

## Research Article

### Cognitive awareness of online-sold prefabricated myofunctional appliances disadvantages among Bandung residents: cross-sectional study

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#### ABSTRACT

**Introduction:** Prefabricated myofunctional appliances (PMAs), commonly known as teeth trainers, are one of myofunctional appliances. These appliances can be used in treating the teeth as well as the muscles. The individuals' need for dental aesthetics today have led to the trend of marketing over-the-counter online PMAs. This is mostly caused by budget limitations that leads people to seek alternative and more affordable orthodontic treatments. However, the use of over-the-counter online PMAs may pose adverse effects to consumers. This study aims to assess the current state of knowledge regarding the disadvantages of prefabricated myofunctional appliances among Bandung residents. **Methods:** This is a descriptive quantitative study, with a cluster random sampling technique. This study involved 100 Bandung residents from 30 different subdistricts, as determined by the Slovin formula. The research instrument consisted of questionnaires which included 27-questions with sub variables of dental appearance, PMAs in general, indications, contraindications, advantages, and adverse effects of using over-the-counter online PMAs. The questionnaire was modified based on Bloom's taxonomy. The obtained results were further analyzed using frequent distribution. **Results:** A total of 30 respondents (30%) were classified as having low knowledge levels. 62 respondents (62%) were categorized as having a moderate level of knowledge. and 8 respondents (8%) were categorized as being highly aware of the disadvantages of over-the-counter PMAs. **Conclusions:** People's knowledge of the disadvantages of over-the-counter online PMAs in Bandung is classified at a moderate level.

**KEY WORDS:** prefabricated myofunctional appliance, myofunctional appliance, orthodontic myofunctional appliance.

### Tingkat pengetahuan masyarakat kota Bandung mengenai dampak buruk prefabricated myofunctional appliances yang dijual secara online: studi cross-sectional

#### ABSTRAK

**Pendahuluan:** Prefabricated myofunctional appliances (PMAs) atau yang dikenal oleh masyarakat awam dengan teeth trainer merupakan sebuah alat myofungsional. PMAs tidak hanya bekerja pada gigi tetapi juga bekerja pada otot. Era modern ini kebutuhan individu akan estetika gigi menyebabkan terciptanya pasar penjualan PMAs secara bebas di online. Hal tersebut disebabkan karena adanya keterbatasan biaya yang menyebabkan individu mencari alternatif perawatan ortodonti yang ekonomis. Penggunaan PMAs yang dibeli bebas secara online dapat menimbulkan bahaya bagi penggunaannya. Penelitian ini bertujuan untuk mengetahui tingkat pengetahuan masyarakat Kota Bandung mengenai dampak buruk prefabricated myofunctional appliances yang dijual bebas secara online. **Metode:** Jenis penelitian ini yaitu deskriptif kuantitatif dengan teknik pengambilan sampel cluster random sampling. Penelitian ini dilakukan terhadap 100 masyarakat Kota Bandung dari 30 kecamatan yang telah dihitung menggunakan rumus slovin. Instrumen penelitian yang digunakan adalah kuesioner yang terdiri dari 27 pertanyaan yang mencakup subvariabel penampilan gigi, PMAs secara umum, indikasi, kontraindikasi, kelebihan, dan dampak buruk penggunaan PMAs yang dijual bebas secara online. Kuesioner ini dimodifikasi berdasarkan taksonomi Bloom. Hasil data yang diperoleh selanjutnya dianalisis menggunakan distribusi frekuensi. **Hasil:** Sebanyak 30 responden (30%) tergolong tingkat pengetahuan rendah, 62 responden (62%) pada kategori sedang, dan 8 responden (8%) memiliki tingkat pengetahuan tinggi terhadap dampak buruk dari PMAs yang dijual secara online. **Simpulan:** Tingkat pengetahuan masyarakat Kota Bandung mengenai dampak buruk prefabricated myofunctional appliances yang dijual secara online tergolong sedang.

**KATA KUNCI:** prefabricated myofunctional appliance, orthodontic myofunctional appliance, online myofunctional appliance.

