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Correlation Between Aphasia in Stroke Patients and Severe Depression of Family Members as Primary Caregivers.

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Abstract

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Keywords: Stroke; Aphasia; Depression; Caregivers.
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Background and Objective: Stroke is a disease with an increasing annual prevalence. One of the most frequent clinical manifestation seen in stroke patients is aphasia which greatly affects the patient's ability to communicate. The burden and the pressure of taking care of the patient placed on the family members often results in psychological impacts such as depression. We intend to know the association between aphasia in stroke patients with severe depression on family members.

Methodology: This was a cross sectional study, using an unpaired categorical comparative analysis. Inclusion criteria were family members of patients with and without aphasia. Patients and caregivers who gave their consent verbally were guided to fill in the Hamilton Depression Rating Scale questionnaire. The association between aphasia status and the depression scale was analyzed using Chi-Square.

Results: Out of 54 respondents included in the study, there were 25 caregivers (46,3%) taking care stroke patients without aphasia, and 29 caregivers (53,7) taking care stroke patients with aphasia. As much as 35 (64.8%) were categorized as normal- moderate level of depression and 19 (35.2%) categorized as major depression. From those with major depression, 14 (73.7%) were found in the aphasic group and 5 were in the non-aphasia group. Chi-Square analysis shows a significant correlation [P=0.03; OR=3.73 (1.1-12.7)] between aphasia in stroke patients and severe depression of the caregivers.

Conclusion: There is a significant association between aphasia in stroke patients and the incidence of severe depression on their caregivers.

Introduction

Stroke is one of the most common cause of disability in adults and its prevalence is predicted to rise because of the increase of adult and elderly population. Prevalence of stroke is multiplied by two every decade after one has reach the age of 55. Stroke happens 30% more to the male population. It is known that stroke is more likely to happen in Asian population¹. Stroke is defined as a brain functional disorder that suddenly occurs with focal or global neurological deficit².

Aphasia is seen on 21-38% of acute stroke patients. The most common cause of aphasia are cerebrovascular disease³. Aphasia is one of the most common form of

cognitive disorder with marked influence on the life of the patient itself, their family members, and people around them⁴. Aphasia and depression are often seen together, especially in Broca aphasia where the comprehension is not affected and the patient is fully aware of their disability⁴. The patient's ability to realize and comprehend his own situation along with his family members are fully intact, however is unable to express their thoughts and feelings, which could trigger frustration. The feeling of helplessness and the burden of huge responsibility to understand and to take care of the patient who is undergoing stress

could trigger depression to the closest family members especially their caregivers⁵.

Depression itself is a mood disorder. Patient with depression will show loss of energy, feeling of guilt, difficulty in concentrating, suicidal thoughts, and loss of appetite⁶. According to Grawburg et al, it is known that depression has an extensive effect towards family members. There are previous reports that show correlation between stroke patients with aphasia and psychological problems found like stress, anxiety, and mild depression on family members. Systematic reviews showed that 47% of caregivers of patients with aphasia needed the help of a psychiatrist^{7,8}. Studies have shown that mental states of caregivers were associated with social function, economy, body health, and quality of life, and not to mention, the psychological state and prognosis of stroke patients⁹⁻¹³.

This research focuses on gaining information on the occurrence of severe depression in family members who act as caregiver of stroke patients with or without aphasia.

METHODS

This was a cross sectional study with consecutive sampling method. The subjects of this study were family members who claimed to be the primary caregiver of a patient that has been diagnosed with stroke in Siloam hospitals, Lippo Karawaci. The

research was held on December 2018 up to March 2019.

Inclusion criteria were being a family member who took care of the patient for at least 10 hours a day, live in the same house with the patient, did not consume any antidepressants, and were willing to give a written consent. Family members who were mentally unstable, were exposed to traumatic events for the past few months, and previously diagnosed with psychological problems were excluded from the study. Family members of patients who were diagnosed with stroke, who have given their consent to participate in the study, were then handed out questionnaires. They were divided into 2 groups, caregiver of patients with aphasia and without aphasia according to the caregiver's information.

Data were collected using the Hamilton Depression Rating Scale (HDRS). This questionnaire emphasizes in physical symptoms of depression. There are a total of 21 questions in the questionnaire¹⁴. The results from the Hamilton scale are categorized into 5, normal, mild depression, moderate depression, severe depression and very severe depression. The score of (0-18) will be categorized as normal-moderate depression, and (>19) will be categorized as severe depression. Chi square was used to determine the p value and the odds ratio between the variables.

This study was approved by the Ethical Committee Faculty of Medicine Universitas Pelita Harapan N0: 132/K-LKJ/ETIK/V/2019.

Results

Table.1 Characteristics of research subject

Subject Characteristics	Frequency (n=54)	Percentage (%)
Sex		
Male	26	48.1
Female	28	51.9
Marital Status		
Not Married	12	22.2
Married	42	77.8
Family Role		
Spouse	22	40.7
Children	32	59.3
Patient Condition		
Non-Aphasia	25	46,3
Aphasia	29	53.7
Depression scale based on the HDRS		
Normal-Moderate	35	64.8
Depression(0-18)		
Severe Depression (≥19)	19	35.2

There are a total of 54 subjects in this study, in which 25 subjects (46,3%) took care of stroke patients without aphasia, and 29 subjects (53,7%) took care of stroke patients with aphasia.

There were 26 (48.1%) male and 28 (51.9%) female in this study (Table 1). Most

of the research subjects are married (77.8%) and the family members who took on the role of primary caregivers are mostly the child of the patient.

Normal-moderate depression was found in 35 subjects (64.8%) and severe depression found in 19 subjects (35.2%).

Table.2 HDRS results of aphasic patients' caregivers who were severely depressed

HDRS Questions	Stroke Patient		OR	95% CI
	With Aphasia	Without Aphasia		
1	14 (100%)	37 (92.5%)	2.7	1.164-1.632
2	11(78.6%)	20 (50%)	3,6	0.887-15.156
3	3 (21.4%)	6 (15%)	1,5	0.330-7.235
4	13(92.9%)	19(47%)	14.3	1.713-120.488
5	11(78.6%)	24(60%)	2,4	0.588-10.161
6	13(92.9%)	20(50%)	13	1.551-109.988
7	13(92.9%)	29(72.5%)	4,9	0.575-42.294
8	3(21.4%)	4(10%)	2,4	0.475-12.681
9	7(50.0%)	15(37.5%)	1,6	0.488-5.689
10	12(85.7%)	12(30%)	14	2.709-72.361
11	14(100%)	24(60%)	19,5	1.242-2.019
12	14(100%)	19(47.5%)	32	1.296-2.328
13	14(100%)	25(62.5%)	17,6	1.233-1.973
14	2(14.3%)	0(0%)	16,2	0.140-0.379
15	1 (7.1%)	3(7.5%)	0,9	0.091-9.945
16	13(92.9%)	21(52.5%)	11,7	1.403-98.630
17	14(100%)	35(87.5%)	4,5	1.173-1.671
18	10(71.4%)	10(25%)	7,5	1.920-29.298
19	12(85.7%)	3(7.5%)	74	11.024-496.732
20	7(50%)	10(25%)	3	0.844-10.669
21	13(95.9%)	10(25%)	39	4.515-336.888

Table 2 outlines the answer given by 14 respondents who took care patients with aphasia and were severely depressed. Among 21 items in HDRS, questions that

were answered 'yes' by all 14(100%) respondents were questions number 1, 11, 12, 13, and 17. Question with the highest Odds Ratio was question number 12.

Table.3 Distribution of the condition of the stroke patients to depression scales on family members as primary caregiver

	DEPRESSION SCALE			
	Normal	Mild	Moderate	Severe
NO-APHASIA	14	5	1	5
APHASIA	1	3	11	14

Table 4. Analysis between aphasia and depression scale of family members as primary caregiver

Patient Condition	Hamilton [N (%)]		OR (95% CI)	P-Value
	Normal – Mild Depression	Severe Depression		
No-Aphasia	20 (37.0%)	5 (9.3%)	3.733 (1.101 - 12.66)	0,03
Aphasia	15 (27.8%)	14 (25.9%)		

The data shown on table 3 shows the result of HDRS on stroke patients' family members. The patient's condition was categorized into patients with or without aphasia and the depression scale was categorized into four categories, normal

(HDRS Score of 0-7), mild depression (8-13), moderate depression (14-18), and severe depression. Severe and very severe depression are put in one category was clearly shown that respondents who took care of patients with aphasia has a higher incidence of severe depression compared to those who took care of stroke patients without aphasia.

Analysis using the Chi-square found that the relationship between taking care of stroke patients with aphasia and severe depression has a P-value of 0.030 which is significant, showing an odds ratio of 3.733, which means that patients who took care of patients with aphasia are 3.733 times more likely to have severe depression.

Discussion

The study aims to analyze whether there is a relationship between the occurrence of aphasia in stroke and major depression on family members acting as caregivers. The results of HDRS of the caregivers were divided into two categories, normal-moderate depression (HDRS <7-18) and severe depression (HDRS >18).

