Knowledge Level of Medical Students Regarding Clinical Manifestations of Autism Spectrum Disorder

Muhammad Reyhan Ichsanino[1], Sari Eka Pratiwi[2]*, Iit Fitrianingrum[3]

[1] Medical School, Faculty of Medicine, Tanjungpura University, Pontianak, Indonesia
[2] Department of Biology and Pathobiology, Faculty of Medicine, Tanjungpura University, Pontianak, Indonesia
[3] Department of Biology and Pathobiology, Faculty of Medicine, Tanjungpura University, Pontianak, Indonesia

Abstract: Autism Spectrum Disorder (ASD) is a group of brain development disorders characterized by stereotyped behavior and deficits in communication and social interaction. Cases of autism in Indonesia increased by as many as 6,900 cases per year. The increase in prevalence is due to the excellent knowledge and awareness among medical students and the broad possible criteria for making a diagnosis. Therefore, this study aims to describe the knowledge level of medical students regarding the clinical manifestations of ASD. This quantitative study used a descriptive design with a total sampling method. The target population of this study was all Tanjungpura University Medical Students. The sample population selected for this study was active Tanjungpura University Medical Students, Class of 2017 and 2018, who were then filtered using inclusion and exclusion criteria. As many as 178 participants filled out a questionnaire, and the data were subsequently analyzed utilizing a statistical program with a descriptive statistical test. Knowledge was divided into three categories of levels, namely good (76-100%), fair (56-75%), and poor (≤55%). The results revealed that the knowledge level of ASD clinical manifestation of the medical students was 77% good, 11% fair, and 12% poor.

Keywords: autism; ASD; knowledge

INTRODUCTION

Autism Spectrum Disorder (ASD) is a group of brain development disorders characterized by stereotyped behavior and deficits in communication and social interaction.[1] The prevalence rate of ASD in 2012 in the United States of America was 14.6 per 1,000. This number is significantly higher in males, with a rate of 23.6 per 1,000 compared with females (5.3 per 1,000).[2] Center for Disease Control and Prevention states that the global prevalence of autism ranges between 0.15-0.20%. Specifically, Indonesia does not have specific data on ASD. However, research predicted that the incidence of autism in Indonesia has reached 6,900 new cases each year.[3]

Clinical manifestations of ASD vary. Children with ASD usually cannot keep eye contact with other people and do not give any response when called. These symptoms of ASD could be seen before the age of 3 years old. Nevertheless, this condition can be unrecognized until years ahead.[4–6] The etiology of ASD remains unclear. However, many factors, such as genetic, autoimmune, environmental, and metabolism, may be associated with ASD.[7–9] ASD affects the quality of life, such as increasing the possibility of developing mental health problems in the future. Not only that, ASD increases negative emotions inside the family, induces stress for the parents and caregiver, and also creates community problems.[10,11] That is why early diagnosis and treatment of ASD is vital.[1,3,12,13]

Early diagnosis and treatment are supported by knowledge and awareness of ASD of medical workers, especially doctors.[12,14–16] Medical students who will be future doctors also need to understand ASD. Therefore, the researchers deem that describing the knowledge level, particularly of Tanjungpura University Medical Students Class of 2017 and 2018, is necessary.

Previously, several studies have been conducted to discuss the level of knowledge about ASD. A study in Malaysia suggested that 97.1% of medical students have misconceptions about ASD and are not

really aware of the proper treatment of ASD.[17] An explanatory research carried out in Malaysia also revealed that senior medical students had better knowledge of ASD symptoms compared to juniors.[18] However, there is no research on medical students' knowledge of ASD in Indonesia, especially Pontianak. Consequently, it is imperative that this investigation be conducted. This study describes the knowledge of Tanjungpura University Medical Students regarding clinical manifestations of ASD, specifically the class of 2017 and 2018. This descriptive study used questionnaires that were composed and verified statistically.

