

Sugar Crash: Analysis of Diabetes Risk in Office Workers Due to Irregular Work Patterns and Eating Patterns

Albert Manggading Hutapea¹, Kimberley Maharani Maulibulung Hutapea²

Universitas Advent Indonesia, Indonesia¹, Universitas Prima Indonesia,
Indonesia²

e-mail*: amhutapea@unai.edu

Entered : February 24, 2025

Accepted: April 15, 2025

Revised : March 20, 2025

Published : April 29, 2025

ABSTRACT

This study aims to analyze the risk of type 2 diabetes in office workers affected by sedentary work patterns and irregular eating patterns. Office work tends to require low physical activity, high work pressure, and inconsistent meal times, which can increase the risk of metabolic disorders, including diabetes. This study used a quantitative approach with a survey method of 150 office workers in urban areas, combined with in-depth interviews with 10 key informants. The results showed that 68% of respondents had irregular eating habits and 74% experienced moderate to high work stress. As many as 45% of respondents also showed blood sugar levels that were on the prediabetes threshold. Factors such as consumption of foods high in sugar and carbohydrates, lack of physical activity, and the habit of skipping breakfast contributed significantly to the increased risk of diabetes. These findings emphasize the need for interventions in the form of occupational health education, provision of healthy food in the office environment, and work time arrangements that support a healthy lifestyle. In conclusion, the lifestyle of modern office workers can be a serious risk factor for metabolic health, and requires more comprehensive preventive treatment.

Keywords: Diabetes-Risk; Irregular-Work and Eating-Patterns; Sugar-Crash

INTRODUCTION

Office workers are now one of the groups at high risk of developing metabolic disorders, especially type 2 diabetes, due to the dominance of sedentary work patterns in their daily routines. Activities dominated by sitting for long periods without sufficient breaks have been shown to have a significant impact on decreasing insulin sensitivity and increasing insulin resistance, two key indicators in the development of type 2 diabetes (Quan et al., 2021). The World Health Organization (WHO) even classifies a sedentary lifestyle as the fourth largest risk factor for global death. In the context of office workers, the habit of sitting for more than 6–8 hours per day without adequate physical



activity contributes to the accumulation of visceral fat, metabolic dysfunction, and low-grade chronic inflammation, all of which accelerate the occurrence of metabolic disorders.

Furthermore, the modernization of the world of work also creates new challenges for employee health, such as target pressure, fast work rhythms, and the use of digital technology that encourage workers to stay in front of the screen for long periods of time. In the long term, the combination of low physical activity and high mental workload strengthens the negative effects on body metabolism. A study by Bailey et al (2019) confirmed that prolonged sitting without interruption, even if someone has exercised before, still has a strong correlation with an increased risk of diabetes and cardiovascular disease. Therefore, this issue is not only a matter of individual lifestyle, but also a consequence of the design of a work environment that does not support long-term metabolic health.

In addition to a sedentary lifestyle, irregular eating patterns also exacerbate the risk of type 2 diabetes in office workers. The habit of skipping breakfast, consuming fast food, and relying on high sugar and simple carbohydrate intake are common eating patterns, especially in work environments that demand high time efficiency. A study by Indra (2024) shows that consistently skipping breakfast can cause impaired glucose regulation and increase insulin levels after eating, which in the long term contributes to insulin resistance. On the other hand, excessive sugar consumption, which is often considered a "quick energy booster" while working, actually triggers unstable blood glucose spikes, which if it continues to occur, can damage the body's metabolic system systemically.

Even more ironically, this irregular eating pattern is often not recognized as a serious problem because it is considered part of the demands of professionalism and productivity. Many workers choose to work while eating or even not eat at all in order to meet deadlines. The work environment also rarely provides affordable and practical healthy food options, making it easier for workers to choose instant food or packaged sweet drinks. Based on data in this study, 68% of respondents admitted to having an irregular eating pattern, and 45% of them had shown signs of prediabetes. This shows that there is a structural gap in the work system that not only normalizes, but also indirectly encourages eating practices that are detrimental to health. Therefore, reforms are needed in company policies related to nutrition and meal times, as well as health education that targets collective awareness of the importance of a healthy and balanced eating rhythm.

