

Relationship between Obesity and Location of Residence with The Incidence of Fibroadenoma Mammae

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Abstract

Purpose: Fibroadenoma mammae (FAM) is a common benign breast tumor predominantly affecting young women. While obesity and location of residence are thought to influence the risk of FAM, evidence remains inconclusive. The aim to analyze the relationship between obesity, location of residence, and the incidence of FAM in Central Java, Indonesia

Methodology: This observational analytical study employed a case-control design using retrospective medical record data. The study included patients with breast tumors who underwent surgery and histopathological examination. Patients were categorized into the FAM group (cases) and non-FAM group (controls). Data on body mass index (BMI) and location of residence (urban or rural) were analyzed to determine their relationship with FAM.

Results: The study revealed that FAM patients had a significantly younger median age compared to non-FAM patients (30 vs. 36 years; $p = 0.015$). Obesity was significantly less common in FAM patients than non-FAM patients ($p = 0.001$), with obese individuals having a 0.2 times lower risk of developing FAM (OR = 0.2). There was no significant association between location of residence and FAM incidence ($p = 1.000$; OR = 1.0).

Applications/Originality/Value: There is a relationship between obesity status and the incidence of FAM. Obese women have a 0.2 times lower risk of experiencing FAM than non-obese study subjects, it can be considered that obesity is a protective factor against the occurrence of FAM. There is no relationship between location of residence and the incidence of FAM.

Keywords: Fibroadenoma Mammae, Obesity, Rural, Urban, Body Mass Index

Introduction

Fibroadenoma mammae (FAM) is a common benign breast tumor and most often occurs in young women aged 20-30 years. This tumour is among the most common benign breast tumours seen in clinical practice. Fibroadenomas, which are characterised by the growth of epithelial and stromal components, frequently show as palpable breast lumps. These lesions mostly affect women of reproductive age and are characterised by clinical heterogeneity, ranging from asymptomatic observations to discomfort and anxiety (Ramala, Chandak S, Chandak M, & Annareddy, 2023).

Fibroadenoma mammae (FAM) is estimated to occur once in a lifetime in 10% of the world's young female population. In China, this tumor reaches 27.6% of the female population aged 18-40 years (Zhu et al., 2022). Breast tumors in Indonesia are increasing every year, with 1.8/100,000 cases found in 2015 and increasing to 21.3/100,000 in 2017. In 2018, 16,956 cases of FAM were found (Kementerian Kesehatan RI, 2018). Based on data obtained from the PKU Muhammadiyah Surakarta Hospital in 2012, the number of FAM patients was 107 people (Pratiwi, 2013).

The specific cause of FAM is not yet known for certain. However, hormonal factors, unbalanced lifestyle and consumption of fatty foods are known to affect it. There are many previous studies that discuss the risk factors for FAM. Obesity is known to be a risk factor for the development of this tumor (Bhattani et al., 2019). According to research by Zulkarnain & Harahap. (2023) the proportion of FAM cases is highest in the obese group, namely with a BMI > 25 (Zulkarnain & Harahap, 2023). Meanwhile, research by Idaiani, Jovina, Mogsa, & Pancarharjono. (2020) states that obesity is not related to the incidence of FAM (Idaiani, Jovina, Mogsa, & Pancarharjono, 2020). The location of residence is known to be related to the incidence of FAM. The prevalence of this tumor is more common in urban

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female populations. Research in India shows that 72% of FAM patients come from urban population (Laxman, Sangolgi, Jabshetty, Bhavikatti, & Uttam, 2018). Meanwhile, research by Gupta & Agarwal. (2018) states that FAM patients are more common in rural populations, namely 52.5% of cases (Gupta & Agarwal, 2018).

Researchers conducted a simple analysis in searching for similar articles using the pubmed and scholar databases. Researchers conducted a search using the keywords "fibroadenoma mammae", "benign breast tumor", and "breast fibroadenoma" in the period 2015-2024 and found 18,438 articles. Researchers have not found similar research in Central Java, especially Surakarta. Hence, it is necessary to conduct research to analyze the relationship between obesity and location of residence with the incidence of fibroadenoma mammae (FAM).