## INTRODUCTION

In this modern era, the advancement of technology and information has had a significant impact on a variety of factors, including the availability of online dental equipment purchases. One type of dental equipment sold over-the-counter online is prefabricated myofunctional appliances. Prefabricated myofunctional appliances (PMAs) or known by the public as teeth trainers, is a myofunctional tool.<sup>1</sup> In orthodontics, myofunctional appliances are those that use muscle action for achieving the desired treatment. PMAs are designed for patients aged 6-12 years as a malocclusion treatment.<sup>2,3</sup> The free purchase of PMAs on online marketplaces is motivated by the need to enhance dental esthetics. Cost consideration has led individuals to look for inexpensive treatment options to improve dental esthetics and oral function, which may increase their confidence.<sup>4,5</sup> The need to improve aesthetics is due to the fact that individuals usually perceive their bodies negatively and feel dissatisfied, so they look for various ways to get positive feelings about their bodies, especially their teeth, in order to get an ideal body image.<sup>6-8</sup> Denich & Ifdil<sup>7</sup> revealed that the body image may be influenced by some external aspects, such as. television, internet, magazines, etc. Some influencers who endorse PMAs products can also be considered external factors. Similar to marketing, this form of influence includes displaying an ideal appearance that inspires a large number of individuals to desire a similar appearance.<sup>5</sup> The use of orthodontic appliances without a dental examination may result in enamel damage, pulp reaction, root resorption, periodontal tissue disorders, soft tissue trauma, and temporomandibular joint disorders.<sup>4,6</sup>

The results of the 2018 National Basic Health Research (Riskesdas) revealed that 57.6% of the Indonesian population experienced oral health problems. In addition, malocclusion also ranked third with a prevalence of 80% of the total population.<sup>3</sup> According to Aikins *et al.*,<sup>9</sup> there is a close connection between the severity of malocclusion and the need for dental treatment. Consequently, as the severity of malocclusion increases, so does the need for treatment to correct the position of the teeth. This high rate of malocclusion also drives many people who cannot afford orthodontic treatment to purchase over-the-counter online PMAs. Herwanda *et al.*,<sup>5</sup> study of 15- to 17-year-old students at SMAN 4 in Banda Aceh, Indonesia, revealed that their knowledge of the adverse effects of wearing fixed orthodontic devices was moderate (70.8%). This various knowledge has been affected by many factors, for example the environment. A study by Mujiyati and Zakaria *et al.*,<sup>10</sup> concluded that, partially, the knowledge variables had a significant effect on decision-making in the use of orthodontic devices among public high school students in Palembang City. According to the prior study, there were still a significant number of individuals who were less concerned with oral health. This condition was caused by the public's ignorance regarding oral health issues.<sup>3,5,10</sup> This condition is also related to the controversy concerning the use of PMAs that are available online; if the public is aware of the adverse effects that will result from the use of online-purchased tools, it will be able to help reduce the adverse effects.<sup>10</sup> The level of knowledge of Bandung's residents regarding the adverse effects of using prefabricated myofunctional appliances (PMA) sold over-the-counter is determined by the cognitive domain, according to Bloom<sup>11</sup>, which includes acknowledging, understanding, implementation, analysis, synthesis, and evaluation. These are influenced by factors such as education, experience, age, information. socio-culture and economy, and environment.<sup>12</sup>

Based on this description, previous research has examined the relationship between adolescents' knowledge of other categories of orthodontic devices and their effects. However, prior research about the level of public knowledge in Bandung City regarding the adverse effects of using PMA sold over-the-counter has not been published yet. This study aims to determine the level of knowledge of the citizens of Bandung, Indonesia, regarding the negative effects of online-sold PMAs.

## METHODS

The research was conducted using the descriptive quantitative technique, to describe the level of knowledge of the residents of Bandung City regarding the negative effects of online-sold PMAs.<sup>13</sup> The population of this research consisted of Bandung city residents aged 18 to 34, because according to Napoleon Cat data from December 2020, 35.8% of Instagram users were between the ages of 18 and 24; and 32.2% were between the ages of 25 and 34.<sup>14</sup> Within this age range, an individual generally concerns more with body image, which affects self-esteem.<sup>15</sup>

The cluster random sampling technique was used, which involves selecting a cluster or group of people as the cluster sample, then taking individuals from that cluster to become a research subject. According to Myers and Hansen *et al.*,<sup>16</sup> this method made it possible to obtain a representative sample of a larger population by taking the cluster structure into account. The Slovin formula was used to determine the sample number, which required 100 respondents. This number of respondents was determined by counting the 749.964 Bandung city residents aged 18 to 34.<sup>17</sup> The study involved randomly selected respondents from 30 sub districts in Bandung. Using the formula of cluster random sampling, the number of respondents as samples from each sub district was determined.