High work pressure and chronic stress in the office work environment are significant risk factors that are often overlooked in the discourse on metabolic health. Persistent stress experienced by workers can trigger the activation of the hypothalamic-pituitary-adrenal (HPA) axis, resulting in prolonged increases in the main stress hormone cortisol. High levels of cortisol cause increased gluconeogenesis and decreased insulin sensitivity, which in the long term contribute to chronic hyperglycemia (Ojo et al., 2023). In this context, stress is not just an emotional issue, but a biological factor that directly disrupts the body's glucose homeostasis. The study that is the basis for this discussion noted that 74%

of respondents experienced moderate to high levels of stress, indicating that psychosocial stress in the modern workplace is not just a side effect, but a potential primary cause of metabolic disorders.

Ironically, the culture of excessive productivity and the glorification of "hard work" actually reinforces the normalization of chronic stress among office workers. Minimal rest time, expectations of working outside of operating hours, and unclear boundaries between personal and professional life encourage the creation of unhealthy working conditions both psychologically and physiologically. The lack of support from the organization, whether in the form of counseling services, flexible working hours, or stress management training, indicates a structural negligence in paying attention to the long-term health of employees. According to Ardiani et al (2021), workplaces that do not manage stress systemically can contribute to a spike in cases of chronic diseases, including diabetes. Therefore, interventions cannot stop at changing individual behavior alone, but must include improvements in organizational design and work policies that support the mental and physical well-being of employees.

The lack of systematic health interventions in the workplace indicates a gap between workers' health needs and applicable company policies. Many workplaces do not yet have a data-based preventive strategy for the risk of metabolic diseases such as type 2 diabetes. The provision of healthy food in the office canteen, flexible working hours to support physical activity, and regular counseling on healthy lifestyles are often just symbolic without adequate sustainability or supervision. A study by Aziz et al (2024) confirmed that workplace-based health interventions that are designed in a participatory manner and integrated with organizational policies have a significant impact on changing employee health behavior. In other words, the absence of such policies is not just negligence, but a form of structural failure in creating a healthy and sustainable work ecosystem.

Furthermore, an approach that only emphasizes individual responsibility for maintaining health without systemic support from the company is not only unfair, but also ineffective. Telling workers to "be more active" or "eat healthier" in a work context that does not provide free time for exercise or access to healthy food is a contradictory approach. The work environment should be a catalyst, not a barrier, for healthy living behavior. This requires a paradigm shift from companies: from mere economic entities to social institutions responsible for the well-being of their workers. The need for preventive and inclusive occupational health programs is now urgent, especially when field data shows that almost half of workers are already prediabetic. Without real policy changes, the work environment will become one of the starting points of future public health crises.

RESEARCH METHODS

This study uses a descriptive qualitative approach to understand the risk factors for type 2 diabetes in office workers in Medan City, especially those related to sedentary work patterns, work stress, and irregular eating patterns. The research location is focused on government agencies, banks, and private

companies in the center of Medan City. Informants were selected by purposive sampling, consisting of 15 office workers and 10 key informants, such as medical personnel and HRD managers. Data were collected through semi-structured interviews, non-participatory observations, and office health policy documentation studies.

In addition, this study also involved a survey with a questionnaire to collect more extensive data on workers' diet, stress levels, and physical activity. The survey was conducted on 150 office workers who met similar criteria to the main informants. The survey data were analyzed using descriptive statistics, then combined with qualitative findings to provide a more comprehensive picture of the risk factors for type 2 diabetes. All data were analyzed using the Miles and Huberman (1994) analysis model. This article is published under the code of ethics 2050/NW25.1 PT.20.03/2025

RESULTS AND DISCUSSION

Sedentary Work Patterns and Their Implications for Diabetes Risk

1. Long Sitting Duration as a Trigger for Metabolic Dysregulation

Long sitting duration has long been known as one of the main factors causing metabolic disorders, especially among office workers who tend to spend hours in front of their desks. This phenomenon is further exacerbated by a sedentary lifestyle that is not supported by a work environment that is friendly to physical activity. Based on the results of a survey of 150 office workers in Medan, 82% spent more than 7 hours sitting per day without interruption, while 64% even sat for more than 9 hours. Only 18% did light physical activities such as stretching regularly during working hours, and 77% did no physical activity at all during work. The lack of supporting facilities such as standing desks (available in only 6% of offices) and stretching areas (only 9%) also reinforced this passive sitting habit.