From Table 2, there were 5 questions that were answered 'yes' by all caregivers with severe depression. Question 1 is a question asking whether the respondents feel sadness. 14 (100%) respondents spontaneously indicated that they felt sadness, both in terms of words, gestures, and expressions. Question 11 asked whether the respondent has somatic anxiety such as gastrointestinal, cardiovascular, respiratory symptoms, frequent urination and/ or sweating. Question 12 focused on asking whether there are any gastrointestinal somatic symptoms such as decreased appetite. Many respondents expressed a decrease in appetite because the fact that they felt sad, had no time and were busy taking care of the patient. They stated that taking care of the patient has taken up most of their time. Question 13 asked whether there are common symptoms felt by the respondent such as back pain, feeling of heaviness all over the body, muscle pain, loss of energy and fatigue. Many of the respondents complained of fatigue and lack of sleep. Question 17 asked about the subject's self-awareness and 14 (100%) subjects denied that they have depression. These people can be categorized with severe depression based on the Hamilton depression rating scale. This analysis of questions showed that all caregivers with severe depression declared their feelings openly, have somatic anxiety as well as somatic symptoms, but

somehow are not aware that they are depressed. Thus, none of them admit on seeking professional help and they insist that they did not need any therapy.

Analysis of the relationship between taking care of aphasic patient and severe depression on family members acting as primary caregiver has a P-value of 0.030, which shows that there is indeed a significant relationship between the two variables. This finding was comparable to a study by Berg which found that 30-33% of people acting as primary caregiver of stroke patients are discovered to have depression. They found that the results are higher compared to depression in stroke patients themselves. The study also learned that depression is more likely found in spouses of the patient¹⁵. A study by Franzen¹⁶ found that the party most affected by the condition of stroke patients are the patient's spouse and not the patient themselves. In this study, nearly 60% of respondents are the patient's child, and are mostly married.

The role and marital status of the caregiver could also be a confounding factor of depression, which is one of the limitations in this study. Other limitation is the use of HDRS, which did not assess atypical depression symptoms (like hypersomnia and hyperphagia)¹⁷. Hopefully in the future, similar study could be conducted looking through the confounding factors and using other assessment of depression and sleep disorder as well. Hopefully, this study can raise more awareness on the mental health of family members acting as primary caregivers of stroke patients.

CONCLUSION

Taking care of stroke patients with aphasia has a significant relation towards the occurrence of severe depression.

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CONFLICT OF INTEREST

None

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Abdominal Wound Dehiscence: A Review of Risk Factors, Prevention and Management in Obstetrics and Gynecology Practice

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Abstract

Abdominal wound dehiscence (AWD) is considered as a severe postoperative complication in which there is a partial or complete disruption of an abdominal wound closure with or without protrusion and evisceration. The incidence and mortality rate varies in different health centers. Risk factors are classified into three groups, which includes: pre-operative, intra-operative, and post-operative. The management of Burst Abdomen or Wound Dehiscence is diverse from conservative treatment to surgical treatment.

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Introduction

Abdominal wound dehiscence (AWD) or 'acute laparotomy wound failure' is described as a post-operative complication in which separation of abdominal wound layers occurs before completion wound healing process. ABD is further classified into: (1) partial AWD (Figure 1), in which only superficial layers or a part of post-operative wound reopens; and (2) complete AWD/burst abdomen (Figure 2), in which all layers or thickness of post-operative wound are separated with protrusion of underlying tissue and organs (evisceration).¹ Similiar condition often confused as a differential diagnosis of AWD is incisional hernia (Figure 3), which refers to abdominal wall hernia at the site of a

previous surgical incision, this condition is further assessed radiologically and will not be discussed further in this review.

The incidence of abdominal wound dehiscence varies between 0.4 – 3.5%, with mortality as high as 45% in different health facilities without specific global incidence recorded.² In Indonesia, a study in Hasan Sadikin General Hospital from 2011 – 2014 found approximately 252 cases of abdominal wound dehiscence with incidence varies between 0.4 – 1.13%.³ Based on the data mentioned, AWD is still considered as a long term problem, which consequently may prolong hospital stay and increase burden on health care resources. There are currently risk factors and risk predictors developed in order to plan proper prevention and management.^{2,3}



Figure 1: A case of 29 year old woman with partial abdominal wound dehiscence post-midline incised caesarean section (Photo taken from one of our cases found in Ende District General Hospital, East Nusa Tenggara, 2019, the patient has consented for usage in this clinical review).

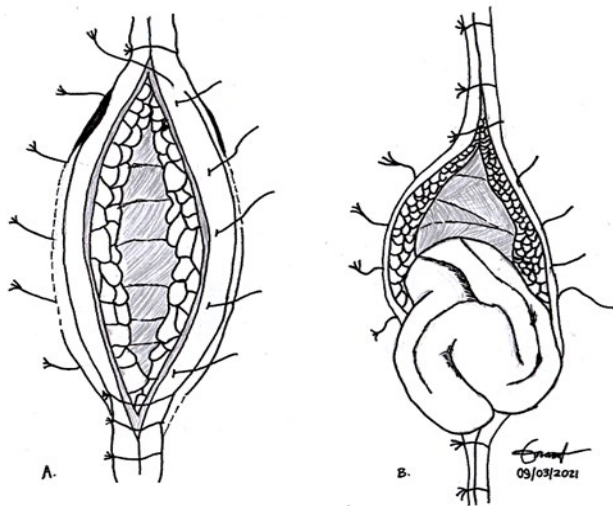


Figure 2: (A) Partial Abdominal Wound Dehiscence, (B) Complete Abdominal Wound Dehiscence



Figure 3: A case of 35 year old woman with incisional hernia post laparotomy (Photo taken from one of our cases found in Ende District General Hospital, East Nusa Tenggara, 2019, the patient has consented for usage in this clinical review).

Risk Factors

Risk factors for AWD can be classified into three main groups: (1) pre-operative risks, (2) intra-operative risks, and (3) post-operative risks. Pre-operative risks include old age (> 65 years old), male gender, smoking, obesity, diabetes, hypoalbuminemia/malnutrition, sepsis, anemia, uremia, malignancy, chemotherapy/radiotherapy, and long term corticosteroid usage.^{4,5} AWD occurs more in male compared to female; this correlated with the higher incidence of peptic ulcer and lower abdominal wall elasticity, which consequently results in higher intra-abdominal pressure and therefore increase risk of AWD.⁴ Anemia, malnutrition, diabetes and smoking may also increase the risk of AWD by impairing cellular oxygen perfusion during wound healing process, which includes hemostasis, inflammation, proliferation, and maturation phases.⁶ During hemostasis phase, platelet aggregation degranulate and activate the formation of blood clots followed by vasodilatation of capillaries and activation of complement cascades. Inflammation phase occurs as macrophage begins cellular lysis, accompanied by production of cytokines

and growth factors by neutrophils; the highly oxidative effect of these processes requires adequate oxygenation. Proper cellular oxygen perfusion also supports the proliferation phase in which granulation tissue formation in wound space due to migration of fibroblast responsible for collagen synthesis.⁶

Intra-operative risk factors include surgical procedure types (emergency vs elective surgical procedure), incision types, use of drainage, suturing techniques and suturing materials.⁷⁻⁸ Emergency surgical procedure increases the risk of AWD compared to elective surgical procedure due to lack of preparation to regulate the patient factors mentioned above. Recent cross sectional study by Saad AR (2019) reported significantly higher incidence of AWD in emergency surgical procedures: simple closure procedure/Grahams patch of perforated peptic ulcer (24.2% cases), Adhesolysis of intestinal obstruction (18.2% cases) and simple closure of perforated typhoid ulcer (10.6% cases).⁹ Incisional types are also reported to have some degree of correlation with AWD patients as the study of Saad AR (2019) established higher incidence of AWD in previous upper

to lower midline incision (48.5% cases), lower midline incisions (21.21% cases), and upper paramedian incision (12.12% cases) compared to other incision types; hence, these reported data supports previous studies by Bueger et. al. (2002) and Mokela et. al. (1995), which first summarized the same conclusion regarding procedure and incision types.^{9,10} The use of drainage in abdominal surgeries with massive bleeding minimize contact between suture wound with intestine as well as pooling of excessive blood which affects intra-abdominal pressure, therefore reduces the risk of AWD or incisional hernia.⁷⁻⁸ Surgical techniques are also play a role, in which less tissue bites (< 1 cm width), Improper layer by layer closure approach, less proper laid knots, and extensive tension in knots increase the risk of AWD. The use of slow absorbable material such as polydioxanone (PDS) gives enough time for wound to properly heal while providing sufficient strength in wound closure; this further explains the lower incidence of AWD in

elective surgical procedures compared to emergency surgical procedures, as a result of the later tends to use fast absorbable surgical material. Previous surgical history, which includes caesarean section procedure also increases the risk of AWD due to potential risk of post-surgical adhesion especially during trial of labor after casearean (TOLAC) within 2 years post sugery.¹¹

Post-operative risk factors include conditions which increase intra-abdominal pressure: the use of mechanical ventilation, excessive coughing and vomiting, post-operative ileus, urinary bladder distention, and ascites; and other post-operative conditions which further impair wound healing: infection and anti-neoplastic medication.¹² Risk factor determination in patients at risk of abdominal wound dehiscence is necessary to formulate necessary prevention and proper management.

