

The Relationship Between Gender and Lower Jaw Third Molar Impaction Classification Determined Using Panoramic Radiographs

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ABSTRACT

Background: A pathological condition in which the obstruction of tooth eruption in the jaw arch is caused by no eruption path for teeth to grow within the predicted period. This condition is called dental impaction. The prevalence of impacted teeth is highest in women compared to men. The etiological factor is due to systemic, local, genetic, and ethnic factors. **Objective:** This study aimed to determine the relationship between sex and the classification of the third molar impaction of the lower jaw in patients of RSGM Andalas University viewed by panoramic radiography. **Materials and Methods:** The type of research conducted is observational analytical research with a *Cross-sectional* research design with *purposive sampling* techniques. The sample in this study was a panoramic X-ray of patients from RSGM Andalas University who met the inclusion and exclusion criteria. The number of samples is calculated using the *Lemeshow* formula. Based on the calculation results, the number of research samples was obtained as many as 32 X-ray photos. The data was analyzed using the *chi-square test*. **Results:** Distribution of frequency classification according to Pell & Gregory based on known position that regions 38 and 48 in men and women occur most in position A and based on male class regions 38 and 48 often experience tooth impact in class II, while women often experience in class I, with a value of $p > 0.05$. **Conclusion:** Based on the results of statistical tests, there is no significant relationship between sex and the classification of lower triple molar impaction seen by panoramic radiographs. **Keywords:** Knowledge Level, Medical Student, Oral Cavity and Systemic Disease

ABSTRAK

Latar Belakang: Keadaan patologis dimana terhambatnya erupsi gigi pada lengkung rahang, disebabkan karena tidak ada jalan erupsi untuk gigi tumbuh dalam jangka waktu yang telah diperkirakan kondisi ini disebut dengan gigi impaksi. Prevalensi gigi impaksi paling tinggi terjadi pada perempuan dibandingkan dengan laki-laki. Faktor etiologinya dikarenakan faktor sistemik, lokal, genetik dan suku. **Tujuan penelitian:** Tujuan penelitian ini adalah Untuk mengetahui hubungan jenis kelamin dengan klasifikasi impaksi molar ketiga rahang bawah pada pasien RSGM Universitas Andalas dilihat secara radiografi panoramik. **Bahan dan Metode:** Jenis penelitian yang dilakukan adalah penelitian adalah analitik observasional dengan desain penelitian *Cross-sectional* dengan pengambilan sampel dengan teknik *purposive sampling*. Sampel pada penelitian ini adalah foto rontgen panoramik pasien RSGM Universitas Andalas yang memenuhi kriteria inklusi dan eksklusi. Jumlah sampel dihitung menggunakan rumus *Lemeshow*. Berdasarkan dari hasil perhitungan maka diperoleh jumlah sampel penelitian sebanyak 32 foto rontgen. Data di analisis dengan menggunakan uji *chi-square*. **Hasil:** Distribusi frekuensi klasifikasi menurut Pell & Gregory berdasarkan posisi yang diketahui bahwa regio 38 dan 48 pada laki-laki dan perempuan paling banyak terjadi pada posisi A dan berdasarkan kelas laki-laki regio 38 dan 48 sering mengalami gigi impaksi pada kelas II, sedangkan perempuan sering mengalami pada kelas I, dengan nilai $p > 0.05$. **Kesimpulan:** Berdasarkan hasil uji statistik tidak terdapat hubungan yang signifikan antara jenis kelamin dengan klasifikasi impaksi molar tiga bawah yang dilihat secara radiografi panoramik.

Kata Kunci : Tingkat Pengetahuan, Mahasiswa Kedokteran, Rongga Mulut dan Penyakit Sistemik

1. Introduction

Impacted teeth are pathological situations where teeth cannot grow in their normal position as they should.¹ Impacted teeth often occur in third molars but also in other teeth. Impacted teeth that are not treated properly will cause impaired mastication function and create complications. Therefore, impacted teeth require treatment to prevent complications.² Impacted teeth can be caused by several factors such as local factors such as lack of space for eruption teeth, premature extraction, push from adjacent teeth, abnormal tooth position, the persistence of tooth decidua, inflammation due to thickened mucosa around the teeth, diseases that cause bone necrosis.³ Narrow mandibles can cause a lack of space due to a lack of perfect bone growth.⁴ Another etiology that affects the third molar impaction tooth of the lower jaw is sex due to the highest frequency of third molar impact teeth in women due to growth in men at the age of 21 years and women at 18 years. Generally, jaw growth in females stops when the third molar begins to erupt. In males, during the third molar eruption, the growth of the jaw is still ongoing, thus providing more space for the third molar of the eruption.^{5,6}

Several sources can classify impacted teeth: Winter, Pell & Gregory, *American Dental Association of Oral Maxillofacial Surgeons*, Killy & Key, Passi D, Asaami & Kasazaki, Tetsch & Walkner. The third most commonly used classification of molar-impacted teeth to assess and predict difficulty in surgical procedures is Pell & Gregory and Winter.⁷ According to Pell & Gregory, the third molar impact tooth, according to depth and relationship to the occlusal surface of the second molar vertically, is class A, B, and C, and the relationship of the impact tooth with the mandibular ramus horizontally is class I, II and III.^{7,8}