MATERIALS AND METHOD

This study employed the quantitative method with a descriptive survey design. Conducted from 2021 May until June at Tanjungpura University, Pontianak, West Borneo. The target population of this study was all Tanjungpura University Medical Students. The sample population selected for this study was active Tanjungpura University Medical Students Class of 2017 and 2018. The sampling method chosen for this study was the total sampling method, where all the students from the class of 2017 and 2018 planned to be potential participants. Then, the potential participants were filtered using inclusion and exclusion criteria. The inclusion criteria of this study were (i) Active Tanjungpura University Medical Students Class of 2017 and 2018, (ii) Willing to fill out the questionnaire, and (iii) Passed the Growth and Development Modul and Neuropsychiatry Modul. In comparison, the exclusion criteria were (i) Respondents who filled out the questionnaire more than once and (ii) Respondents who withdrew.

The variable examined in this study was knowledge level towards clinical manifestations of ASD and how the respondents' characteristics (GPA, class of year, gender, and source of information) affected the knowledge level. The instrument used to assess this variable was a questionnaire divided into two sections: demographic and knowledge. The demographic section contained basic questions to collect the personal information of the respondents. The knowledge section was made up of 18 questions about ASD clinical manifestations using the Guttman Scale with "true" or "false" options to measure the knowledge of the respondents. Each of the correct answers in the knowledge section was given 1 point. This point was accumulated and interpreted as: <11 points are poor knowledge, 11-13 points are fair knowledge, and >13 points are good knowledge. The knowledge questionnaire was divided into three domains: domain 1 (communication), domain 2 (behavior), and domain 3 (social interaction). The information source section was to know from which sources of information about ASD were obtained by respondents. In addition, the validity and reliability of the questionnaire had been tested using product-moment correlation (r) for validity and Alpha Cronbach for reliability. As many as 45 medical students class of 2017 and 2018 from various universities took part as respondents in testing the validity and reliability of this questionnaire.

The questionnaire was distributed online using Google Forms because of the COVID-19 pandemic. The filling-out process was carried out simultaneously on the same day in each class. As many as 179 responses were collected, but three data were excluded. Other than the questionnaire, the researchers also collected data using secondary sources to know the respondent's GPA. There was a total of 176 data. Data collected were then analyzed univariately utilizing statistical programs to know the distribution, frequency, and percentage. This study has been approved by the Tanjungpura University Ethical Committee with letter number 2374/UN22.9/TA/2021.

RESULTS

As many as 176 Tanjungpura University Medical Students, class of 2017 and 2018, completed filling out the questionnaire online. In detail, as many as 81 respondents were from the class of 2017 and 95 respondents were from the class of 2018. Respondents' distribution is based on the actual proportion of the number of students in each faculty, and the following details are shown in Table 1. Respondents were characterized by year of class, gender, place of origin, student admission route, and information sources of ASD. There were more respondents from the class of 2018 (54.00%) than from the class of 2017. The majority of respondents were female (68.20%). Most of the respondents had a GPA of around 3-3.5 (55.68%). All of the respondents had received information about ASD. In addition, the most widely accepted source of information by respondents came from lectures (43.70%).

Table 1. Subject Characteristics

Characteristics	Total	Percentage
Year of Class		
2017	81	46.00%
2018	95	54.00%
Gender		
Male	56	31.80%
Female	120	68.20%
GPA		
<3	24	13.63%
3-3.5	98	55.68%
3.5-4	54	30.68%
Source of Information		
Textbook	11	6.20%
Lecture	77	43.70%
Workshop	1	0.50%
Electronic Media	46	26.00%
Print Media	3	1.70%
Article	25	14.10%
Others	13	7.80%

As many as 137 respondents (77.84%) had a good level of knowledge regarding ASD clinical manifestations. While 20 respondents (11.36%) had fair knowledge, 19 respondents (10.80%) had poor knowledge. Table 2 presents the results characterized based on year of class, gender, and GPA.

Table 2. Knowledge Level Distribution

Characteristics	Knowledge Level											
	Class of 2017						Class of 2018					
	Good		Fair		Poor		Good		Fair		Poor	
	N	%	N	%	n	%	N	%	n	%	N	%
Gender												
Male	24	85.7	2	7.15	2	7.15	19	65.5	4	13.8	6	20.7
Female	41	77.4	10	18.8	2	3.8	53	80.3	4	6.1	9	13.6
GPA												
<3	9	73.5	1	13.25	1	13.25	6	46.2	2	15.4	5	38.4
3-3.5	45	81.8	7	12.7	3	5.5	37	86.0	3	7.0	3	7.0
3.5-4	11	74.0	4	26.0	0	0	28	74.3	3	7.7	7	17.9

Three domains were researched. Domain 1 asked participants about communication patterns in ASD patients, consisting of questions number 1 to number 6. Domain 2 composed of questions number 7 to 12, talked about the behavior of ASD patients. Questions number 13 until 18 are included as domain 3, which tested participants' knowledge about the social interaction of ASD patients.