Method

This study is an observational analytical study with a case-control design. Data collection was carried out retrospectively based on data from medical records. The subjects of this study were patients with a diagnosis of breast tumor who were then operated on and underwent histopathological examination. The histopathological data were then classified into FAM (case group) or non-FAM (control group) with 43 samples each.

This research method uses strict inclusion and exclusion criteria to ensure the validity and relevance of the data collected. Inclusion criteria include: samples with a final diagnosis of true fibroadenoma mammae that do not have other breast abnormalities in one preparation, without massive inflammation or abscess and not from malformation. The exclusion criteria set were samples with a final diagnosis of fibroadenoma mammae with malignancy. This research method uses operational definitions for the variables studied. Obesity is measured by Body Mass Index (BMI) ≥ 25 kg/m², categorized as non-obese and obese. Location of residence is grouped into urban and rural based on the 2020 Indonesian Central Statistics Agency classification, with rural and urban categories. Fibroadenoma mammae is determined through histopathology results of benign breast tumors, which are categorized as non-fibroadenoma mammae and fibroadenoma mammae.

This operational definition aims to ensure consistent and reliable measurements for data analysis. From the residential address information, it was determined whether the patient lived in a rural or urban area, and from the weight and height information, the body mass index was obtained, so that it could be classified into obesity or non-obesity. Data were analyzed using univariate and bivariate analysis tests.

Result and Discussion

Fibroadenoma mammae (FAM) is a benign breast tumor that often occurs in young women, especially those of reproductive age. Risk factors that influence the incidence of FAM have been widely studied, including age, obesity, and residential environment. However, the results of studies on the relationship between obesity and residential environment with the incidence of FAM are still mixed. This study aims to evaluate the relationship between obesity and residential environment with the incidence of FAM and provide new insights into the two risk patterns. A total of 86 patients were included in this study, consisting of 43 FAM patients and 43 non-FAM patients.

Table 1. Characteristics of Research Subjects.

Characteristic	Group					
	Case			Control		
	Frequency	Percentage	Median	Frequency	Percentage	Median
Age						
Reproductive 13-50	39	90.7%	30 (21-56)	37	86.0%	36 (22-80)
Menopause \geq 51	4	9.3%	-	6	14.0%	-
Location of Residence						
Rural	3	7.0%	-	3	7.0%	-
Urban	40	93.0%	-	40	93.0%	-
Body Mass Index Status						
Non obesity	32	74.4%	-	17	39.5%	-

Obesity	11	25.6%	-	26	60.5%	-
Marital Status						
Not married yet	22	51.2%	-	4	9.3%	-
Married	21	48.8%	-	39	90.7%	-
Occupation						
Housewife	10	23.3%	-	13	30.2%	-
Collage student	14	32.6%	-	1	2.3%	-
Company employee	5	11.6%	-	6	14.0%	-
Entrepreneur	11	25.6%	-	18	41.9%	-
Educator	1	2.3%	-	2	4.7%	-
Civil servant	2	4.6%	-	3	7.0%	-

Based on the table 1, it can be seen that patients with FAM is younger compared to patients without FAM (30 vs 36 years). Fibroadenoma mammae is most often found in young women, especially in reproductive age because this tumor is closely related to hormonal activity, especially estrogen. At a young age, estrogen hormone levels tend to be higher and fluctuate, so they can stimulate breast epithelial proliferation (Ajmal, Khan, & Fossen, 2020). One of the main target tissues of the estrogen hormone is the breast. Estrogen will bind to the estrogen receptor (ER α) on the surface of the tumor cell nucleus that is positive for the estrogen receptor. Activation of the receptor (ER α) activates the PI3K/AKT and MAPK/ERK pathways which promote cell proliferation and increase tumor cell survival (Pu & Chen, 2021).

Fibroadenoma mammae develops in response to this hormonal stimulation, especially in breast tissue that is more physiologically active at a young age. In addition, higher breast density in young women is also a predisposing factor for the formation of FAM compared to older women because they have more breast tissue replaced by fat (Ramala, Chandak S, Chandak M, & Annareddy, 2023). With increasing age, the sensitivity of breast tissue to hormones decreases, especially after entering the premenopausal period. At an older age, estrogen levels begin to decline and these hormonal changes can reduce the risk of benign tumor formation, including FAM. In addition, the physiological involution process in breast tissue that occurs gradually also reduces the possibility of new lesions forming, so that the prevalence is lower in older age groups (Lin et al., 2023).