Radiography is a necessary supporting examination carried out in dentistry. Supporting examinations help determine the diagnosis treatment plan and assess the results of treatment to be carried out or done before. Radiograph examination, among others, can determine the presence of caries, dental injuries, third molar growth, and so on.^{9,10} Research by Passi et al. conducted in Delhi-NCR, India, states that molar impaction of the three lower jaws is more prevalent in class II (48%) and position B (64.2%). The prevalence of tooth impaction of third molars of the lower jaw is more common in males (60.8%) compared to females (39.2%). The third type of molar impact teeth, based on Winter's classification, mesioangular, is the most common. According to Pell & Gregory, the third most common molar impaction is class II impaction position B.¹¹ The prevalence of lower jaw impact tooth eruption in patients undergoing treatment at the Oral Health Department at SQUH, Arabia, was more prevalent in women at 60.1% and men at 39.9%.¹² Based on the above background, researchers wanted to know the relationship between sex and the impaction of the three lower jaw molars seen by panoramic radiographs at Andalas University Hospital.

2. Material and Methods

The type of research conducted is observational analytic research with a *Cross-sectional* research design. This research was conducted at RSGM Andalas University from April 3 to April 30, 2023. The research was conducted after passing the *Ethical Clearance* from the Faculty of Medicine Ethics Commission, Andalas University. The samples in this study were panoramic X-rays of patients RSGM Andalas University who met the inclusion criteria, namely panoramic X-rays of patients at RSGM UNAND who had third molar impact teeth of the right and left lower jaws and exclusion criteria, namely panoramic X-rays of patients at RSGM UNAND that were not visible. The sampling technique in this study is *purposive sampling*. The number of samples is calculated using the *Lemeshow* formula. Based on the calculation results, the number of research samples is as many as 32 X-ray photos of patients at RSGM Andalas University. Ronggen photos of RSGM Andalas University patients were analyzed to see the classification of three-maxillary molar impaction using the Winter classification classification. The data were analyzed univariately to determine the distribution of triple molar impaction classification and the sex distribution of the study sample. Bivariate data analysis was performed using the *chi-square* test with a confidence level of 95%.

3. Result and Discussion

The research was conducted at RSGM Andalas University in April 2023. The population of this study was patients of Andalas University General Hospital who had panoramic radiographs.

The number of samples in this study was 32, and the sampling techniques used were purposive. The patient's panoramic radiographs were analyzed above the *Tracing* Lamp to see the classification of the molar impaction of the three lower jaws based on the Pell & Gregory Classification.

Table 1. Frequency Distribution of Characteristics by Sex (n=32)

Characteristic	n	%
Man	7	21,9
Woman	25	78,1
Sum	32	100

Table 1 shows that most respondents were women, namely 24 people (78.1%), and the rest were men, as many as 7 people (46.6%).

Table 2. Frequency Distribution of classifications 38 and 48, according to Pell & Gregory

Pell & Gregory Impaction Classification	Gear 3.8		Gear 48	
	N	%	N	%
1A	10	31,3	10	31,3
2A	9	28,1	11	34,4
3A	5	15,6	4	12,5
1B	2	6,3	2	6,3
2B	1	3,1	0	0
3B	2	6,3	2	6,3
1C	0	0	0	0
2C	0	0	0	0
3C	3	9,4	3	9,4
Total	32	100	32	100

Table 2 shows that in the classification of molar infracton of the three lower jaws, according to Pell & Gregory, the highest classification percentage in teeth 38 is classification 1A (31.3%). At the same time, classification 2B (3.1%) is the least, while classifications 1C and 2C are absent (0%). In gear 48, the most common classifications are 1A (31.3%) and 1C, and 2C is also lacking (0%). Based on Table 3, it is known that the classification according to Pell & Gregory based on positions in regions 38 and 48 in men shows the most occurs in position A as many as seven people (100%). In comparison, women in Region 38 were found the most in position A, as many as 17 people (68%), and in Region 48, as many as 18 people (72%).

Table 1. Frequency Distribution of Classification According to Pell & Gregory by Position (n=32)

Gender	n	Characteristic Position	Region	%
Man	7	A	38	100
	0	B		0
	0	C		0
	7	A	48	100
	0	B		0
	0	C		0
Woman	17	A	38	68
	5	B		20
	3	C		12
	18	A	48	72
	4	B		16
	3	C		12

Based on Table 4, it is known that the classification according to Pell & Gregory by class in region 38 men showed the most in Class 2, as many as 4 people (57.1%), and in Region 48, as many as (71.4%), while in women in region 38 found the most in class 1 as many as 11 people (44%) and in region 48 as many as 10 people (40%).