The inclusion criteria included Bandung city residents aged 18 to 34 who were familiar with PMAs, would like to use PMAs, volunteered to become research subjects by completing an e-questionnaire, and Instagram users. The exclusion criteria in this study were the residents of Bandung who filled out the e-questionnaire invalidly or incomplete, had limitations in completing the questionnaire, caused by unstable signals and the respondents' ability to fill out Google Forms.

The study was conducted online in Bandung, between June and July 2021. The questionnaire included yes and no answer options based on a Guttman scale.<sup>17</sup> SPSS was used, the questionnaire's validity and dependability were evaluated in order to determine the data collection procedure. In this study, the validity was determined using Product Moment (Pearson) correlation and the reliability was determined using Cronbach Alpha. The validity test results indicated that this questionnaire was declared valid, and the reliability coefficient calculation results demonstrated that this questionnaire had a high level of reliability. The questionnaire consisted of 27 items, which was a new questionnaire that the author compiled himself with questions that can be seen in Table 3.

The questionnaire began with an explanatory narrative and informed consent. Questions in the questionnaire were about dental appearance (10 questions), general knowledge of PMAs (3 questions), indications for PMAs (4 questions), contraindications for PMAs (1 question), benefits of PMAs (4 questions), and negative effects of PMAs which were bought over-the-counter online (5 questions).

The questionnaire was developed specifically by adopting and adapting Bloom's taxonomy theory relating to knowledge. The questionnaire that had passed the validity and reliability tests was then distributed on social media via a link in the form of Google Form. The results of the data analysis were presented in the form of tables and graphs based on frequency distribution. The percentage calculation results were then inserted into the standard criteria for the level of knowledge according to Arikunto *et al.*<sup>18</sup> The criteria for the level of knowledge consisted of 76%–100% for the high category, 56–75% for the moderate category, and less than 56% for the low category.

## RESULTS

This study was conducted with 100 Bandung residents who met the inclusion criteria. The following characteristics of respondents in this study are described in Table 1 and Table 2.

**Table 1.** Characteristics of respondents (n=100)

Characteristics of Respondents	Frequency	%
<b>Gender</b>		
Males	40	40
Females	60	60
<b>Age</b>		
18-20 years	21	21
21 – 24 years	57	57
25-29 years	6	6
30-34 years	16	16
<b>Last Education</b>		
Elementary School	3	3
Junior High School	11	11
Senior High School	42	42
Diploma 1/2/3	2	2
Bachelor Degree	31	31
Master Degree	8	8
Doctoral Degree	3	3
<b>Occupation</b>		
Students	9	9
University Students	49	49
Housewives	16	16
Skilled workers (tailor, mechanics, etc.)	4	4
Informal sector workers (traders, shop attendances, etc.)	7	7
Professional workers (teachers, lawyers, nurses, etc.)	15	15
<b>Monthly income</b>		
< Rp.1.000.000	52	52
Rp.1.000.000 -Rp.4.000.000	34	34
>Rp. 4.000.000	14	14

Table 1 displays that the majority of respondents are 60 females (60%) and 40 males (40%), with an age range of 21-24 years (57%). In general, their last education is high school (42%), but the largest proportion of respondents' occupations are university students, at 49% (49 respondents). On average, their income is less than Rp. 1.000.000 (52%).

**Table 2.** Distributions of Respondents' Source of Information (n=100)

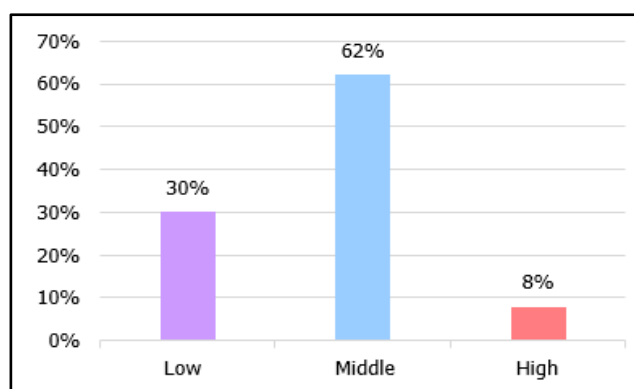
Source of information	Amount (n)	Percentage (%)
Social media (Instagram, YouTube, Twitter, etc.)	73	73
Brochures/ Flyers	3	3
Family	6	6
Friends	16	16
Others	2	2%

Table 2 shows that 73% of respondents obtained information about PMAs sold over-the-counter mainly through social media, followed by information from friends (16%). Table 3 provides the percentage of respondents who were familiar with and unfamiliar with the question items. The questions used the term 'teeth trainer' because they were distributed to the general public. Table 3 demonstrates that the majority of respondents were unfamiliar with question no. 7, resulting in 76% of them thinking that purchasing PMAs online without consulting their doctor was harmless.