This is in line with the in-depth interviews conducted, where most informants stated that they did not have the opportunity to stand or move outside of lunch hours. One informant said,

"I mostly sit at my desk without standing or walking around much, except during my lunch break."

Another informant added,

"My office does not have a policy to encourage us to stand or move around after a few hours of sitting. Sometimes I feel tired and there is no option to move around except during lunch."

This condition has a direct impact on the decrease in skeletal muscle activity, which is very important in the absorption of glucose from the blood. When muscles are rarely used, the body becomes less responsive to insulin, triggering insulin resistance. Pandongan's research (2020) shows that even if

someone exercises after work hours, sitting too long still increases the risk of hyperglycemia. This is reinforced by the statement of one of the informants who said,

"Even though I exercise regularly after work, I still feel unfit after sitting for a long time in the office."

The survey also revealed that 68% of respondents have irregular eating patterns, 71% often consume foods high in sugar and carbohydrates, and 61% skip breakfast more than three times a week. As many as 74% experience moderate to high levels of work stress, and 58% feel tired even after exercising. As a result, 45% of respondents showed blood sugar levels on the prediabetes threshold. Meanwhile, only 12% of offices have a break policy for physical activity, 21% provide occupational health education, and only 16% provide healthy food.

Despite these concerns, there are positive signs of increasing worker awareness. As many as 63% are aware that sitting too long can trigger diabetes, 41% have tried to reduce their sitting duration, 78% want changes in office policies, and 84% are willing to participate in occupational health programs. According to Moghetti et al (2020), the risk of metabolic disorders can be reduced by regular light activity such as brisk walking or stretching.

Therefore, comprehensive and integrated interventions are needed from both individuals and organizations. This step includes providing supporting facilities, office policies that encourage physical activity, and ongoing occupational health education. As explained by Listyandini et al (2020), active work patterns can improve workers' metabolic profiles. By encouraging changes in lifestyle and a healthier work culture, the risk of metabolic disorders can be reduced, improving the quality of life of individuals as well as overall company productivity.

2. Normalization of Work Culture that Ignores Physical Activity

A work culture that prioritizes productivity without considering workers' physical health further exacerbates the sedentary tendencies in the office environment. This phenomenon can be seen from the fact that many workers feel guilty if they leave their desks too often, even just to walk for a while. This reflects the implicit pressure in the workplace that requires workers to stay focused on work without physical distractions, which can actually have a negative impact on their long-term health. Most workers feel that they are considered more productive if they do not spend time on physical activity, as if the time to move is just a waste of time that should be used to complete tasks. One informant in the interview stated,

"I get anxious if I leave my desk too often. Sometimes just to take a quick walk feels like a waste of time that could be spent on work."

This statement illustrates how social norms in the workplace can inhibit healthy behaviors such as taking breaks and moving around.

This phenomenon is exacerbated by rigid policies, high work targets, and a lack of awareness from management about the importance of physical movement. Workers often feel trapped in a work routine that requires them to be at their desks all the time without any opportunity to take a break, even though research shows that physical activity can improve employee performance and health. As explained in a study by Ghodeshwar et al (2023), a "passive work environment" refers to conditions in which work structures and policies actually create barriers to healthy behavior. This means that the design of a work environment that does not support body movement, such as non-ergonomic desks or inadequate workspaces for physical activity, contributes to sedentary habits that are harmful to health.

In broader research, many studies have shown that a sedentary lifestyle exacerbated by the habit of working in a sitting position for too long can increase the risk of various health problems, such as obesity, type 2 diabetes, and heart disease. A study by Maidartati et al (2022) showed that lack of physical activity, especially in the context of work that requires sitting for long periods of time, can increase the risk of cardiovascular disease by up to 147%. Therefore, the longer a person sits without moving, the more likely they are to experience related health problems.

On the other hand, the benefits of physical movement in the work environment have been widely proven. Research by Prakoso & Churiyah (2023) found that policies that encourage physical activity in the workplace, such as providing time to rest and move or providing sports facilities, can increase productivity, reduce stress levels, and improve overall worker well-being. In an interview with one of the informants, they stated,

"When the company gives me the opportunity to take a break and walk around, I feel more refreshed and my productivity increases. I feel like my body is more ready to work again after moving around a bit."