Table 3. Correct Answers by Domain

No.	Domain	Correct Answers	
		2017	2018
1.	Domain 1: Communication Patterns	441 (90.7%)	479 (84.0%)
2.	Domain 2: Behavior	388 (79.8%)	426 (74.7%)
3.	Domain 3: Social Interaction	409 (84.1%)	454 (79.6%)

DISCUSSION

The primary goal of this study was to examine medical students' knowledge level of ASD clinical manifestation. Based on the research results, it can be concluded that the level of knowledge of Tanjungpura University Medical Students Class of 2017 and Class of 2018 regarding ASD was mostly good. A

similar study in Tanzania with 178 participants demonstrates that medical students in Tanzania exhibited a good level of knowledge of ASD.[19] In contrary to this result, research in Baghdad states that medical students' knowledge of ASD is relatively low. The level of knowledge is affected by awareness.[20] Awareness means "knowing something exists and is important," while knowledge is "the information, understanding, and skills that individuals gain through education or experience.[21] Better awareness results in better knowledge. Since the participants of this study were in their fourth and fifth of medical school, their awareness regarding autism was good.

Additionally, the class of 2017 had relatively better knowledge regarding autism spectrum disorder manifestations than the class of 2018. These results are similar to recent studies, stating that year of class is a significant predictor of knowledge and concluding that the higher the year of class, the knowledge level regarding ASD is also higher.[19,20] In this study, this could occur because the class of 2017 students had received more lecture material and had gone through the clinical stage (co-ass) when this research was taken, which indicates that they might have been exposed to patients with ASD compared to the class of 2018. The researchers observed that experience and information are some of the valued knowledge resources and have a large influence on knowledge.[22]

The result revealed that females had higher participants that had good levels of knowledge, both in the class of 2017 and 2018. In line with this study, research in Saudi Arabia uncovered that gender is associated with knowledge and belief toward ASD.[23] Theoretically, females have the potential to have a better level of knowledge than males. This is possibly because females have more time to read or discuss with peers and possess the ability to focus more on a problem than males. Apart from that, a male's lack of motivation in searching for information can also affect a person's level of knowledge. Motivation can influence a person's knowledge, as it will increase curiosity about something, and increasing curiosity will motivate a person to look for sources of information.[24]

Moreover, the GPA grouping for this research is based on the Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 49 of 2014 concerning National Higher Education Standards Article 24 Paragraph 2 concerning the criteria for student graduation from diploma and undergraduate programs to be declared with the predicate of satisfactory, very satisfactory, or commendable.[19] Results of this study align with other research, with the results showing a significant relationship between metacognition and cumulative achievement index in medical faculty students. In another study conducted in Southeast Texas, it was found that metacognitive awareness exhibited a significant positive relationship with academic achievement.[25]

Both of the classes of 2017 and 2018 answered the most questions correctly in domain 1, which talked about the communication patterns of patients with ASD. In harmony with this result, it was found that medical students' knowledge of communication impairments of ASD was better than other domains. Conversely, domain 2 had the lowest percentage of correct answers compared to other domains. These results denote a lack of student understanding against the diagnostic criteria Criterion A regarding behavior in all contexts based on DSM-V-TR.[15]

This result can be related to the approach method in accepting and understanding the material received by students. Students' learning approaches can change and be influenced by factors in the learning environment, students' perceptions of factors, and characteristics such as their previous knowledge of the topic being studied. The learning approach in student understanding influences students' understanding of related material.[26] This can also determine the difficulty of questions even within the same material coverage as well as a differentiating force between students who understand and the material they receive.[27]

Overall, students' knowledge regarding the clinical manifestations of ASD was quite adequate. It could be affected by the fact that the majority of participants had received information about ASD. Based on the characteristics of the sources of information obtained by respondents regarding ASD, the most used sources of information came from lecture material for both of the class materials regarding autism spectrum disorder attained in the growth and development module in semester 3 of the Medical Study Program, Faculty of Medicine, Tanjungpura University. Electronic media and social media also play a role in raising medical students' knowledge of ASD.