According to the percentage of their responses, respondents were familiar mostly with questions no. 1 and 5 (100%), in which they believed that dental appearance is essential and are aware of PMAs. 80% of respondents had a high level of knowledge regarding PMA contraindications, based on the six sub variables listed above. The average percentage of respondents who knew the indications of PMAs was 45%, while the percentage of respondents who did not know reached 55%.

**Table 3.** Percentage of Respondents' answers

Sub Variables	Questions	Score Percentage	
		Know	Don't Know
Dental Appearance	Do you think dental appearance is important?	100%	0%
	Do you believe overcrowded teeth (malocclusion) affect the appearance?	89%	11%
	Do you wish to correct your overcrowded teeth?	82%	18%
	Do you know of any dental appliances that are sold over-the-counter?	71%	29%
	Do you know anything about teeth trainers?	100%	0%
	Do you think buying dental appliances online can fix your overcrowded teeth?	76%	24%
	Do you think buying this online without a doctor's supervision is dangerous?	24%	76%
	In terms of cost, can teeth trainers be considered as an alternative treatment?	38%	62%
	Do you think it's still necessary to see a dentist after learning about the device?	73%	27%
	If you wish to straighten your teeth, would you be interested in purchasing this product online?	47%	53%
Teeth trainer in general	A teeth trainer is myofunctional appliances	29%	71%
	This device improves facial and masticatory muscle balance	56%	44%
	In addition to repairing the teeth, it also stimulates the facial muscles.	67%	33%
Indication of Teeth trainer	Teeth trainers can be used for any types of malocclusions	43%	57%
	Teeth trainers are used for children	36%	64%
	People with poor dental practices can use teeth-trainers. (Thumb suction, improper swallowing technique)	59%	41%
	Mouth breathing habits can be corrected using a teeth trainer.	42%	58%
Contraindication	Uncooperative patients cannot use the teeth trainer.	80%	20%
The benefits of Teeth trainers	The teeth trainers can improve tooth alignment and arch outline.	79%	21%
	Bad habits, such as the position of the tongue between the front teeth, can be corrected using this device.	54%	46%
	Teeth trainers are made of polyurethane or non-thermoplastic silicone material.	77%	23%
	Teeth trainers have good flexibility and adhesion properties.	40%	60%
Bad effect of online-sold Teeth trainers	Using this device without a doctor's supervision may give negative effects.	57%	43%
	Online purchases of teeth trainers may irritate the gums.	63%	37%
	The use of online-purchased teeth trainers may cause dysfunction in the jaw joints.	73%	27%
	Online purchases of over-the-counter tooth conditioners can cause toothache.	65%	35%
	The use of over-the-counter teeth trainers purchased online can cause further tooth structure damage.	45%	55%



**Figure 1.** Frequency Distribution Chart of Respondents' Knowledge Level

Respondents with high levels of knowledge amounted to 8 individuals (8%). Meanwhile, the majority of respondents fell into the category of moderate knowledge level (62%), and respondents with low levels of knowledge amounted to 30 individuals (30%). This information is reflected in the data shown on Figure 1.

## DISCUSSION

The results above show that the level of knowledge of respondents regarding the adverse effects of PMAs sold over-the-counter online is moderate (Figure 1). The level of knowledge of respondents may have been influenced by several factors, as mentioned by Mubarak *et al.*<sup>16</sup> These factors include education, age, information, socio-culture, economy, experience, and environment.<sup>12</sup> These characteristics also influenced the knowledge of the adverse effects of this device in this study.