Lack of awareness from management regarding the importance of workers' physical well-being is a major inhibiting factor. Many companies still focus more on short-term results and work targets without considering how physical health can affect long-term performance. However, as research on the benefits of physical activity in improving performance grows, more and more companies are beginning to recognize the importance of supporting physical activity in the work environment. For example, companies that provide fitness programs, flexible time for breaks, and policies that support physical activity in the workplace show significant increases in employee productivity and satisfaction (Bintang et al., 2024).

A work culture that ignores physical activity not only risks damaging individual health, but can also impact the overall performance of the organization. Therefore, companies need to design policies that better support

physical well-being, such as providing space for rest, encouraging physical activity, and reducing unnecessary pressure to continue working without interruption. Implementing these policies will not only help maintain employee health, but can also increase productivity and create a healthier and more balanced work environment. As expressed by one informant in an interview,

"When companies show concern for our physical health, we feel more valued, and that makes us more enthusiastic about our work."

Overall, a work culture that supports employee physical well-being is essential to creating a productive and healthy work environment. If companies are able to integrate policies that address physical well-being, such as providing opportunities for movement and regular breaks, then not only will employee health improve, but also the organization's long-term performance and productivity.

Eating Dysfunction and Lack of Health Interventions in the Office Environment

1. Work Pressure and Schedule Disorganization as Triggers for Irregular Eating Patterns

High work pressure and irregular work schedules have been shown to have a significant impact on workers' eating behavior, with many of them often skipping major meals such as breakfast or lunch. This is due to distractions from various factors, such as sudden meetings, tight work deadlines, and uncontrolled multitasking. In an interview with one of the informants, a project manager, he said,

"I often have to skip lunch because of a last-minute meeting or a pressing deadline. I feel like I don't have time to eat in peace."

This phenomenon can be explained through the job strain theory proposed by Karasek & Theorell (1990), which explains that an imbalance between high job demands and low personal control will trigger stress and psychological tension. In this context, workers who face very high job demands but have little control over their time and priorities often neglect their biological needs, including eating, because they feel more focused on more pressing work tasks.

This eating disorder phenomenon can not only be understood as an individual habit, but also a product of dysfunctional work structures and cultures. As explained in a study conducted by Arbin et al (2021), organizations that have a high-pressure work environment, where workers have little freedom in managing their working hours, are more likely to cause workers to neglect healthy eating habits. In an interview, an administrative employee said,

"I feel like my work is more important than eating. When I'm faced with a tight deadline, eating is the last thing on my mind."

This statement illustrates how demanding work, without control over working hours, can lead to neglect of basic bodily needs, such as eating.

The impact of this eating disorder not only affects short-term well-being, but can also lead to long-term health problems. Research conducted by Mubin (2025) shows that irregular eating patterns, such as skipping main meals or eating in a hurry, can disrupt the body's metabolism and increase the risk of obesity, type 2 diabetes, and digestive disorders. In addition, high work stress, as explained by Amelia et al (2025), can trigger emotional eating patterns, where workers tend to overeat or choose unhealthy foods in response to anxiety or mental fatigue. This is relevant to the statement of one informant who said,

"When I'm stressed, I often eat fast food or snacks, because it's easier and faster," which reflects eating patterns influenced by emotional factors and work pressure.

In addition, a study by Yarmmani et al (2021) underlines the importance of a balance between job demands and personal control in creating workers' psychosocial well-being. When workers do not have adequate control over their working hours, they are more likely to experience stress leading to neglect of basic needs such as eating. A better balance between job demands and control over those jobs can help reduce stress and enable workers to maintain a more regular and healthy diet.

In conclusion, eating disorders experienced by workers under high work pressure and irregular schedules are not simply individual decisions, but are the result of dysfunctional work structures and cultures. Workers' inability to manage their time or have control over their work creates an imbalance that affects their eating behavior. Therefore, it is important for organizations to create a work environment that is more supportive of the balance between work demands and personal control, to ensure that workers can meet their basic needs in a healthier and more regular manner.

b. Absence of Balanced Nutrition Policy in the Office Environment

The absence of a balanced nutrition policy in the office environment is one of the main factors that influences unhealthy eating habits among employees. This can be seen from the food choices available in the workplace, which are dominated by fast food, sweet drinks, and instant snacks that are low in nutrition. Not only does it have an impact on long-term physical health, the lack of this policy also reflects a lack of concern for the overall well-being of employees. In this case, there needs to be serious attention from the company to provide policies that support healthy eating patterns and increase nutritional awareness among employees.