A significantly higher proportion of patients with FAM were unmarried compared to those without FAM (51.2% vs 9.3%). This suggests that marital status may differ substantially between these groups, possibly reflecting lifestyle, social, or cultural factors associated with FAM. A larger percentage of patients with FAM were college students compared to those without FAM (32.6% vs 2.3%). This finding highlights a potential association between the prevalence of FAM and the demographic characteristics of younger, more educated individuals, possibly due to increased awareness or access to healthcare.

Table 2. Relationship between Obesity and the Incidence of FAM.

		FAM	Non FAM	Total	p	OR (95% CI)
Obesity	N	11	26	37	0,001	0.2 (0.1-0.6)
	%	25.6%	60.5%	43.0%		
Not Obese	N	32	17	49		
	%	74.4%	39.5%	57.0%		
Total	N	43	43	86		
	%	100.0%	100.0%	100.0%		

Based on the Table 2, it can be seen that 25.6% of obese subjects experienced FAM and 74.4% of non-obese subjects experienced FAM. The proportion of obesity in research subjects who experienced FAM was significantly lower than those who did not experience FAM ($p = 0.001$), so it can be interpreted that there is a relationship between obesity status and the incidence of FAM. It was also found that obese research subjects had a 0.2 times lower risk of experiencing FAM than non-obese research subjects (OR = 0.2).

These results are in line with the research of Idaiani, Jovina, Mogsas, & Pancarharjono. (2020) in Indonesia. The study used a cross-sectional research design with a sample size of 37,984 people. The results of the study stated that

obesity can reduce the risk of breast tumors in women who have not experienced menopause, namely having a 0.8 times lower risk with an odds ratio (OR) of 0.803 (Idaiyani, Jovina, Mogsa, & Pancaharjono, 2020).

Different results were shown in the study by Bhattani et al. (2019) in the UK. The study with a cross-sectional design involving 300 patients aimed to determine the relationship between body mass index and the characteristics of FAM lesions. One of the results of the study found that there was a relationship between obesity and the occurrence of FAM ($p = 0.01$). Patients who are obese will have a 3.6-fold higher risk of experiencing FAM than patients who are not obese (Bhattani et al., 2019).

Different results were shown in the study by Nawar et al. (2023) in Saudi Arabia. The study with a cross-sectional design involving 199 uterine leiomyoma patients aimed to determine the relationship between uterine leiomyoma and the occurrence of FAM, although it also included an analysis of various individual patient characteristics. One of the results of the study found that there was a relationship between obesity and the occurrence of FAM ($p = 0.05$). Patients who are obese will have a 2-fold higher risk of experiencing FAM than patients who are not obese (Nawar et al., 2023).

The results of this study differ from previous studies that tend to state that obesity increases the risk of breast tumors, including FAM. This difference may be due to the characteristics of the population studied. Genetic variations, dietary patterns, and levels of physical activity in the study population may affect how obesity affects the risk of FAM. In addition, differences in the definition of obesity in other studies may also contribute to differences in results.

Obesity is known to be a risk factor for breast tumors. This occurs through various mechanisms including hormonal imbalance, increased estrogen and chronic inflammation. Adipocytes in obese conditions produce various signaling molecules known as adipokines such as leptin, adiponectin, resistin and excessive estrogen. This condition creates an environment that supports tumor development (Sat-Muñoz et al., 2022).