The data from this study indicated that 60 women (60%) and 40 men (40%), as shown in Table 1, knew about PMAs and wanted to utilize PMAs that were sold over-the-counter online. This is consistent with Sharda *et al.*'s Herwanda *et al.*,<sup>5</sup> study, which found that female students demonstrated greater knowledge, attitudes, and behaviors regarding oral health than male students. Women are more concerned with their bodies and attractiveness. Furthermore, the findings of research by Amalia *et al.*,<sup>19</sup> and Lishoy *et al.*,<sup>20</sup> are directly proportionate to this study, as evidenced by the fact that women seek orthodontic treatment significantly more than men. This is due to the fact that women are more concerned with dental aesthetics than men are.<sup>21</sup>

Education and age can influence respondents' knowledge of the detrimental effects of PMAs marketed over-the-counter online. This study's respondents had an average senior high school education. High school is a fairly advanced educational level. The average age range of respondents who completed this questionnaire was 21 to 24 years, which falls within the category of early adulthood.<sup>8</sup> At this age, a person is highly concerned about his or her appearance, which impacts his or her self-confidence.<sup>15</sup>

This is also consistent with Alhaija *et al.*,<sup>21</sup> statement that age influences the desire for orthodontic treatment. When it comes to orthodontic treatment, younger people have a more positive attitude than older people. However, the findings of this study contradict the findings of Salama *et al.*,<sup>22</sup> who found that the greater the age, the greater the knowledge.

Information sources influence the level of knowledge of the community in Bandung City, which is in the medium category. Table 2 shows that 73% of people have obtained information about PMAs through social media. Currently, social media is an easily accessible source of information and is widely used in daily life. The community's degree of knowledge in Bandung City, which is in the medium category, is influenced by information sources. According to Table 2, 73% of people learned about PMAs from social media. Social media is now a widely used and easily accessible source of information.<sup>23</sup> Increased knowledge is one of the positive impacts of social media, as it provides useful information.<sup>24</sup> According to Guo *et al.*,<sup>25</sup> research information on healthcare providers can also be received through social media platforms such as YouTube, which displays numerous types of videos relevant to orthodontics.<sup>25,25</sup>

Because advertising is one of the most popular categories, it can be deduced that the majority of individuals, around 73%, acquire information on PMAs from YouTube. This study's findings are also consistent with those of Al Moammar *et al.*,<sup>26</sup> who discovered that social media is the primary source of information on orthodontic treatment. What is important to note in the findings of this study is that there are still a large number of respondents who have poor knowledge and a small number of respondents who possess extensive knowledge about the adverse impacts of PMAs supplied over-the-counter online (Figure 1).

The respondent's lack of information about the negative consequences of PMAs sold over-the-counter online could be influenced by socioeconomic and environmental factors. The total income of respondents can be observed in Table 1, which demonstrates that 52% of respondents have an income of less than Rp. 1.000.000.00, providing a socioeconomic picture of respondents. This depicts the socioeconomic responders, who are often middle- to lower-class. This condition is consistent with Raidha *et al.*,<sup>25</sup> research, which claims that middle- to lower-class socioeconomic characteristics influence respondents' experiences. The capacity to procure and implement reliable dental aesthetic procedures is also affected by a person's socioeconomic standing.<sup>26</sup>



As a result, in this study, respondents who were aware of PMAs and desired to utilize PMAs purchased over-the-counter online had a socioeconomic status ranging from middle to lower class. The respondent's job provides a description of the respondent's working environment. According to Table 1, 49% of respondents stated that their job was as a student. According to the findings of this study, students' work environments have an impact on their knowledge since work increases the intensity of interaction between individuals, resulting in higher exposure to information regarding over-the-counter PMAs marketed online.

This is consistent with the findings of Herwanda *et al.*,<sup>5</sup> research, in which different levels of knowledge are influenced by a variety of factors, one of which is the environment. Individuals' knowledge acquisition is influenced by their environment.<sup>5,19</sup> The appearance of one's teeth is essential. This is demonstrated by the responses in Table 3, where 100% of respondents agreed that dental aesthetics is crucial. According to Viyanti *et al.*,<sup>26</sup> research, dental appearance affects a person's psychosocial life and relationships with others. This will have an impact on one's self-image, self-esteem, and social well-being.<sup>26,27</sup>

Referring to the second question in Table 3, 89% of respondents were worried by the appearance of their crowded teeth; this can be attributed to the effect of dental appearance on psychological well-being. Graber *et al.*<sup>29</sup> stated that individuals with dental aesthetic disorders often experience negative responses from others, which can lead to low self-esteem and emotional disturbance.

This led to 53% of respondents being interested in purchasing PMAs online. The study also showed that 76% of respondents considered the use of PMAs without a doctor's supervision to be harmless. Good knowledge and understanding of PMAs in general are needed so that people can be more aware of the adverse effects of PMAs sold over-the-counter online.