Knowledge and awareness of health workers about ASD, especially medical students who will become future doctors, are crucial. The general practitioner profession is required to be able to diagnose autism disorders from an early age. According to the Indonesian Doctor Competency Standards, the general practitioner should have skill level 2, namely diagnosis and referral for autism patients. The results of this research indicate that although students' knowledge about ASD is appreciable, there are still

knowledge gaps, especially regarding ASD behavior. There is still room for improvement to fill the knowledge gaps. This can be achieved by standardizing the course lecture on ASD in Indonesia.

However, this research still has many limitations, such as the difficulties in detecting respondent fraud in filling out research questionnaires because the honesty assessment was not carried out in filling out the research questionnaire.

CONCLUSION

It is concluded that the level of knowledge of Tanjungpura University Medical Students Class of 2017 and Class of 2018 regarding ASD is mostly good. The majority of participants have received information about ASD via lecture. It is recommended that Tanjungpura University's medical students deepen their knowledge about ASD; therefore, early diagnosis of ASD in the future can be better.

ACKNOWLEDGEMENT

Not declared.

CONFLICT OF INTEREST

Not declared.

REFERENCES
1. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. Fifth Edit. Arlington: American Psychiatric Publishing; 2013. https://doi.org/10.1176/appi.books.9780890425596
2. Christensen DL, Braun KVN, Baio J, Bilder D, Charles J, Constantino JN, et al. Prevalence and Characteristics of Autism Spectrum Disorder Among Children Aged 8 Years - Autism and Developmental Disabilities Monitoring Network, 11 Sites, United States, 2012. MMWR Surveill Summ. 2018 Nov;65(13):1–23. 10.15585/mmwr.ss7202a1
3. Mashab N, Tajudin N. Pengetahuan Gizi Ibu dan Pola Makan Anak Autis. Seri Kesehat (Health Ser Vol 13, No 2 December. 2009 Dec;13. https://lib.ui.ac.id/file?file=digital/2017-4/20448453-369.pdf
4. Kidder JE, McDonnell AP. Visual Aids for Positive Behavior Support of Young Children With Autism Spectrum Disorders. Young Except Child. 2015 May;20(3):103–16. 10.1177/1096250615586029
5. Carr M, Anderson A, Moore D. Self-Management Interventions on Students With Autism: A Meta-Analysis of Single-Subject Research. Except Child. 2014 Oct. https://doi.org/10.1177/0014402914532235
6. Elsabbagh M. Linking risk factors and outcomes in autism spectrum disorder: is there evidence for resilience? BMJ. 2020 Jan;368:l6880. https://doi.org/10.1136/bmj.l6880
7. Alabdali A, Al-Ayadhi L, El-Ansary A. A key role for an impaired detoxification mechanism in the etiology and severity of autism spectrum disorders. Behav Brain Funct. 2014 Apr;10:14. 10.1186/1744-9081-10-14
8. Rogers S, Talbott M. Early Identification and Early Treatment of Autism Spectrum Disorder. In: International Review of Research in Developmental Disabilities. 2016. https://doi.org/10.1016/bs.irrdd.2016.05.004
9. Pangestu N, Fibriana AI. Faktor risiko kejadian autisme. HIGEIA (Journal Public Heal Res Dev. 2017;1(2):141–50. https://journal.unnes.ac.id/sju/higeia/article/view/14019
10. Chaste P, Leboyer M. Autism risk factors: genes, environment, and gene-environment interactions. Dialogues Clin Neurosci. 2012 Sep;14(3):281–92. 10.31887/DCNS.2012.14.3/pchaste
11. Hisle-Gorman E, Susi A, Stokes T, Gorman G, Erdie-Lalena C, Nylund CM. Prenatal, perinatal, and neonatal risk factors of autism spectrum disorder. Pediatr Res. 2018 Aug;84(2):190–8. 10.1038/pr.2018.23
12. Farmer C, Butter E, Mazurek MO, Cowan C, Lainhart J, Cook EH, et al. Aggression in children with autism spectrum disorders and a clinic-referred comparison group. Autism. 2015 Apr;19(3):281–91. https://doi.org/10.1177/1362361313518995
13. Mukherjee SB. Autism Spectrum Disorders - Diagnosis and Management. Indian J Pediatr. 2017 Apr;84(4):307–14. 10.1007/s12098-016-2272-2
14. Schwartz RG. Handbook of child language disorders: Second edition. Handbook of Child Language Disorders: 2nd Edition. 2017. 1–656 p. https://doi.org/10.4324/9781315283531
15. Altay MA. Family Physicians' Awareness of Autism Spectrum Disorder: Results from a Survey Study. Open

