental health status of children and adolescents during outbreak of COVID-19" indicted that the mental status of children and adolescents in china has been put in risk since the sudden outbreak and rapid spread of COVID-10 at the end of 2019. They found separation anxiety, physical injury, social phobia, panic disorder, and generalized anxiety disorder were higher.

Also, in Germany study by **Fegert JM. (2020)** 'burden of Corona virus 2019 pandemic for children and adolescents mental health', indicated that, 54% of their participants of large online survey rated a moderate to severe depressive symptoms and anxiety . Furthermore In Greek, **Sakk. et al., (2020)**. Studied anxiety and resilience among Greek adolescents during COVID-19 pandemic and explored that the anxiety level among their subjects ranged from moderate to higher and the girls showed higher level of anxiety than boys. They supported their results with data from the international literature as gender –

linked response biases, or gender difference in self-confidence or self-efficacy that contributed to over reporting anxiety among girls in their study<sup>(21,22)</sup>. This consisted with the study **Qi M. et al., (2020)**. In china who studied mental health in Chinese adolescents during the outbreak of COVID-19 and show that female reported a higher prevalence of depression and anxiety. This previous findings are consisted with the findings of the present study where the participants were adolescents' girls who showed higher anxiety level pre implementation of psycho educational health program.

In the same line, **Majeed S et al., (2020)**. In Pakistan assessed psychological impact of social distancing during COVID -19 in adolescents through an on line survey. They revealed that the participants were experienced depressed mood, a lack of pleasure, sleep problems, and difficult to maintain attention and concentration. (10) This results are a line with a study conducted in Iran under title " Iranian mental health during the COVID-19 epidemic , which concluded that some factors like lack of information, social distancing are lead to psychological disorders.

Moreover **UNICEF (2020)** conducted a survey with 1,700 children, parents and teacher in 104 countries with reference to mental health and well- being in the COVID-19 pandemic. Children were very much worried about catching dying from virus and were sad because they had to stay away from their family and friends. Thus, adolescents around the globe potentially increasingly share the same problems and need to develop competencies in order to

cope effectively with this major stress and maintain their health.

The third domain of finding in the present study is coping strategies used by participants regarding of COVID -19 pandemic induced stresses. The finding of the present study indicated that, the mean score of effective coping strategies was enhanced after the program than before the program. There is a statistical significant difference among studied adolescents regarding their coping strategies pre and post intervention. It is worthy to mention that coping is a psychological process helping to diminish the traumatic impact of a disaster (**Skinner EA et al., 2003**). Many studies indicated that, adolescents under stress think in some of ways to relieve symptoms of stress. Some of these ways are adaptive and others are maladaptive. This shown by the findings of the present study that, there are three types of coping strategies that used by the participants: (1) task - coping, (2) emotional- coping, and (3) avoidance- coping. the adolescents who used the task- coping strategies make effort to purposefully resolve the stressful situations .Such as: focus on a problem try to understand situation, analysis the problem before reacting, learn from previous mistake( previous infected illness such as common cold), and see how to solve it, and determine course of actions. This strategy is more adaptive and healthy to dealing with stress, and improved among participants after the educational program, whereby mean score of this strategy increased than before. This explained by the effect of the program, the adolescents' acquired

knowledge about COVID-19 pandemic that helped them to cope effectively during this major stress.

In this context, **Okech D. et al., (2018)** stated that, the availability of resources, such as aid materials, services, information about stressors, coping knowledge, and supportive community networks could enhance person's mastery of environment and facilitate them to deal with sources of stress in a direct way<sup>(33)</sup>. This finding comes in agreement with the finding of the present study that, there was a positive correlation between effective coping strategies used by participants and the improvement in their knowledge ( $r = 0.170$ ,  $P = 0.020$ ).

The second coping strategy used by participants in our study was emotional coping. This is focus on decreasing feeling of stress and concentrating on one' own feeling, the most frequency reported by participants through the Coping Inventory for Stressful Situations scale (CISS) before the program were feel anxious about not able to cope, become very upset, and blame themselves for not knowing what to do and focus on their inadequate. This coping strategy is considered maladaptive and unhealthy to solve stress or problems. The results shows that mean score of emotional coping strategy that used by participants was decrease after the program than before and there was statically significant difference in pre and post-program.

This result comes in agreement with **Orgiles. M et al., (2020)**. who studied 'coping behaviours and psychological disturbance in youth affected by the

COVID-10 health crisis' and showed that children who used an emotional coping style have more behavioural and emotional symptoms more anxiety, mood disturbance, sleep, behavioural and cognitive alterations.. Contrary, those who use a task - oriented have fewer emotional and behavioural symptoms. Also, These results are in line with previous studies findings that emotional focused coping is not directed to solving the problem is usually related to internalized symptoms such as anxiety or mood , and externalized symptoms such as behavioural disturbance (**Sears SF et al., 2000 & Carlo , et al , 2012**) .

In the same line, study by **Young F. (2021)** under the title " coping strategies, cyber bullying behaviour and depression among Chinese netizens during the COVID-19 pandemic' a web – based national survey, they indicated that the COVID-19 coping strategies used by Chinese could be categorized into problem - focused coping and emotional - focused coping. Moreover, the participants with higher educational levels were more likely to adapt problem- focused coping while others with lower educational were levels likely to adapt emotional focused coping

The third coping strategy used by participants in the present study was avoidance coping strategy. The results reflect that, the mean score of this strategy decreased after the educational program than before the program. The most frequency responses by participants before the program were get away from situations, go out of sank, or treat myself to a favourite food or sank, phone friends, , and engage on to

using play games on smartphone . This supported by **Waselewski A E. (2020)** who found in their study that avoidance as a coping strategy is frequency associated with anxiety and depression

It important to mention that, study by **Persike M. et al., (2012)** under the title "competence in coping with stress in adolescents from three regions of the world " stated that adolescents around the globe potentially increasingly share the same problems and needs to develop competences in order to navigate in an adult world that is complex and disorderly given the strong impact of maladaptive coping style on health (**Larson, 2011**). These issues are of interest in order to design effective prevention and intervention programs across countries especially during at time COVID- pandemic.

### **Conclusion:**

Based on the results of the present study it was concluded that utilizing Bio-Psycho-Educational program has positive effect and greater impact on adolescents' knowledge, anxiety, and coping towards COVID-19 pandemic induced stress.

### **Recommendations:**

1. On-going in-service Bio-Psycho-Educational programs should be designed and implemented continually for adolescent students to improve their knowledge and practices on the basis of actual physical and mental needs in facing COVID-19 Pandemic.
2. Future studies should be applied on a larger sample to investigate

the effect of designed Bio-Psycho-Educational program on emotional stability and coping strategies among adolescents students regarding COVID-19 pandemic

3. Further studied should be conducted to explore other aspects regarding adolescents' biological and psychological health during COVID-19 pandemic.

### **Limitations of the study:**

- 1- Sudden internet disconnection during some sessions of the program leading to the researchers repeated the missed content again in another time, this required additional efforts.
- 2- Few of the studied adolescent students withdrawn from the study during time of data collection. The researchers replaced them with new participants.
- 3- Some of the parents of the studied adolescent students desired to participate in the program; and this may interfere with the aim of the study and the validity of results. So, the researcher gently explained for them the logical reasons of not sharing in the study.

### **Acknowledgments:**

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