Theoretically, obesity is considered as one of the factors that can influence the risk of benign and malignant breast tumors due to hormonal changes that occur due to increased adipose tissue. In obese individuals, adipose tissue produces estrogen through androgen aromatization which can trigger the proliferation of breast epithelial cells (Bhardwaj et al., 2019). However, in the case of FAM, this mechanism may have a different effect. One potential explanation is that in obesity, increased leptin levels and insulin resistance may create a microenvironment that is less supportive of the development of benign tumors such as FAM, although it contributes to the risk of breast cancer (Bocian-Jastrzębska, Malczewska-Herman, & Kos-Kudla, 2023). In addition, adipose tissue produces pro-inflammatory cytokines such as tumor necrosis factor-alpha (TNF- α) and interleukin-6 (IL-6), which can inhibit the development of benign tumors. Benign tumors such as FAM tend to require a microenvironment that supports cellular growth with optimal hormone levels. Metabolic imbalance in obesity may inhibit this process, there by reducing the risk of FAM formation compared to individuals with normal weight (Atoum, Alzoughool, & Al-Hourani, 2020)

Free radicals produced during the inflammatory process play a significant role in the pathogenesis of breast tumor growth. The inflammatory process produces chronic increases in reactive oxygen species (ROS) and reactive nitrogen (RNS). These free radicals damage the DNA of breast epithelial cells resulting in mutations that can cause cell damage that plays an important role in tumor development. In breast tumors, ROS can cause genetic changes that support cell proliferation, inhibit apoptosis and increase angiogenesis so that they can contribute to tumor development (Romadhon & Kurniati, 2024). Therefore, hormonal imbalance, increased estrogen production and chronic inflammation triggered by obesity will encourage DNA damage to breast epithelial cells and will lead to a greater risk of tumorigenesis (Zulkarnain & Harahap, 2023).

Table 3. Relationship between Location of Residence and the Incidence of FAM.

		FAM	Non FAM	Total	p	OR (95% CI)
Urban	N	40	40	80	1,000	1.0 (0.2-5.2)
	%	93.0%	93.0%	93.0%		
Rural	N	3	3	6		
	%	7.0%	7.0%	7.0%		
Total	N	43	43	86		
	%	100.0%	100.0%	100.0%		

Based on the Table 3, it can be seen that 93.0% of subjects from urban areas experienced FAM and 7.0% of subjects from rural areas experienced FAM. The percentage results are the same as the non-FAM subjects studied. There was no difference in the proportion of residence in research subjects who experienced FAM and those who did not experience FAM ($p = 1.000$), so it can be interpreted that there is no relationship between residence and the incidence of FAM. Individuals who live in urban and rural areas have the same risk of experiencing FAM ($OR = 1.0$).

These results are in line with a study conducted by Kucuk. (2024) in Turkey. The study with a retrospective design involving 730 patients with mastalgia complaints aimed to compare various demographic characteristics in female patients with mastalgia complaints. One of the results of the study found that there was no relationship between location of residence (rural vs urban) and the incidence of fibroadenoma ($p = 0.407$) (Kucuk, 2024).

Similar results were also obtained in the study by Saleem, Tariq S, Tariq S, Irfan, & Javed. (2023) in Pakistan. The study with a cross-sectional design involving 145 female patients aimed to determine the factors that influence the delay in the diagnosis of benign breast tumors. One of the results of the study found that the proportion of patients with fibroadenoma mammae had relatively balanced residential characteristics between rural and urban areas (51% vs 49%), so that residence was not a factor influencing the occurrence of fibroadenoma mammae (Saleem, Tariq S, Tariq S, Irfan, & Javed, 2023)

The results showed no association between location of residence (urban or rural) and the incidence of FAM. This can be explained by the fact that the main risk factors for FAM, such as hormonal changes and age, are more influenced by the individual's internal conditions than the external environment. Although some studies have shown that urban lifestyle can increase exposure to estrogen, this factor may not be significant enough to affect the risk of FAM in this study. In addition, differences in access to health facilities in urban and rural areas do not affect these results because FAM is usually found in young women who have more frequent routine check-ups. Environmental exposures such as pollution or different diets in urban and rural areas may play a greater role in the risk of invasive breast cancer than benign tumors such as FAM (Eve, Fervers, Romancer, & Etienne-Selloum, 2020)

Regarding location of residence, the results of this study showed no significant association with the incidence of FAM, in contrast to several previous studies that showed an association between urban lifestyle and the risk of benign breast tumors. This difference may be influenced by the homogeneity of the population in this study, namely the difference in lifestyle between urban and rural individuals is not too striking, so that the risk FAM is equivalent. In addition, non-environmental factors, such as genetics and hormones, may have a more dominant influence on the population studied.