<u>Risk Factors for Wound Dehiscence after Laparotomy</u>	
Preoperative/Patient's Factors:	<ul style="list-style-type: none"> • Age (> 65 years) • Male • Smoker • Obesity • Diabetes • Hypoalbuminemia/Malnutrition • Sepsis • Anemia • Uremia • Malignancy • Chemotherapy/Radiotherapy • Steroid Use
Operative Factors:	<ul style="list-style-type: none"> • Emergency Surgery • Re-Operation • Bowel (Dirty) Surgery • Suture Type and Technique
Post-Operative Factors:	<ul style="list-style-type: none"> • Mechanical Ventilation • Haemodynamic Instability • Increased Intraabdominal Pressure • Ascites • Wound Infection

Figure 4: Risk Factors Associated with Abdominal Wound Dehiscence (Abdominal Surgery: Abdominal Wound Dehiscence and Incisional Hernia, Elsevier, 2009)

Prevention and Management

The prevention of AWD is done effectively by identifying and addressing each potential risk factors mentioned before.¹³ A few pre-operative risk factors or patient related conditions are modifiable in non-emergency surgical cases; these risk factors include diabetes, hypoalbuminemia, sepsis, anemia and uremia which should be managed earlier before surgical procedure commences. The management of these conditions includes maintenance of blood glucose level within ideal range, appropriate use of prophylactic antibiotics, transfusion of blood products and fluid resuscitation necessary to ensure proper cellular perfusion. Other non-modifiable pre-operative risk factors (age, gender, smoking, malignancy, history of chemotherapy/radiotherapy and steroid usage) can be used to reconsider indications, objectives, and necessities of a surgical procedure; elective surgical procedures should only be conducted if the benefits far-outweigh the risks mentioned.¹³

Intra-operative risk factors should be addressed with proper choice of incision types, use of drainage if necessary, proper suturing techniques and materials. According to the studies mentioned before, there is a distinct higher incidence of AWD in vertical (midline and para-midline) incisions compared to transverse incisions; therefore, recent use of vertical incisions have decreased over the years. This is apparently seen in daily obstetrics and gynecology practice, in which *pfannensteil incision* also known as infraumbilical transverse incision is more preferable in daily caesarean section and a few elective laparotomy procedures; this incision type reduces the risk of deep epigastric vessel dissection and nerve injuries, hence allowing effective wound healing and less post-operative pain. Upper or lower midline incision is still preferred in most emergency or exploratory laparotomy procedures due to its easy access and wider surgical field of the whole abdomen.^{10,13}

Another study recommends the installation of abdominal and subcutaneous

drainage (e.g. Ryle's tube) in surgical procedures with risk of massive blood loss (e.g. exploratory laparotomy). The use of drainage in abdominal surgeries with massive bleeding minimize contact between suture wound with intestine as well as pooling of excessive blood which affects intraabdominal pressure, therefore it reduces the risk of AWD or incisional hernia.⁷⁻⁸

Proper suturing techniques also has a significant impact for intra-operative prevention of AWD.¹³ Good bites of tissue (> 1 cm) with minimal suture length to wound length ratio of 4:1, properly laid/tied knots, and avoidance of excessive suture tension are recommended by European Hernia Society Guideline; the abdominal anatomy should be restored to its normal state, suture closure is performed with layer by layer approach from innermost to outermost layers: intra-abdominal organs (uterus/intestines), peritoneum, extra-peritoneal fat, deep fascia, abdominal muscles, superficial fascia, subcutaneous tissue, and skin.^{13,14} In case of *Pfannensteil incision* used in obstetrics and gynecology procedures, an incision is performed below arcuate line located between umbilicus and inguinal ligament, where the fascia of all three abdominal muscles combined in front of the rectus muscle as a single fascia (anterior rectus fascia), hence closure of peritoneum is directly followed by rectus closure and subsequent anterior rectus fascia closure; these can be performed with continuous suture, however outer subcutaneous fat closure is performed with interrupted sutures, which is more recommended compared to continuous suture in providing necessary tension to prevent AWD.¹⁴ In case of midline incision similar suturing techniques can also be applied and closure is performed along linea alba due to its less vascularization, many surgeons combined the use midline incision from skin to fascia layers and proceed with transverse incision from rectus to lower uterine segment; this combination is performed to reduce risk of deep epigastric vessel dissection and nerve damage, which are benefits of transverse incision and yet still able to widened incision vertically for

better field of view and access of the abdomen in emergency situation. The use of slow absorbable material such as polydioxanone (PDS) is recommended to give enough time for the wound to properly heal while providing sufficient strength in wound closure.¹⁴

Post-operative risk factors can be prevented by alleviating additional patient symptoms which may increase intra-abdominal pressure (e.g. coughing and vomiting) and educating the patient to prevent coughing, vomiting, and reduce excessive abdominal pressure when urinating or defecating.^{13,14} Other conditions such as ileus, urinary bladder distention and ascites require immediate abdominal decompression with nasogastric tube and/or foley catheter to reduce excess intra-abdominal pressure. Pre-operative skin preparation which includes hair trimming especially in obstetrics and gynecology procedures which is mostly performed in pubic region, and aseptic followed with antiseptic application of chlorhexidine-alcohol and/or povidone iodine rub, can reduce microbial load and subsequent risk of post-operative surgical site infections.¹⁴

The management of AWD depends on the severity of dehiscence (partial or complete), which varies from conservative management to debridement and secondary re-closure. Conservative management is accomplished by wound packing with saline moistened sterile gauze, sometimes additional semi-occlusive dressing impregnated with petrolatum, silicone, topical crude honey, zinc chloride spray, or magnesium hydroxide ointment can be added to allow small amount of exudates to pass through; therefore moist environment necessary for cells migration, proliferation, and maturation can be maintained; the use of those additional adjunctives has also been shown to decrease wound size, healing time, and infection risk. This can be followed with secondary intention healing in which wet dressing is changed to dry dressing, allowing further periodic removal of inflammatory exudates, excess suture materials, infectious organisms and debris (physical debridement); while wound bed

granulates in. Even though it was less invasive, conservative management with secondary intention healing still has a relatively lengthy recovery period.¹⁴ This method of approach is only applicable in partial wound dehiscence cases, while, complete dehiscence, or 'burst abdomen', will require emergency re-closure.^{13,14}

The recent development of multidisciplinary AWD management strategies has shifted from the preference of conservative management with secondary intention towards debridement and secondary re-closure. Secondary re-closure employs surgical wound debridement and re-closure after approximately 4 days of granulation period. A prospective study by Dodson et al (1992) in a series of 33 obstetric and gynecology cases, found that patients who underwent secondary closure had a significant shorter mean healing time of approximately 10-17 days (n=15) compared to 30-60 days (n=18), additionally patient from secondary re-closure group has significantly fewer amount of follow up visits (1-2 times) compared to patients from secondary intention healing group (2-14 times). Similar result is also reported from the study of Walter et. al. (1990) with mean healing time of 0-3 days in secondary re-closure group compared to 60-70 days in secondary intention group. Recent development of immediate re-closure after debridement as an alternative is currently considered beneficial. A study of Falola et. al. (2018) observed patients who underwent immediate direct re-closure after debridement; demonstrated a median healing time of approximately 20 days, which is comparable to previous studies. Immediate re-closure of wound eliminates all the period of secondary intention healing, which may prolong disability period, increase postoperative follow-up visits, and increase the emotional toll on affected patients. Although this approach of management does carry risks associated with the use of anesthesia and surgical intervention, which may not be present in conservative management with secondary intention healing; it is demonstrated that the benefits far outweigh the surgical risks.^{13,14}

Conclusion

Abdominal wound dehiscence (AWD) is still considered as a long term problem, which is described as a post-operative complication in which separation of abdominal wound layers occurs before completion wound healing process. Risk factors for AWD can be classified into three main groups: pre-operative risks, intra-operative risks, and post-operative risks. Risk factor determination in patients at risk of abdominal wound dehiscence is

necessary to formulate necessary prevention and proper management. Management of AWD is dependent to the risk factors involved and severity of cases, which varies from conservative management to surgical debridement with delayed or immediate wound re-closure. Immediate re-closure of wound is currently considered beneficial since it eliminates all the period of secondary intention healing, which may prolong disability period, increase postoperative follow-up visits, and increase the emotional toll on affected patients.

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Author's Statement

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Signature,

A handwritten signature in blue ink, appearing to read 'Gnasaf', with a stylized flourish extending to the right.

Gezta Nasafir Hermawan

Incidence And Characteristics Of Double Lumen Induced Central Venous Catheter-Related Thromboembolism In Hemodialytic Patients

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Abstract

Background: Central venous catheters (CVCs) are frequently used in patients for several indications such as cancer treatment, diagnostic monitoring, parenteral nutrition, hemodialysis, and administration of fluids, blood products or medication. Double lumen catheter induced CVCs thrombosis has not been paid into proper attention in developing countries such as Indonesia.

Aims: The aim of this study is to identify the incidence and characteristic of double lumen catheter induced CVCs thrombosis in patients undergoing hemodialysis.

Methods: This systematic review has been registered in PROSPERO (CRD42020181584). A systematic search of literature for observational and randomized controlled trial was conducted in PubMed, PubMed central, and Google Scholar through April 16, 2020. Two reviewers independently searched and selected. The risk of bias was evaluated using the Newcastle-Ottawa Quality assessment tool.

Results: A total of 408 patients were included in our study. There were 192 (47.1%) male patients. The double lumen catheter was mostly placed in the jugular vein (60%), followed by subclavian vein (25%) and femoral vein (15%). Four (1.1%) patients had deep vein thrombosis after about one month of double lumen catheter placement. All these four patients, the double lumen catheter was inserted in the femoral vein. Any other significant risk factors for thrombosis other than double lumen catheter insertion not found. Out of these four patients, one of them passed away. All patients were treated using heparin.