Table 42. Frequency Distribution of Classification According to Pell & Gregory by Class (n=32)

Gender	n	Characteristic Class	Region	%
Man	1	1	38	14,3
	4	2		57,1
	2	3		28,6
	1	1	48	14,3
	5	2		71,4
	1	3		14,3
Woman	11	1	38	44
	6	2		24
	8	3		32
	10	1	48	40
	7	2		28
	8	3		32

Table 5 shows a value > 0.05 , and it can be concluded that there is no significant relationship between sex and the classification of molar impaction of the three lower jaws seen by Panoramic radiography in patients of RSGM Andalas University

Table 5. Sex relationship and classification of three-maxillary molar impaction

Variable	n	Region 38	Region 48
		<i>P-value</i>	<i>P-value</i>
Gender	32	0,349	0,270
Impact Classification	32		

This study obtained 25 women (78.1%) and 7 men (21.9%). This study is in line with Samira M et al., who got the same results: the impact of the third molar of the lower jaw occurred in many women, as many as 328 people (60%), and compared with 215 men (40%).¹² This is in line with the research of Sadeta et al., which found that women had more impacted teeth by 491 people (64%) and men 270 (36%).¹³ According to Hassan et al., men's jaws are more prominent than women's, so women often lack space when the third molars of the lower jaw erupt and facilitate impact.⁵ The results of this study show that the classification of Pell & Gregory in men is 7 people (100%) in positions A regions 38 and 48, while in women by 17 people (68%) in positions A region 38 and 18 people (72%) in position A region 48. The classification of Pell & Gregory by class shows that in men, the highest percentage occurs in class II as many as 4 people (57.1%) in Region 38 and as many as 5 people (71.4%) in Region 48, while in women the highest percentage in class I, as many as 11 people (44%) in region 38 and as many as 10 people (40%) in region 48. However, based on statistics, a $p > 0.05$ was obtained where there was no significant relationship between sex and the classification of molar impaction of the three lower jaws.

Previous research that has been conducted by Septina et al. and Afzal et al., based on position and class according to Pell & Gregory, the most commonly found are grade 2 and position A.^{14, 10} Eruption of the third molar of the lower jaw is usually predicted with a sufficient distance between the mandibular ramus and the distal molar teeth of both lower jaws, if the distance is sufficient and greater than the width of the crown of the third molar tooth of the lower jaw, there is a 70% chance of complete eruption.¹⁵ The research conducted by Hassan is not in line with the results of this study. Position B results from classification according to the largest Pell & Gregory (Hassan, 2010). The most frequent classification of class II is due to the lack of distal space of the second molar and delayed mineralization of the third molar of the jaw below¹⁵.

The lack of space can vary by gender due to jaw growth that stops in women when the third molar erupts; in men, growth in the jaw continues beyond the third molar eruption (On & Je, 2017).¹⁶ The high frequency of third molar impaction in women is due to the difference in growth period between men at the age of 21 years and women at the age of 18 years, during which women usually stop growing when the third molar begins to erupt. In males, the growth of their jaws still takes place during the eruption of the third molar, thus providing more room for the eruption of the third molar. In addition, some causative factors such as pressure due to mastication, the shape of food, and the large proportion of teeth and jaws in men tend to be greater than in women so that later it will affect the growth and development of the jaw.¹⁰ According to Mendel's theory, the

growth of jaws and teeth was influenced by heredity. If one of the parents (mother) has a small jaw, and the father has large teeth, then there is a possibility that one of the children has a small jaw and big teeth. In this situation, there can be a shortage of eruption sites for third molars so that there is a chance of impact.²

Tribes and races can also determine the occurrence of impacted teeth. Each race has unique characteristics, so it cannot be a benchmark standard for other races, as is the case with the Banjar Tribe, who eat soft food and gravy, thus making the jaw arch of the Banjar Tribe less developed optimally. It causes the third molars to lack space for eruption in the jaw arch, resulting in impacted teeth. Women most often have lower jaw tooth impaction compared to men.¹⁷ In Javanese, tribes such as the Mongoloid race have elliptical jaw arches and narrow jaw sizes, so Javanese include a relatively high prevalence of impacted teeth. Tribe and racial factors are very influential on the jaw arch and jaw shape.¹⁸

4. Conclusion

According to Pell & Gregory, tooth impaction frequently occurs in regions 38 and 48 for both men and women, especially in position A. Men more often experience tooth impaction in Class II, while women more commonly in Class I. Women generally experience tooth impactions more frequently than men. However, there is no statistically significant relationship between gender and the classification of third molar impaction based on Pell & Gregory classifications seen in panoramic radiographs of patients at RSGM Andalas University.

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Authors Contribution

Contribution	Fitri H	Nismal H	Sovira GDJ	Kasuma N	Fitri C
Concepts or ideas	√	√	√	√	√
Design	√	√	√	√	√
Definition of intellectual content	√				√
Literature search	√	√	√	√	√
Experimental studies	√				√
Data acquisition	√	√		√	√
Data analysis	√	√		√	√
Statistical analysis	√		√	√	√
Manuscript preparation	√		√	√	√
Manuscript editing	√	√			√
Manuscript review	√	√			√



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