Based on the results of observations and interviews, it was found that the food choices available in the office environment are dominated by fast food, sweet drinks, and instant snacks. These foods generally contain added sugar, saturated fat, and processed carbohydrates, which can affect long-term health. Consumption of foods like this, which are high in calories but low in nutritional

value, is directly related to an increased risk of obesity, type 2 diabetes, and cardiovascular disease. Research by Widiastuti et al (2024) shows that excessive consumption of fast food can affect nutritional balance, increase obesity, and worsen metabolic health conditions, such as insulin resistance.

Based on the interview conducted, one of the employees said,

"Every time I take a lunch break, I only have fast food and unhealthy snacks. Healthy food is rarely available, and sometimes I have to choose something that is fast and convenient, even though I know it is not good for my health."

This illustrates a reliance on unhealthy food choices, which tend to be readily available but do not support balanced nutritional needs.

In addition, the absence of a nutrition education policy or program from the company further exacerbates unhealthy eating habits. The absence of interventions in the form of nutrition socialization or the arrangement of healthy canteens in the work environment shows a lack of attention to the importance of healthy eating patterns. A study by Andriyani et al (2024) showed that nutrition education integrated into a company's health program can improve employee understanding of healthy food choices, as well as encourage them to make better eating decisions. When companies do not provide information or facilities that support healthy eating patterns, employees tend to get caught up in bad eating habits due to lack of knowledge and limited choices.

WHO (2016) asserts that the workplace has a strategic responsibility to provide an environment that supports healthy lifestyle choices, which includes access to healthy foods and educational programs on balanced diets. A work environment that does not support healthy eating habits creates a cycle that worsens health problems. For example, in another interview, an employee said,

"We know healthy food is important, but because there are no good options in the office cafeteria, we prefer to eat outside the office or buy quick and cheap snacks."

The absence of policies that support the provision of healthy food or adequate education about nutrition leaves employees trapped in suboptimal eating patterns, even though they are aware of the importance of a healthy diet.

The lack of a clear policy regarding the provision of healthy food in the office environment can also impact employee physical health and productivity. For example, a study by Yuwanti et al (2021) showed that unhealthy eating patterns are associated with decreased work productivity, more sick days, and higher health care costs. When companies fail to provide healthy food options, the impact is not only seen in the long-term health of employees, but can also reduce their daily performance. Additionally, a study by Kurniawidjadja et al (2021) showed that companies that implemented comprehensive health policies, including the provision of healthy food and nutrition education programs, experienced increased productivity and decreased absenteeism. These policies

have been shown to help employees maintain better health, which in turn increases motivation and work efficiency.

Based on these findings, it is important for companies to introduce policies that support the provision of healthy food in the workplace, such as providing a healthy canteen, selecting food vendors that offer nutritious options, and involving employees in nutrition education programs. Policies that support healthy lifestyles will not only improve employee well-being but also have a positive impact on their productivity and job satisfaction. In addition, integrating nutrition education into corporate well-being programs can strengthen employee awareness of the importance of a balanced diet and its impact on health. Workplace-based interventions that include healthy eating policies can reduce the risk of chronic disease among employees and lead to better overall health outcomes.

CONCLUSION

Sedentary work patterns in office environments, characterized by long sitting periods and minimal physical activity, contribute significantly to the risk of metabolic disorders such as diabetes. A survey in Medan showed that the majority of workers sit for more than 7 hours per day without interruption, with very limited facilities to support physical activity. A work culture that normalizes continuous sitting is considered an indicator of productivity, despite having a negative impact on health. The lack of policies that encourage movement and physical activity adds to the burden on workers' health. In addition, work pressure and irregular schedules cause disrupted eating patterns, such as skipping breakfast and consuming foods high in sugar. The absence of company policies that support balanced nutrition, such as healthy canteens and nutrition education, worsens this situation. Workers often rely on fast food due to limited time and choices. This condition increases the risk of prediabetes, obesity, and other metabolic disorders. Even so, there is increasing awareness among workers of the importance of healthy lifestyle changes. Many want changes in office policies to support physical well-being. Therefore, integrated interventions from companies, ranging from supporting facilities to ongoing education, are crucial to creating a healthy and productive work environment.