Conclusion: The incidence of double lumen catheter induced thrombosis is low (1.1%) in patients undergoing hemodialysis. However, further larger study is needed to confirm and find the associating factors.

Introduction

Central venous catheters (CVCs) is an indwelling device that is peripherally inserted into a central vein, most commonly the internal jugular, subclavian or femoral and advanced until the terminal lumen resides within the inferior vena cava, superior vena cava or right atrium.¹ CVCs are frequently used for several indications including cancer treatment, diagnostic monitoring, parenteral nutrition, hemodialysis, and administration of fluids, blood products or medication. Potential complications of catheter related thrombosis (CRT) are thromboembolism in 10% to 15%, interruption of venous flow 10%, infection and catheter occlusion.^{2,3} Hemodialysis patient related to long-term vascular access, double lumen catheters often used for hemodialysis patient to reduced the infection rate, however, the other complication such as thrombosis remain a problem.⁴ There are several risk factors for the development of CRT including patient factors such as hypercoagulable states (malignancy, sepsis, critical illness, renal failure, inherited thrombophilias, use of certain drugs), catheter type (increased lumen diameter such as double lumen CVC) and insertion process (multiple insertion attempts, tip located above the junction between the SCV and atrium).² The pathophysiology are related to Virchow's triad of endothelial damage, stasis and hypercoagulability, described as the components involved in thrombus formation.³ Intravenous catheters may cause endothelial trauma and are often placed in patients who are hypercoagulable, leading to venous thrombosis.⁵ Catheter-related thromboembolism can be symptomatic or asymptomatic.

The incidence of catheter-related asymptomatic thromboembolism is 27% to 66% and symptomatic catheter-related thromboembolism is 0% to 28%.⁶ And if left untreated, it can contribute to decreased quality of life and can be fatal. Double lumen catheter induced CVCs thrombosis has not been paid into proper attention in developing countries such as Indonesia.

Methods

This is a retrospective cohort study conducted in General Teaching Hospital in a suburban area Indonesia. Data was taken from the medical records from January 2018 to January 2019. Inclusion criteria were patients who had undergone hemodialysis using double lumen catheter. The baseline characteristics and incidence of catheter induced thrombosis was noted using a structured questionnaire. CVCs thrombosis was confirmed using D-dimer and compression ultrasonography.

Results

A total of 408 patients were included in our study. The mean age of the patients was \pm 49.3 years. There were 192 (47.1%) male patients. The double lumen catheter was mostly placed in the jugular vein (60%), followed by subclavian vein (25%) and femoral vein (15%) (Table 1).

Four (1.1%) patients had deep vein thrombosis after about one month of double lumen catheter placement. Out of four patients, two of the patients were male. In all these four patients, the double lumen catheter was inserted in the femoral vein. Any other significant risk factors for thrombosis other than double lumen catheter insertion not found. Out of these four patients, one of them passed away. All patients were treated using heparin.

Discussion

Over 150 years ago, the German pathologist Rudolph Virchow postulated that thrombus formation and propagation resulted due to abnormalities in 3 areas namely; blood flow, vessel wall and blood components (Figure 1). Catheter insertion is a risk for thrombosis due to its damage to the endothelial wall, and contribution to stasis.⁷⁻⁹

There are also several catheter-related risk factors for development of thrombosis such as catheter tip location, number of lumens, prior catheterization at same puncture site, prolonged catheter dwell time, catheter related infection and more than one insertion attempt.^{10,11} There has been evidence on larger diameter catheters and increased thrombosis risk in recent literature.¹²⁻¹³ Catheter to vessel ratio (CVR) defined as the indwelling space or area consumed or occupied by an intravascular device inserted and positioned within a venous or arterial blood vessel. In 2016, new practice recommendations stated that the CVR is below 45% of the vessel diameter.¹⁴ Larger lumens caused larger endothelial damage. Injury to endothelium is accompanied by loss of protective molecules and expression of adhesive molecules, procoagulant activities and mitogenic factors leading to development of thrombosis.¹⁵

Majority of CRT are asymptomatic which can make identification difficult. The clinical features may be fairly self-evident such as arm or neck swelling and discomfort or venous distension. In some cases, patient may experience atypical symptoms such as jaw or shoulder pain, headache, erythema of limb, phlebitis, localised numbness and pain.⁷ Consensus opinion for the treatment of CRT is systemic

anticoagulation such as low molecular weight heparin (LMWH) for minimum of three months.^{7,16} Based on current guidelines, anticoagulation for the routine prevention of CRT is not recommended, although it is expected that vast majority of critical care patients will receive LMWH or low dose heparin (1 mg/ day) as standard care prophylaxis without increase in bleeding risk.^{17,18}

In our study, one patient passed away. We hope that in the future prophylactic anticoagulation can be given to high risk patients in order to avoid such major complications.

Limitations of our study are we only took data from the past one year since this is still a preliminary study. Another limitation is that this is a retrospective study. There are many factors that may impact thrombosis, it is difficult to account for all confounding variables with this study design. Further recommendations are we suggest study with prospective methods and larger studies are required.

Conclusion

The incidence of double lumen catheter induced thrombosis is low (1.1%) in patients undergoing hemodialysis. However, further larger study is needed to confirm and find the associating factors.

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None

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Appendices

Table 1. Demography Characteristics

Variable	n	%
Gender		
Male	192	47,1
Female	216	52,9
Age Mean	± 49.3 years	
Catheter Location		
Jugular Vein	245	60
Subclavian Vein	102	25
Femoral Vein	61	15

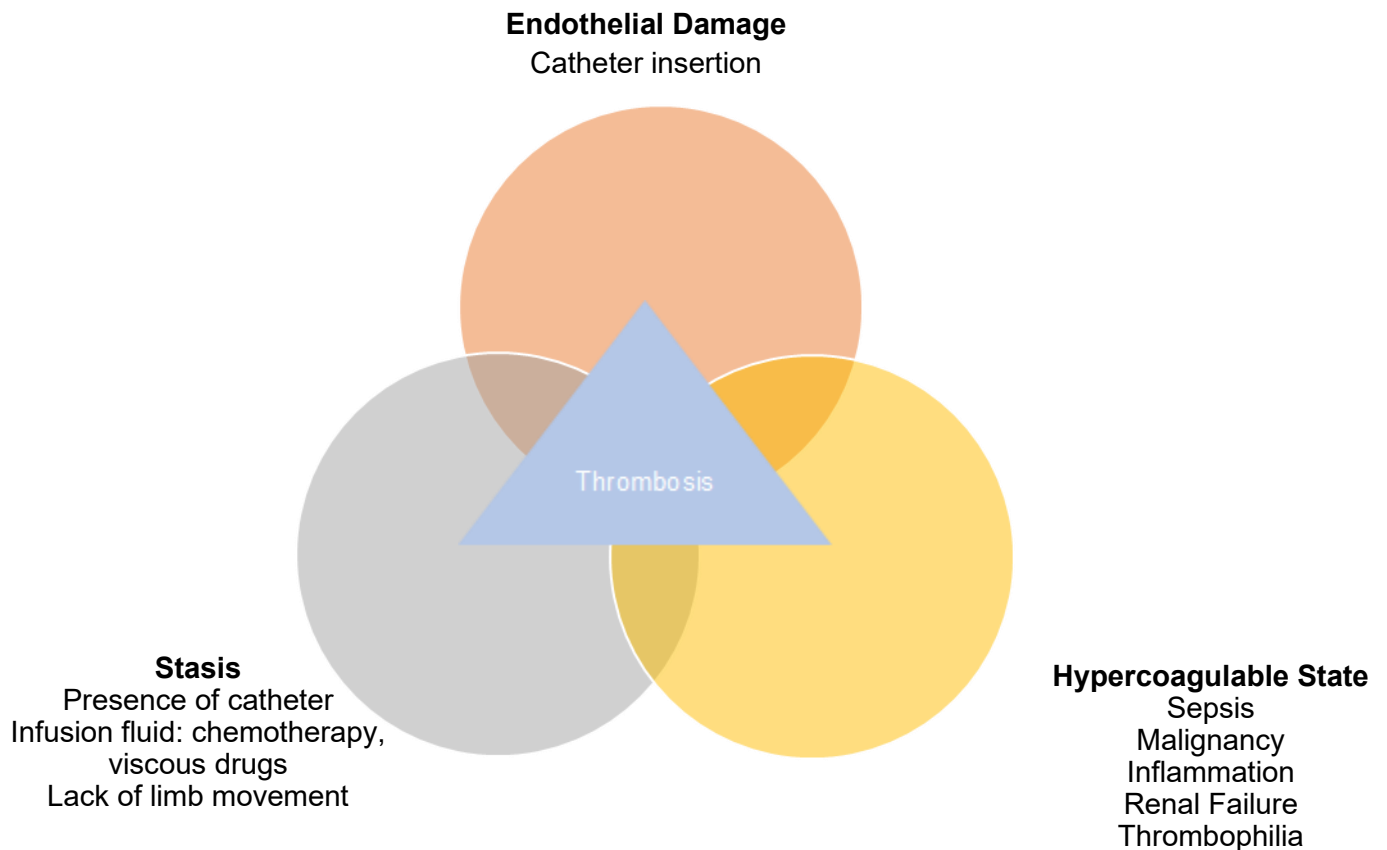


Figure 1. Postulated Mechanisms Development of CVC Related Thrombosis

Development and Validation of a “Pelita Harapan” Questionnaire Assessing Knowledge, Attitude, and Practice Toward Coronavirus Disease 2019 Among Young People in Indonesia

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Abstract

Introduction: Coronavirus Disease 2019 (COVID-19) has become a pandemic. Much false information was circulating especially through social media and affected individual's knowledge, attitude, practice (KAP) towards COVID-19. Currently, there is lack of validated questionnaires to assess KAP about COVID-19 especially in Indonesian young people.