One limitation of this study is the use of medical record data as the primary source of information. Medical record data often do not include all potentially relevant variables, such as lifestyle factors, diet, or family history that may influence the risk of FAM, so these factors could not be analyzed in this study. Potential information bias can also occur if there is data that is not recorded or recorded inconsistently, which can affect the results of the analysis. Another limitation is related to the use of the purposive sampling method. Although this technique allows the study to be carried out relatively quickly, this approach can increase the risk of selection bias because the sample is not completely random. This can reduce the generalizability of the study results to a wider population.

Conclusions

Based on the research that has been conducted, it can be concluded that there is a relationship between obesity status and the incidence of FAM. Obese women have a 0.2 times lower risk of experiencing FAM than non-obese study subjects. Obesity is a protective factor against the occurrence of FAM. There is no relationship between location of residence and the incidence of FAM. Individuals living in urban and rural areas have an equal risk of experiencing FAM. Individuals living in urban or rural areas have no influence on the risk of FAM. The risk of FAM is the same between the two groups.

Suggestions for further research need to be conducted by considering the use of other parameters besides Body Mass Index (BMI) in determining obesity criteria, considering diet intake and physical activity. Further researchers need to consider the use of other parameters besides urban and rural classifications based on the 2020 Indonesian Central Statistics Agency classification in determining urban and rural area criteria and can consider environmental toxicology that can affect the incidence of breast tumors. For policy makers and clinicians, special attention is needed to the incidence of breast tumors.

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References

- Ajmal, M., Khan, M., & Fossen, K. Van. (2020). Breast Fibroadenoma. Definitions, 2–7. <https://doi.org/10.32388/rhumuu>
- Atoum, M. F., Alzoughool, F., & Al-Hourani, H. (2020). Linkage Between Obesity Leptin and Breast Cancer. In *Breast Cancer: Basic and Clinical Research* (Vol. 14). <https://doi.org/10.1177/1178223419898458>
- Bhardwaj, P., Au, C. M. C., Benito-Martin, A., Ladumor, H., Oshchepkova, S., Moges, R., & Brown, K. A. (2019). Estrogens and breast cancer: Mechanisms involved in obesity-related development, growth and progression. *Journal of Steroid Biochemistry and Molecular Biology*, 189(646), 161–170. <https://doi.org/10.1016/j.jsbmb.2019.03.002>
- Bhettani, M. K., Rehman, M., Altaf, H. N., Ahmed, S. M., Tahir, A. A., Khan, M. S., & Imran, T. (2019). Correlation Between Body Mass Index and Fibroadenoma. *Cureus*, 54(7), 1–8. <https://doi.org/10.7759/cureus.5219>
- Bocian-Jastrzębska, A., Malczewska-Herman, A., & Kos-Kudła, B. (2023). Role of Leptin and Adiponectin in Carcinogenesis. *Cancers*, 15(17). <https://doi.org/10.3390/cancers15174250>
- Eve, L., Fervers, B., Romancer, M. Le, & Etienne-Selloum, N. (2020). Exposure to endocrine disrupting chemicals and risk of breast cancer. In *International Journal of Molecular Sciences* (Vol. 21, Issue 23). <https://doi.org/10.3390/ijms21239139>
- Gupta, A. K., & Agarwal, D. K. (2018). Fibroadenoma of Breast: Our Experience. *International Journal of Research & Review* (Www.Ijrrjournal.Com), 5(7), 87. www.ijrrjournal.com
- Idaiani, S., Jovina, T. A., Fajar Mogsa, D., & Pancaharjono, W. (2020). Obesity and the Risk of Breast Tumors in Indonesian Women Based on Clinical Breast Examination. *Thai Journal of Public Health*, 50(2), 161–175.
- Kementerian Kesehatan RI., 2018. Panduan penatalaksanaan kanker payudara. [pdf] Available at: http://p2ptm.kemkes.go.id/uploads/vhcrbkvobjrzudn3ucs4euj0dvbndz09/2018/02.Panduan_Pelaksanaan_Hari_Kanker_Sedunia_2018.pdf.> [Accessed 03 June 2024].
- Kucuk, G. O. (2024). Comparison of Presentation Types and Clinical Findings of Rural and Urban Patients with Mastalgia: A Retrospective Analysis of 730 Patients from Turkey. *Medical Science Monitor*, 30, 1–10. <https://doi.org/10.12659/MSM.943448>
- Laxman, S., Sangolgi, P., Jabshetty, S., Bhavikatti, A., & Uttam, A. (2018). Clinical profile of patients with fibroadenoma of breast. *International Surgery Journal*, 5(3), 1057. <https://doi.org/10.18203/2349-2902.isj20180830>
- Lin, J., Ye, S., Ke, H., Lin, L., Wu, X., Guo, M., Jiao, B., Chen, C., & Zhao, L. (2023). Changes in the mammary gland during aging and its links with breast diseases. In *Acta Biochimica et Biophysica Sinica* (Vol. 55, Issue 6, pp. 1001–1019). Science Press. <https://doi.org/10.3724/abbs.2023073>
- Nawar, A. T., Binmahfouz, A., Abbas, E., Almeahmadi, S. F., Turson, S. A., & Kanbayti, I. H. (2023). Increased Risk of Breast Fibroadenomas Among Obese and Postmenopausal Women With Uterine Fibroids. *Cureus*, 15(8). <https://doi.org/10.7759/cureus.43503>
- Pratiwi, Y. (2013). Asuhan Keperawatan Pada Klien Dengan Gangguan Sistem Reproduksi : Post Lumpektomi Fibroadenoma Mammae (Fam) Sinistra Diruang Multazam Rs Pku Muhammadiyah Surakarta.
- Pu, X., & Chen, D. (2021). Targeting Adipokines in Obesity-Related Tumors. *Frontiers in Oncology*, 11(August 2021), 1–20. <https://doi.org/10.3389/fonc.2021.685923>
- Ramala, S. R., Chandak, S., Chandak, M. S., & Annareddy, S. (2023). A Comprehensive Review of Breast Fibroadenoma: Correlating Clinical and Pathological Findings. *Cureus*, 15(12). <https://doi.org/10.7759/cureus.49948>