access Maced J Med Sci. 2019 Mar;7(6):967–72. https://doi.org/10.3889/oamjms.2019.199

16. Gerges P, Bitar T, Hawat M, Alameddine A, Soufia M, Andres CR, et al. Risk and protective factors in autism spectrum disorders: A case control study in the lebanese population. Int J Environ Res Public Health. 2020;17(17):1–8. **https://doi.org/10.3390/ijerph17176323**

17. Marzo R. Literacy of Autism Spectrum Disorder (ASD) among Clinical Year Medical Students in Malaysia. TEXILA Int J Med. 2016 Jun;4:1–14. 10.21522/TIJMD.2013.04.01.Art003

18. Hui M, Lay W, Che Ahmad A, Ghazali E, Phaik K, Sien A. A Survey of Lay Knowledge of Autism Spectrum Disorder in Malaysia. J Sains Kesihat Malaysia. 2021 Jan;19:49–57. 10.17576/jskm-2021-1901-06

19. Shah A, Manji K. Assessment of Knowledge of Autism Spectrum Disorders among Medical Students at the Muhimbili University of Health and Allied Sciences: A Semiquantitative Study TMJ. 2022 Dec;33:74–84. 10.4314/tmj.v33i4.521.g312

20. Aziz RA, Mohammed NR, Abdulmunaf FA, Abbas F alzhraa A. Knowledge, attitude and practices of medical students regarding Autism spectrum disorder (ASD). University of Baghdad AL-Kindy College of Medicine; 2023. Knowledge-attitude-and-practices-of-medical-students-regarding-Autism.pdf (uobaghdad.edu.iq)

21. Oxford. Oxford's Learner Dictionary. 7th Editio. University Press; 2005. (99+) Oxford_Advanced_Learners_Dictionary_7th.pdf | Doug Bailey - Academia.edu

22. Nadeak B. Correlation between Knowledge, Experience and Common Sense, with Critical Thinking Capability of Medical Faculty's Students at Indonesia Christian University. J Educ Pract. 2015;6:45–55. Microsoft Word - JEP-Vol.6 No.32 2015 (ed.gov)

23. Mobasher AA, Alsaawi OK, Alharbi AS, Alsulaim AM, Alnassar AS. Awareness of Autism Spectrum Disorder among Medical Students of Qassim University, Saudi Arabia. EC Microbiol. 2020;3(16.3):1–13. (99+) Awareness of Autism Spectrum Disorder among Medical Students ofQassim University, Saudi Arabia | Ahmed Mobasher - Academia.edu

24. Pius A, Berek, FB M, A. YMC. Hubungan Jenis Kelamin dan Umur Dengan Tingkat Pengetahuan Remaja Tentang HIV/AIDS di SMAN 3 Atambua Nusa Tenggara Timur. J Unimor. 2018;6–13. https://doi.org/10.32938/jsk.v1i01.85

25. Young A, Fry JD. Metacognitive awareness and academic achievement in college students. J Scholarsh Teach Learn. 2008;8(2):1–10. Microsoft Word - Young FINAL (ed.gov)

26. Lintang AA, Oktaria D. Peranan Pendekatan Belajar dalam Pendidikan Kedokteran. J Agromedicine. 2017;4(2):342–7. Peranan Pendekatan Belajar dalam Pendidikan Kedokteran | Jurnal Kesehatan dan Agromedicine (unila.ac.id)

27. Suroyo A. Pemahaman individu, observasi, checklist, interview kuesioner dansosiometri. Yogyakarta: Pustaka pelajar; 2013. Pemahaman Individu: Observasi, Checklist, Interviu, Kuesioner, Sosiometri | Senayan (iainpare.ac.id)