Aim: To develop and validate a new COVID-19 KAP questionnaire for young people population in Indonesian language.

Methods: Some literature review was done to look for the concept to generate a new questionnaire. Open-ended questions were generated to know the baseline knowledge. Then, close-ended questions were formulized for knowledge, attitude, and practice area. The experts and several respondents were asked to give their opinions about the contents of the questionnaire. The validity was examined using Cronbach's alpha coefficient. For reliability, internal consistency was examined by using Pearson or Spearmen correlation test.

Results: A total of 59 subjects with median ages 21 (16-24) years old of non-medical individuals were included in this validation process. More than half were male, mostly held bachelor's degree/diploma, and were dominated with students. This Indonesian COVID-19 KAP questionnaire for young people consists of 10 knowledge, 8 attitude, and 7 practice questions. The Cronbach's alpha coefficient of knowledge, attitude, and practice areas were 0.87, 0.82, and 0.91, respectively.

Conclusions: A questionnaire of KAP towards COVID-19 in Indonesian language had been developed and the results showed good validity.

Introduction

In March 2020, World Health Organization (WHO) declared Coronavirus Disease 2019 (COVID-19) as a pandemic. Its positive cases increased day by day since it first appeared in Wuhan, China in December 2019. Globally, the mortality rate of COVID-19 was 3.4%.¹ Its transmission rate (R_0) was 3.5 to 4, which means one person can transmit the disease up to four other people.² Our focus in this study were young people, that contribute to 24.01% of Indonesia's total population,³ who could transmit the virus to the other person even they were asymptomatic,⁴ yet, have a great potential to contribute to stopping COVID-19 transmission.^{5,6}

A knowledge, attitude, and practice (KAP) survey is useful in evaluating the effectiveness of intervention programs. Also, it can assess a target group's current knowledge, attitude and practice on a specific health topic to identify their needs, problems and possible barriers before developing and implementing an intervention.⁷ Individual's knowledge, attitude, and practice towards COVID-19 are very important components to prevent and stop the spread of COVID-19. KAP could increase people's awareness about the prevention of illness, health-seeking behavior, and broadcast the right information to other individuals.^{8,9}

Much false information was circulating in the community especially through social media and affected individual's KAP towards COVID-19.¹⁰ Knowledge, attitude, and practice, in general, is widely evaluated using a questionnaire.¹¹ Currently, there is a lack of validated questionnaires to assess KAP about COVID-19, especially in Indonesian young people. In this study, we would like to develop and validate a questionnaire to assess Indonesian KAP towards COVID-19 to generate educational strategies about COVID-19 and its prevention.

Method

The KAP questionnaire was developed through a series of steps. First, questionnaire development consisted of a literature review followed by an open-ended questions-survey to delve into the domains and the items to be considered in the questionnaire and a nominal group technique by the experts to validate the content of the developed questionnaire. Secondly, the validity and reliability test of the questionnaire would be done in the target population to obtain the statistical values.

Questionnaire development

Item Generation

MeSH terms such as "Knowledge, Attitude, and Practice", "COVID-19" OR "outbreak", and "Questionnaire" were used to look for relevant articles and related questions from previous questionnaires in medical search engines and some journals. The literature review was done to look for the concept to generate a new questionnaire. We generated 9 open-ended questions (2 regarding virology, 2 regarding clinical presentation and risk factors, 2 regarding prevention and control, and 3 regarding symptoms handling) and 1 close-ended question (regarding information of official government website for COVID-19) to explore the understanding of the potential subjects. This open-ended-questionnaire was broadcasted to young people respondent via google form through the social media conducted in the second week of the outbreak of COVID-19 in Indonesia.

A total of 355 respondents filled the questionnaire. The eligible participants were Indonesian residents aged 10 to 25 years, and those who were studying or active in health science fields were excluded. The participants were required to complete an e-consent form and then a self-reported questionnaire. The answers of those respondents were listed from the commonest answered to the least

in every question. The results of these descriptive studies have been sent for publication. From those results, we got the preliminary background of young people's basic knowledge toward COVID 19 and the domains needed in the questionnaire.¹² Then, we formalized yes or no questions for knowledge and practice and five-likert scale for attitude questions. Firstly, we developed 41 questions from all parts of KAP including all domains of knowledge.

Those questions then were reviewed by three experts in internal medicine and adolescent health. The experts were asked to give their opinions qualitatively about the contents of the KAP questions and quantitatively regarding the clarity, coverage, relevance, and representativeness by the score every question from 1 to 5 based on the quality of the questions. From the expert opinions, we discussed to omit or change the questions. Since this is a questionnaire to evaluate KAP on adolescent it is important to involve their opinion regarding the quality of the questionnaire, we asked as many as 4 young people subjects aged 18 to 22 years old to give their opinions about the clarity of the questions by an open-ended answer. For the second time, we asked again the experts to give their opinions. After all the authors give score 4 of 5, then this step was finished. Cronbach's alpha coefficient was obtained from the final results of these experts.

From this step, all of the subjects shared a good perspective about the questions. At the end, there were 25 questions of KAP, consist of 10 knowledge, 8 attitude, and 7 practice questions.

Validity and Reliability

The final questionnaire then broadcast via google form through social media to young people in Indonesia to get KAP results. Some of these subjects then were evaluated for external reliability. The results from every question were coding if the answered correct by binary coding. The

Pearson or Spearman correlation test was conducted to know the results of the external reliability. We score good reliability if the r results for the majority (more than 80 percent) questions. We also did the normality distribution test as the prerequisite to move to the next step.

Construct validity was measured by exploratory factor analysis if the normality distribution test is good and there was no hypercolinearity (r more than 0.8) between the questions. Keiser-Meyer-Olkin (KMO) measure of the sampling adequacy and Bartlett's test of sphericity for sampling adequacy. If the KMO value was more than 0.5 and Bartlett's test was significant (p value < 0.001), the sample was considered as adequate. The last step was to know if all the questions can be grouped into domains of knowledge.

Internal consistency in validity was examined by using Cronbach's alpha coefficient from the three experts related to the content of questions. Cronbach's alpha coefficient used to evaluate the homogeneity of each area. A good internal consistency presented by Cronbach's alpha coefficient 0.7 or higher.¹³

Data Analysis

Statistical Package for Social Science (SPSS) version 23 was used for data analysis. A descriptive statistic was used to analyze demographic data. Correlations between each question were established by correlation matrix if $r > 0.4$ and p -value < 0.05 . The questions that correlated will be included in the next questionnaire. Cronbach's alpha coefficient was evaluated by experts' scoring of ambiguity, accuracy, and representativeness of each item, which the experts will give the score by five-point Likert Scale, from 1 (very bad) to 5 (very good).

Results

Questionnaire Development

Based on literature review, 9 open-ended questions and 1 close-ended question were developed to assess subjects' basic understanding toward COVID 19 that consisted questions on etiology, transmission, sign and symptoms, risk factors, complications, and preventions. From 355 subjects aged 19.93 ± 2.91 , we found that most young people of Indonesia had an overall moderate-good knowledge towards COVID-19 but there was a lack of understanding about crucial preventive measures. Further study was needed to apprehend more detail about the preventive aspect. Thus, we expand and highlight some questions concerning preventive measures in this KAP questionnaire.

The final questionnaire contains 25 items representing three areas: 10 items regarding knowledge (1 item regarding etiology (K1), 3 items regarding transmission (K2 to K4), 1 item regarding sign and symptoms (K5), 1 item regarding complication (K6), and 4 items regarding prevention (K7 to K10)), 8 items regarding attitude (A1 to A8) (1 item about teenagers' role to resolve this pandemic), and 7 items regarding practice (P1 to P7). The final questionnaire can be seen in Table 1.

From the qualitative interview with 4 young people they stated that in general the questionnaire was understandable. The separation by domains was said to be useful. They found that the questionnaire is not too general thus they could learn something out of the questions. Yet, some of them still felt that 10-15 minutes taken to fill in the questionnaire was too long. They expressed their wishes for the questionnaire not asking what most people must have known nor asking some too specific questions that they did not even understand the meaning of the word, thus it may cut the time to fill it. Two young people mentioned some questionnaires were too difficult for them; these questions were then omitted or change in the next step.

Validation

A total of 59 subjects with median ages 21 (16-24) years old of non-medical individuals were included in this validation process.

More than half were male, mostly held bachelor's degree/diploma, and were dominated with students. Further details information can be seen in Table 2.

Firstly, we evaluated for the normality distribution test whether it was normal distribution. Correlation matrix was developed to analyze the correlation of each item. In knowledge area, we got the r value range from 0.357 to 0.56. In attitude area, the r value ranges from 0.405 to 0.697. And in practice area, we got the r value range from 0.42 to 0.603. Further results could be seen in table 3,4 and 5.

Content validity and face validity were examined in expert evaluation and pretest. Sampling adequacy was established by Kaiser-Meyer-Olkin (0.479) and the Bartlett's Test of sphericity (p value < 0.001). Kaiser's criterion was used to enter the 25 items into the analysis. Internal consistency of this questionnaire was good determined by Cronbach's alpha coefficient of 0.87 for the whole questionnaire. Cronbach's alpha coefficient of knowledge, attitude, and practice areas were 0.87, 0.82, and 0.91, respectively. Further results could be seen in table 6.