- Romadhon, Y. A., & Kurniati, Y. P. (2024). Pathway Pengaruh Lingkungan dalam Inisiasi dan Progresivitas Kanker Tulang dan Jaringan Lunak.
- Saleem, S., Tariq, S., Tariq, S., Irfan, S., & Javed, F. (2023). Factors leading to delayed and challenging presentation of benign breast lumps in young females. *Pakistan Journal of Medical Sciences*, 39(1). <https://doi.org/10.12669/pjms.39.1.6647>
- Sat-Muñoz, D., Martínez-Herrera, B. E., Quiroga-Morales, L. A., Trujillo-Hernández, B., González-Rodríguez, J. A., Gutiérrez-Rodríguez, L. X., Leal-Cortés, C. A., Portilla-De-buen, E., Rubio-Jurado, B., Salazar-Páramo, M., Gómez-Sánchez, E., Delgadillo-Cristerna, R., Carrillo-Nuñez, G. G., Nava-Zavala, A. H., & Balderas-Peña, L. M. A. (2022). Adipocytokines and Insulin Resistance: Their Role as Benign Breast Disease and Breast Cancer Risk Factors in a High-Prevalence Overweight-Obesity Group of Women over 40 Years Old. *International Journal of Environmental Research and Public Health*, 19(10). <https://doi.org/10.3390/ijerph19106093>
- Zhu, L., Zeng, X., Jiang, S., Ruan, S., Ma, H., Li, Y., Ye, C., & Dong, J. (2022). Prevalence of breast fibroadenoma in healthy physical examination population in Guangdong province of China: A cross-sectional study. *BMJ Open*, 12(6), 1–7. <https://doi.org/10.1136/bmjopen-2021-057080>
- Zulkarnain, saskia putri nistrina, & Harahap, rini syahrani. (2023). GAMBARAN KLINIS PASIEN FIBROADENOMA MAMMAE TERKAIT OBESITA. 8(1), 93–99.