Table 3 shows that respondents still lacked knowledge about PMAs, which are myofunctional devices.<sup>2</sup> This could be due to people not understanding what myofunctional means. According to this study, 67% of respondents have a moderate level of knowledge about PMAs, which work not only on teeth but also on muscles. According to the findings of this survey, many respondents are still unaware of the indications for the use of PMAs. When using a device on our body, it is essential to understand the device's indication.<sup>2,28,29</sup> Table 3 shows that 64% of respondents were unaware that PMAs are administered medically to children. PMAs, according to 59% of respondents, can be used on those who have bad habits like thumb sucking, inappropriate swallowing, and so on. 58% of the respondents did not know that PMAs can correct mouth breathing habits. PMAs, according to Anastasi *et al.*,<sup>2</sup> and Paola *et al.*,<sup>31</sup> can be used to remediate bad habits in children.<sup>2,29,30</sup>

The use of PMAs requires the user's compliance and participation. This is due to the fact that PMAs are removable orthodontic appliances.<sup>2</sup> According to the findings of this study, around 80% of respondents were aware that PMAs are not intended for uncooperative individuals.

The respondents in this study ranged in age from 21 to 24, representing the early adult phase. Lishoy *et al.*,<sup>18</sup> explained that in this phase of early adulthood, patients tend to have high concerns related to their appearance in front of others. They are also eager to cooperate in taking the required steps to improve their appearance in the hope of improving their quality of life.<sup>20</sup>

One of the advantages of PMAs is they can help align teeth and dental arches.<sup>30</sup> 79% of respondents were able to identify this function of PMAs, according to the results of the study. Anastasi *et al.*,<sup>2</sup> concluded that using PMAs for younger individuals with malocclusion may help improve teeth alignment. Meanwhile, respondents' knowledge regarding the adhesive properties and flexibility of PMA devices is classified as having a low percentage of 40%, which is inconsistent with the 77% of respondents who were aware that PMAs are made up of polyurethane or non-thermoplastic silicone. This happens possibly because there's not enough literacy about the polyurethane or non-thermoplastic silicone properties, which have proper flexibility and adhesion. Pujar *et al.*,<sup>33</sup> claimed that PMAs are capable of aligning teeth because they are made of those materials.

Orthodontic treatment, like any other treatment, has unfavorable side effects. The use of PMAs offered over-the-counter online without consulting a doctor carries a substantially higher risk of side effects or injury because there is no one to oversee the usage of these devices. According to the findings of this survey, 43% of respondents believed that taking PMAs without consulting a dentist would have no harmful consequences. For individuals who want to utilize orthodontic devices, understanding these side effects or hazards is critical.<sup>31,32</sup> This study demonstrates that respondents' knowledge of the use of PMAs, which are easily available online and can lead to disorders of the jaw joint, is substantial, with a proportion of 73%. This is consistent with the findings of Wishney *et al.*,<sup>33</sup> study, which found a close connection between temporomandibular joint abnormalities and orthodontic treatment.

It can be inferred that PMAs offered over-the-counter online can cause jaw joint issues as a result of the potential risk of orthodontic appliance use.<sup>33,34</sup> This study succeeded in describing the level of knowledge of the people of Bandung City regarding the adverse effects of prefabricated myofunctional appliances sold over-the-counter, which had not previously been studied in Indonesia. This study did not have any data collection bias because it used a representative sample of the intended general population.

An appropriate sampling method ensures every member of the population has an equal chance of being part of the sample.

The questionnaires used in this study were neutral, objective, and valid. The confidentiality and anonymity of the respondents were protected to create an environment that was harmless and free from external influences. The data analysis was meticulously carried out in order to minimize bias and obtain objective results. However, this study also has limitations on the number of respondents and the areas covered, so it is hoped that future research will cover a larger area and include more respondents. Furthermore, the relationship between the level of public knowledge and PMAs purchase decision-making can also be further investigated.

## CONCLUSION

Residents of Bandung City have a moderate level of awareness regarding the negative effects of online-sold prefabricated myofunctional appliances. This is due to the fact that the majority of them already have adequate knowledge about dental appearance, PMAs in general, indications, contraindications, benefits, and adverse effects of purchasing PMAs over-the-counter online.

The results of this study indicated that respondents who were more familiar with PMAs and who had the desire to use PMAs sold over-the-counter online were more likely to be female, 21–24 years old, who completed high school, as well as those whose income was < Rp. 1.000.000. In addition, the majority of respondents obtained the information about online-sold PMAs through social media, such as Instagram, YouTube, Twitter, and others. This study's findings will hopefully provide dentists and dental students with material to improve health promotion regarding the adverse effects of PMAs available for online purchase.

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