Discussion

To the best of our knowledge, this is the first validated questionnaire knowledge, attitude, practice of COVID-19 in Indonesia's young people population.

Our preliminary survey found that the general knowledge towards COVID-19 was relatively good especially because the data was taken just 2 weeks after the Indonesian government officially announced the outbreak. However, there were some important concern regarding the specific preventive measure knowledge such as physical distancing and hand washing.¹² Thus, in our final questionnaire we have significant numbers of questions around specific COVID-19 preventive measures which are 4 questions out of 10 in the knowledge area, 5 questions out of 8 in the attitude area and 3 questions out of 7 questions in practice area. There was a significant difference in numbers of item

between this questionnaire and KAP questionnaire toward COVID-19 that was in Chinese population. The Chinese KAP questionnaire consisted of 12 items regarding knowledge (Cronbach's alpha of their knowledge area was 0.71), 2 items regarding attitude, and 2 items regarding practice. This questionnaire had been used to evaluate residents' awareness toward COVID-19 during rapid rise period of the outbreak.¹⁴

Most of our questions on preventive measure were made based on the latest Indonesian government education material,^{15,16} to search how well the young people understand the message. The gap found would help the preventive program to improve.

There was a significant difference in numbers of item between this questionnaire and KAP questionnaire toward COVID-19 that was in Chinese population. The Chinese KAP questionnaire consisted of 12 items regarding knowledge with only 3 questions around preventive measures, only 2 items regarding attitude towards the government action on the pandemic, and 2 items regarding practice.¹⁴ The difference may be due to that this was a questionnaire aimed to general public.

The thorough answers that were provided qualitatively by 4 young people who were interviewed implicitly showed their eagerness to be part of the effort to combat this pandemic. Furthermore, since young people a valuable resource and network in the society, including during crisis and public health emergencies (United Nations Population Fund (UNFPA) technical brief), thus we include 2 specific questions in each area around youth participation.¹⁷

The participated young people in this validity survey were boys predominated (59.3%). A study done in university faculty in the United States that tend to have higher respond rate in female faculty found that this was not merely because of the gender itself, but because of the disproportionate of the gender in the population. Thus, an online survey was concluded to be free of gender bias.¹⁸

The targeted age of this validity survey was accordance to the intended population (middle and late adolescent age) with minimal age was 16 and maximal age was 24 distribution. However, the age distribution was not normal with median 21 years old that may reveal that the inadequate heterogeneity of the population. However, the validity and internal consistency of this questionnaire were satisfying. This was might due to good response of the experts and Cronbach's alpha coefficient of 0.87 for the whole questionnaire. This questionnaire also had been used in survey in other population and showed good evaluation of knowledge, attitude and practice.¹⁹

There were some limitations of this study. Firstly, we did not perform an initial focus group discussion nor series of in-depth interview with adolescents to have an in-depth understanding of their KAP and need. However, we did an open-ended survey with a big sample of 355 adolescents which shape the initial construction of the questionnaire. Thirdly, the KMO value for sample adequacy in this study was 0.47, it means the samples were not adequate enough, so more samples were needed.

The strength of this study was this is the first COVID-19 KAP questionnaire for Indonesia's young people population in the early outbreak, thus it was started from scratch. The open-ended questions to 355 adolescents was significantly helped to gain a valuable amount of data to construct the first version of the questionnaire. Adding to this, we had a qualitative individual interview in the middle of the questionnaire development process which improve our understanding to improve the questionnaire. Moreover, we were lucky to have an adolescent health expert within the questionnaire review team, since it is a scarce expertise in the country.

Conclusion

The knowledge, attitude, and practice questionnaire towards COVID-19 for young people in Indonesia was developed and validated. The validity and internal consistency of this questionnaire were good. This new KAP questionnaire could help to arrange a better COVID-19 preventive program specific for young people based on overall population knowledge to improve their attitude and practice. In the clinical settings, this questionnaire could help practitioners to inform their adolescent patients better.¹⁵

List of Abbreviations

COVID-19 = Coronavirus Disease 2019
KAP = Knowledge, attitude, Practice
KMO = Keiser-Meyer-Olkin
SPSS = Statistical Package for Social Science

UNFPA = United Nations Population Fund

WHO = World Health Organization

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Authorship contributions

Concept: A.K; Design: S.W., A.K., F.H.A., C.J., D.A.H., S.A.; Data Collection or Processing: S.W., A.K., C.J., D.A.H., S.A., C.M.A.; Analysis or Interpretation: S.W., F.H.A., C.J., D.A.H., S.A., A.K.; Literature search: S.W., A.K., C.J., D.A.H., S.A.; Writing: S.W., A.K., F.H.A., N.P.H.L.

Table 1. “Pelita Harapan” Questionnaire of Knowledge, Attitude, and Practice Toward COVID-19 Among Young People in Indonesia

No	Statement	Response
Knowledge		
Etiology		
K1	COVID-19 is caused by bacteria that invade to the body	True/False
Transmission		
K2	Sneeze can transmit the virus that causes COVID-19	True/False
K3	Mosquito can transmit the virus that causes COVID-19	True/False
K4	Something that touched by many people (e.g door's handle), can caused the virus that causes COVID-19 be transmitted from one person to another person	True/False
Sign and Symptoms		
K5	Diarrhea is not one of the symptoms that may be found in COVID-19	True/False
Complication		
K6	COVID-19 can damage the heart	True/False
Prevention		
K7	Using a mask is one of the way to prevent transmission	True/False
K8	Keeping the distance within 2 meters is recommended	True/False
K9	Washing hands at least 10 seconds is recommended	True/False
K10	The Indonesian government doesn't yet have an official website that contain news about COVID-19 handling	True/False
Attitude		
A1	Keeping the distance between people in minimal 2 meters can reduce COVID-19 transmission	5-point Likert Scale*
A2	Application of cough etiquette to prevent transmission of COVID-19	5-point Likert Scale*
A3	I need to read updated news/ information related to COVID-19	5-point Likert Scale*
A4	Washing hands with soap of minimal 20 seconds can prevent COVID-19 transmission	5-point Likert Scale*
A5	Eating vegetables and fruits can help boosting the immunity	5-point Likert Scale*
A6	Face mask usage can prevent transmission	5-point Likert Scale*

A7	I am worried that my father/mother/grandfather/grandmother will be infected by the virus that causes COVID-19	5-point Likert Scale*
A8	Teenagers and young people can play a role in preventing the transmission of the virus that causes COVID-19	5-point Likert Scale*
Practice (in past 2 weeks)		
P1	Do you wash your hands at least 20 seconds after your activity to prevent transmission of COVID-19?	Yes/No
P2	Do you cover your mouth and nose when you cough or sneeze with a tissue or your elbow?	Yes/No
P3	Have you opened and read the official website of the government about COVID-19 (covid19.go.id)?	Yes/No
P4	Do you use face mask to prevent transmission?	Yes/No
P5	Do you easily spread the information that you get from social media?	Yes/No
P6	I encourage my family/friends/people around me to obey the government's policy	Yes/No
P7	I encourage my family/friends/people around me to help somebody who are in difficult condition in this pandemic	Yes/No

*1= very not important/ strongly disagree/ very not worry, 2= not important/ disagree/ not worry, 3= not really important / disagree / less worried, 4= important / agree / worry, 5= very important / strongly agree /very worried

Table 2. Demographic Characteristics of the Participants

Variables	Median (min-max)	Frequency	Percentage (%)
Age (years old)	21 (16-24)		
Gender			
Female		24	40.7
Male		35	59.3
Highest level of education			
Tertiary		33	55.9
Secondary		26	44.1
Occupation			
Employee		19	32.2
Entrepreneur		3	5.1
Student		35	59.3
Unemployed		2	3.4

Table 3. Correlation matrix of items in the knowledge statement

		K1	K2	K3	K4	K5	K6	K7	K8	K9	K10
K1	Pearson Correlation	1	0.432**	-0.079	-0.079	-0.079	-0.246	-0.045	-0.034	0.097	-0.071
	<i>p-value</i>		0.001	0.554	0.554	0.558	0.063	0.737	0.802	0.467	0.595
K2	Pearson Correlation	0.432**	1	-0.055	-0.055	-0.054	-0.073	-0.031	0.073	-0.014	0.04
	<i>p-value</i>	0.001		0.684	0.684	0.687	0.587	0.818	0.587	0.917	0.766
K3	Pearson Correlation	-0.079	-0.055	1	-0.055	-0.054	-0.457**	-0.031	-0.119	-0.014	0.04
	<i>p-value</i>	0.554	0.684		0.684	0.687	0	0.818	0.372	0.917	0.766
K4	Pearson Correlation	-0.079	-0.055	-0.055	1	0.103	0.119	0.567**	-0.119	0.148	0.218
	<i>p-value</i>	0.554	0.684	0.684		0.444	0.372	0	0.372	0.267	0.101
K5	Pearson Correlation	-0.079	-0.054	-0.054	0.103	1	-0.053	-0.119	-0.204	0.042	0.101
	<i>p-value</i>	0.558	0.687	0.687	0.444		0.692	0.372	0.125	0.753	0.451
K6	Pearson Correlation	-0.246	-0.073	-0.457**	0.119	-0.053	1	0.068	0.156	-0.058	0.01
	<i>p-value</i>	0.063	0.587	0	0.372	0.692		0.614	0.243	0.665	0.94
K7	Pearson Correlation	-0.045	-0.031	-0.031	0.567**	-0.119	0.068	1	-0.068	0.176	0.224
	<i>p-value</i>	0.737	0.818	0.818	0	0.372	0.614		0.614	0.187	0.091
K8	Pearson Correlation	-0.034	0.073	-0.119	-0.119	-0.204	0.156	-0.068	1	-0.385**	-0.01
	<i>p-value</i>	0.802	0.587	0.372	0.372	0.125	0.243	0.614		0.003	0.94
K9	Pearson Correlation	0.097	-0.014	-0.014	0.148	0.042	-0.058	0.176	-0.385**	1	0.047
	<i>p-value</i>	0.467	0.917	0.917	0.267	0.753	0.665	0.187	0.003		0.728
K10	Pearson Correlation	-0.071	0.04	0.04	0.218	0.101	0.01	0.224	-0.01	0.047	1
	<i>p-value</i>	0.595	0.766	0.766	0.101	0.451	0.94	0.091	0.94	0.728	
** Correlation is significant at the 0.01 level (2-tailed).											

Table 4. Correlation matrix of items in the attitude statements

		A1	A2	A3	A4	A5	A6	A7	A8
A1	Pearson Correlation	1	0.027	0.341**	0.189	0.366**	0.077	-0.041	0.087
	<i>p-value</i>		0.838	0.009	0.155	0.005	0.564	0.761	0.517
A2	Pearson Correlation	0.027	1	0.082	0.095	0.115	0.225	0.095	.269*
	<i>p-value</i>	0.838		0.539	0.479	0.39	0.089	0.477	0.041
A3	Pearson Correlation	0.341**	0.082	1	0.164	0.191	0.09	0.019	0.138
	<i>p-value</i>	0.009	0.539		0.219	0.152	0.503	0.887	0.301
A4	Pearson Correlation	0.189	0.095	0.164	1	.0544**	0.432**	0.23	0.223
	<i>p-value</i>	0.155	0.479	0.219		0	0.001	0.082	0.092
A5	Pearson Correlation	0.366**	0.115	0.191	0.544**	1	.509**	0.2	0.161
	<i>p-value</i>	0.005	0.39	0.152	0		0	0.131	0.227
A6	Pearson Correlation	0.077	0.225	0.09	.432**	0.509**	1	0.295*	0.353**
	<i>p-value</i>	0.564	0.089	0.503	0.001	0		0.024	0.007
A7	Pearson Correlation	-0.041	0.095	0.019	0.23	0.2	0.295*	1	0.281*
	<i>p-value</i>	0.761	0.477	0.887	0.082	0.131	0.024		0.032
A8	Pearson Correlation	0.087	0.269*	0.138	0.223	0.161	0.353**	0.281*	1
	<i>p-value</i>	0.517	0.041	0.301	0.092	0.227	0.007	0.032	
** Correlation is significant at the 0.01 level (2-tailed).									
* Correlation is significant at the 0.05 level (2-tailed).									

Table 5. Correlation matrix between items in practice statements

		P1	P2	P3	P4	P5	P6	P7
P1	Pearson Correlation	1	0.263*	0.002	0.108	-0.038	0.22	0.280*
	<i>p-value</i>		0.046	0.989	0.42	0.775	0.097	0.033
P2	Pearson Correlation	0.263*	1	0.019	0.401**	-0.114	0.279*	0.038
	<i>p-value</i>	0.046		0.886	0.002	0.395	0.034	0.777
P3	Pearson Correlation	0.002	0.019	1	-0.038	0.323*	0.164	0.085
	<i>p-value</i>	0.989	0.886		0.778	0.014	0.217	0.528
P4	Pearson Correlation	0.108	0.401**	-0.038	1	-0.005	0.321*	0.071
	<i>p-value</i>	0.42	0.002	0.778		0.967	0.014	0.595
P5	Pearson Correlation	-0.038	-0.114	0.323*	-0.005	1	0.107	0.242
	<i>p-value</i>	0.775	0.395	0.014	0.967		0.426	0.068
P6	Pearson Correlation	0.22	0.279*	0.164	0.321*	0.107	1	0.441**
	<i>p-value</i>	0.097	0.034	0.217	0.014	0.426		0.001
P7	Pearson Correlation	0.280*	0.038	0.085	0.071	0.242	0.441**	1
	<i>p-value</i>	0.033	0.777	0.528	0.595	0.068	0.001	

Table 6. Cronbach's alpha coefficient of knowledge, attitude, and practice areas

Items	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
K1	48.0517	12.927	0	0.607
K2	48.1034	12.831	0.029	0.607
K3	48.1034	13.147	-0.167	0.618
K4	48.1034	12.515	0.229	0.596
K5	48.5	12.57	0.03	0.615
K6	48.8448	12.204	0.195	0.595
K7	48.069	12.802	0.115	0.604
K8	48.2586	12.757	0.001	0.614
K9	48.4138	12.492	0.058	0.611
K10	48.3103	12.428	0.098	0.605
A1	44.2931	11.86	0.261	0.587
A2	44.3103	12.288	0.104	0.606
A3	45	11.158	0.25	0.588
A4	44.6552	10.195	0.502	0.54
A5	44.4655	10.744	0.546	0.545
A6	44.6552	9.739	0.563	0.524
A7	44.6207	11.082	0.182	0.607
A8	44.3276	11.382	0.397	0.569
P1	48.1724	12.321	0.216	0.594
P2	48.1379	12.612	0.117	0.602
P3	48.6207	11.748	0.271	0.585
P4	48.1207	12.915	-0.029	0.612
P5	48.8103	12.648	0.03	0.612
P6	48.0862	12.852	0.031	0.607
P7	48.2069	12.518	0.107	0.603

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Profile and Factors Associated with Depression, Anxiety, and Stress in Indonesian People During COVID-19 Pandemic

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Abstract

Background : As a result of the COVID-19 pandemic, Indonesia implemented various policies to break the chain of transmission of COVID-19, starting from large-scale social restrictions, quarantines, and even lockdowns. Without exception, schools were also closed. These conditions affect people psychologically, including levels of depression, anxiety, and stress in students. The aim of this study is to determine profile and factors associated with depression, anxiety, and stress in Indonesian people during the COVID-19 pandemic.

Methods : A cross-sectional study among students in Indonesia was conducted to determine depression, anxiety, and stress levels in adolescents based on their sociodemographic characters. The DASS-21 questionnaire was distributed online.

Results : A total of 913 people participated from all provinces in Indonesia. Depression, anxiety, and stress were found in 43.5%, 43.3%, 25.2%, respectively. The severity of depression was significantly associated with age ($p < 0.001$), gender ($p = 0.003$), and region ($p = 0.039$). Adults (25-55) are 4.6 times odds more likely to have depression than adolescent during pandemic (OR=4.641, 95% CI=2.053-10.491). The severity of anxiety was significantly associated with age ($p = 0.002$), gender ($p < 0.001$), education ($p = 0.004$) and region ($p = 0.004$). The severity of stress was significantly associated with gender ($p < 0.001$) and education ($p = 0.018$).

Conclusion : Depression, anxiety and stress quite common found in Indonesian during COVID-19 pandemic. Several sociodemographic factors were associated with depression, anxiety and stress among Indonesia

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Introduction

Coronavirus Disease (COVID-19) or severe acute respiratory syndrome 2 (SARS-COV-2) is an illness caused by a novel coronavirus.¹ January 31st was the day where the director-general of WHO declared the outbreak as a public health emergency of international concern (PHEIC) after the first case reported in Wuhan, China, on December 31st 2019.² After going through the sequence and evolutionary tree analysis, SARS-COV-2 is classified as part of the β -CoVs family that causes respiratory, enteric, hepatic, and neurological diseases.³ The main route of SARS-CoV-2 transmission is between humans and humans, causing the spread to become more aggressive.⁴ Indonesia is one of the countries affected by this virus until February 25th, 2021, 1.306.141 people are confirmed to be COVID-19 positive.⁵ On March 15th, President Jokowi announced national social distancing and encouraged people to work, study, worship at home and postponed any large-scale events.⁶

However, this preventive policy has affected the education sector since March 2020.⁷ Students in Indonesia have to study online from home. Teens tend to be more vulnerable and feel more psychological impact than adults. Impact psychologically on adolescents cover lack of social interaction, boredom due to staying at home, a lot of work, change in daily routine, and fear of Covid-19 infection.⁸

This study aims to determine profile and factors associated with depression, anxiety, and stress in Indonesian people during the COVID-19 pandemic.

Results

A total of 913 people from 34 provinces in Indonesia contributed to this study. Most of them are females (60.9%) and lives on Java Island (68.9%), age from

Methods

Study participants and sampling

This cross-sectional study started from February 4th to 16th, 2021. The Survey distributed through *Instagram*, *WhatsApp* groups, *Line* groups, and other social media using Ms. Forms.

Screening instruments

Demographic information

The survey contains questions about the respondents' sociodemographics such as age, gender, education level, religion, and the province where the respondent lives.

DASS-21

Dass-21 is a questionnaire used to measure a person's level of depression, anxiety, and stress. The questions on Dass-21 asked what conditions the subject had felt in the past week. Depression, anxiety, and stress level ratings are ranging from the scale of 0-28+ for depression, 0-20+ for anxiety, and 0-34+ for stress.⁹

Data Analyses

The data was analysed using SPSS version 22.0. The demographic data presented descriptively, the variables tested using a Chi-square test with a risk estimate and 95% confidence interval.

Ethical Consideration

The Ethics Committee of Faculty of Medicine, Pelita Harapan University has approved the protocol for this study. The approval letter was issued with the number 082/K-LJK/ETIK/II/2021.

15-55, and categorized into adolescents (15-24) and adults (25-55). The respondents are mostly in high school (74.5%), the rest are university students. Table 1 showed the sociodemographic characteristics of the respondents.

Table 1. Sociodemographic Characteristics of Participants

		Frequency (n=913)	Percentage (%)
Age (years Old)	15-24	867	93.8
	25-55	46	5.0
Gender	Male	350	37.9
	Female	563	60.9
Education	High School	688	74.5
	University	225	24.4
Religion	Moslem	122	13.2
	Christian	477	51.6
	Catholic	200	21.6
	Buddha	83	9.0
	Hindu	9	1.0
	Kong Hu Cu	2	0.2
	Others	12	1.3
Region	Java Island	637	68.9
	Outside Java Island	276	29.9

Displayed in Table 2, was data of DASS-21 among all the respondents. The table showed the degree of severity of each depression, anxiety, and stress in five

categories based on the DASS-21. Depression, anxiety, and stress were found in 43.5%, 43.3%, 25.2%, respectively.

Table 2. Severity of Depression, Anxiety, and Stress in Adolescent During Pandemic

Severity of Depression	Frequency (n=913)	Percentage (%)
Normal (0-9)	522	56.5
Mild (10-13)	175	18.9
Moderate (14-20)	151	16.3
Severe (21-27)	48	5.2
Extremely Severe (≥ 28)	27	2.9

Severity of Anxiety	Frequency (n=913)	Percentage (%)
Normal (0-7)	524	56.7
Mild (8-9)	95	10.3
Moderate (10-14)	180	19.5
Severe (15-19)	63	6.8
Extremely Severe (≥ 20)	61	6.6

Severity of Stress	Frequency (n=913)	Percentage (%)
Normal (0-14)	691	74.8
Mild (15-18)	96	10.4
Moderate (19-25)	60	6.5
Severe (26-33)	60	6.5
Extremely Severe (≥ 34)	17	1.8

Table 3. Bivariate Analysis between Sociodemographic Characteristics of Participants and Depression in Adolescent During Pandemic

		Depression Degree		Total (n=913)	OR (CI 95%)	p-value
		Normal-Moderate	Severe-Extremely severe			
Age	15-24	394 (45.4%)	473 (54.6%)	867	4.641 (2.053-10.491)	<0.001 (0.000)
	25-55	7 (15.2%)	39 (84.8%)	46		
Gender	Male	132 (37.7%)	218 (62.3%)	350	0.662 (0.504-0.869)	<0.01 (0.003)
	Female	269 (47.8%)	294 (52.2%)	563		
Education	High School	314 (45.6%)	374 (54.4%)	688	1.332 (0.979-1.811)	0.067
	University	87 (38.7%)	138 (61.3%)	225		
Regions	Java	294 (46.2%)	343 (53.8%)	637	1.354 (1.015-1.806)	0.039
	Outside					
	Java	107 (38.8%)	169 (61.2%)	276		

Table 3 showed the bivariate analysis results between sociodemographic characteristics of participants and depression variable. The data showed the severity of depression was significantly associated with age ($p < 0.001$), gender ($p = 0.003$), and Indonesia region ($p = 0.039$). While for depression and education were not significantly associated ($p > 0.05$). Adults (25-55) were 4.6 times odds more likely to

have depression than adolescent during pandemic (OR 4.641, 95% CI 2.053-10.491). University students (OR 1.332, 95% CI 0.979-1.811) and those who lived in outside Java island (OR 1.354 95% CI 1.015-1.806) were 1.3 times more likely to have severe depression. Male also more likely to have severe depression rather than female (OR 0.662, 95% CI 0.504-0.869).

Table 4. Bivariate Analysis between Sociodemographic Characteristics of Participants and Anxiety in Adolescent During Pandemic

		Anxiety Degree		Total (n=913)	OR (CI 95%)	p-value
		Normal- Moderate	Severe- Extremely severe			
Age	15-24	478 (55.1%)	389 (44.9%)	867	0.341 (0.167-0.697)	<0.01 (0.002)
	25-55	36 (78.3%)	10 (21.7%)	46		
Gender	Male	231 (66.0%)	119 (34.0%)	350	1.921 (1.1457-2.531)	<0.001 (0.000)
	Female	283 (50.3%)	280 (49.7%)	563		
Education	High school	371 (53.9%)	317 (46.1%)	688	0.671 (0.492-0.915)	0.011
	University	143 (63.6%)	82 (36.4%)	225		
Regions	Java	339 (53.2%)	298 (46.8%)	637	0.657 (0.491-0.878)	0.004
	Outside					
	Java	175(63.4%)	101 (36.6%)	276		

Table 4 showed the bivariate analysis results between sociodemographic characteristics of participants and anxiety variable. The severity of anxiety was significantly associated with age (p 0.002), gender (p <0.001), education (p 0.004) and Indonesian region (p 0.004). In contrary with

Table 3, adolescents (OR 0.341 95% CI 0.167-0.697), female (OR 1.921 95% CI 1.1457-2.531), high school student (OR 0.671, 95% CI 0.492-0.915) and those who lives in Java island (OR 0.657, 95% CI 0.491-0.878) were more likely to have severe anxiety.

Table 5. Bivariate Analysis between Sociodemographic Characteristics of Participants and Stress in Adolescent During Pandemic

		Stress Degree		Total (n=913)	OR (CI 95%)	p-value
		Normal- Moderate	Severe- Extremely severe			
Age	15-24	642 (74.0%)	225 (26.0%)	867	0.601 (0.276-1.307)	0.194
	25-55	38 (82.6%)	8 (17.4%)	46		
Gender	Male	293 (83.7%)	57 (16.3%)	350	2.338 (1.672-3.268)	<0.001 (0.000)
	Female	387 (68.7%)	176 (31.3%)	563		
Education	High school	499 (72.5%)	189 (27.5%)	688	0.642 (0.444-0.929)	0.018
	University	181 (80.4%)	44 (19.6%)	225		
Regions	Java	470 (73.8%)	167 (26.2%)	637	0.885 (0.637-1.228)	0.463
	Outside Java	210 (76.1%)	66 (23.9%)	276		

Table 5 showed the bivariate analysis results between sociodemographic characteristics of participants and stress variable. The severity of stress was significantly associated with gender ($p < 0.001$) and education ($p = 0.018$). Adolescents (OR 0.601 95% CI 0.276-

1.307), high school student (OR 0.642, 95% CI 0.444-0.929) and those who lived in Java island (OR 0.885, 95% CI 0.637-1.228) were more likely to have severe stress. Female 2.3 times odds more likely to have severe stress (OR 2.338 95% CI 1.672-3.268).

Discussion

To our knowledge, this results may be the first study in 2021 that analyses the profile and factors associated with depression, anxiety, and stress in Indonesian people. In general, that's been worked for in the COVID-19 pandemics. Furthermore, Indonesia a developing country, along with others, still lacks a large number of studies regarding COVID-19 and its variables. This study determines the profile and factors associated with depression, anxiety, and stress in Indonesian people during the COVID-19 pandemic.

From the data, adults from the age group of 25-55 are potentially at risk of having depressive symptoms. Men are more vulnerable than women in the depression category. However, a journal from the United Arab Emirates stated how depression affects the younger age group and females more than it is to older age group and male gender.¹⁰ A discrepancy between data is available because of the different situations in every country during the pandemic. The study from the United Arab Emirates talks about how younger group age is in despair of their time ahead and how females have a passive ruminative response that leads to negative moods. This study, however, stated that Indonesia, on the other hand, showed that anxiety and stress affect males more due to the significant rate of unemployment and economic recession during the pandemic. That information alone correlates with the older age group and males as the head of a family.

The level of anxiety and stress affects younger age groups and high school students significantly. This data corresponds with other studies, such as in Canada that says how stress and anxiety affect adolescents.¹¹ The reason behind anxiety and stress that affects adolescents more was how younger age groups

experienced an impactful lifestyle change due to Covid-19 pandemic. Socially distancing for instance, which resonates in the decreasing amount of going outdoors or how much the younger age groups spent time on social media is closely related to the increasing amount of stress.

A study from China states how females experienced more severe stress and anxiety symptoms than males.¹² Because apparently, males showed better resilience to stress. That resilience correlated with later developing psychological symptoms such as stress and anxiety. The additional data from China matches this study's data of how women are more vulnerable to stress and anxiety symptoms. The stress may be related to the increase of social media users especially in adolescence population.¹³

Despite all the data that has been obtained, this study still has several limitations. One of them is how this study applied online surveys due to the pandemic that may affect how the respondents think about their private and objective results and how long it took, which affects the data's validity. This study also uses cross-sectional research methods that do not provide any 'cause and effect' data that explains which variable has occurred or explains variables associated with an economic condition, morbidities, medical history, and much more.

Conclusion

Depression, anxiety and stress quite common found in Indonesian during COVID-19 pandemic. Several sociodemographic factors were associated with depression, anxiety and stress among Indonesia. To conclude, sudden changes in lifestyle during the COVID-19 pandemic affected depression, anxiety, and stress in Indonesian people, especially regarding their gender, age group, and education.

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