BIBLIOGRAPHY

- Amelia, R., Mardiyah, S., Wijayanti, W., & Kurniawan, S. S. (2025). Hubungan Pola Makan, Tingkat Stres, dan Durasi Tidur dengan Status Gizi pada Mahasiswa Tingkat Akhir: The Relationship between Diet, Stress Level, and Sleep Duration with Nutritional Status in Final-Year University Students. *JURNAL GIZI DAN KESEHATAN*, 17(1), 67-77.
- Andriyani, A., Baroroh Barir, S. K. M., Gz, M., Musiana, S. H. I., MM, M. K., Irianto, S. K. M., ... & Gz, M. (2024). Kebijakan Dan Manajemen Program Gizi Masyarakat. *Cendikia mulia mandiri*.

- Arbin, K., Frostenson, M., Helin, S., & Borglund, T. (2021). Explaining workers' resistance against a health and safety programme: An understanding based on hierarchical and social accountability. *Safety science*, 136, 105131.
- Ardiani, H. E., Permatasari, T. A. E., & Sugiatmi, S. (2021). Obesitas, pola diet, dan aktifitas fisik dalam penanganan diabetes melitus pada masa pandemi COVID-19. *Muhammadiyah Journal of Nutrition and Food Science (MJNF)*, 2(1), 1-12.
- Aziz, M., Alfian, R. M., & Alverina, C. (2024). Memahami Kesehatan Komunitas: Mengupas Determinan Kesehatan Untuk Mewujudkan Masa Depan Yang Sehat. Penerbit NEM.
- Bailey, D. P., Hewson, D. J., Champion, R. B., & Sayegh, S. M. (2019). Sitting time and risk of cardiovascular disease and diabetes: a systematic review and meta-analysis. *American journal of preventive medicine*, 57(3), 408-416.
- Bintang, R., Imsar, I., & Syarbaini, A. M. B. (2024). Analisis Efektivitas Kebijakan Work Life Balance Pada PT. Pelabuhan Indonesia Regional I Medan. *Jambura Economic Education Journal*, 6(1), 123-141.
- Ghodeswar, G. K., Dube, A., Khobragade, D., & Dube, A. H. (2023). Impact of lifestyle modifications on cardiovascular health: a narrative review. *Cureus*, 15(7).
- Indra Panjaitan, P. (2024). Penerapan Edukasi Kepatuhan Diet Terhadap Kestabilan Kadar Gula Darah Pada Pasien Diabetes Melitus Dengan Peningkatan Gula Darah Di Puskesmas Alak Kota Kupang (Doctoral dissertation, Poltekkes Kemenkes Kupang).
- Kurniawidjadja, L. M., Ok, S., Martomulyono, S., Susilowati, I. H., Km, S., & Kkk, M. (2021). Teori dan aplikasi promosi kesehatan di tempat kerja meningkatkan produktivitas. Universitas Indonesia Publishing.
- Listyandini, R., Pertiwi, F. D., & Riana, D. P. (2020). Asupan Makan, Stress, dan Aktivitas Fisik Dengan Sindrom Metabolik Pada Pekerja di Jakarta. *AN-Nur: Jurnal Kajian dan Pengembangan Kesehatan Masyarakat*, 1(1), 19-32.
- Maidartati, M., Hayati, S., Anggraeni, D. E., Irawan, E., Damayanti, A., & Silviani, D. A. R. (2022). Gambaran sedentary lifestyle pada remaja di SMA Kota Bandung. *Jurnal Keperawatan BSI*, 10(2), 250-265.
- Moggetti, P., Balducci, S., Guidetti, L., Mazzuca, P., Rossi, E., & Schena, F. (2020). Walking for subjects with type 2 diabetes: a systematic review and joint AMD/SID/SISMES evidence-based practical guideline. *Nutrition, Metabolism and Cardiovascular Diseases*, 30(11), 1882-1898.
- Mubin, M. R. (2025). Hubungan Pola Makan Dengan Status Gizi Pada Remaja (Di Pondok Pesantren Anwarul Huda Kabupaten Jombang) (Doctoral dissertation, ITSkes ICMe Jombang).
- Ojo, O. A., Ibrahim, H. S., Rotimi, D. E., Ogunlakin, A. D., & Ojo, A. B. (2023). Diabetes mellitus: From molecular mechanism to pathophysiology and pharmacology. *Medicine in Novel Technology and Devices*, 19, 100247.
- Pandangan, R. R. (2020). IDENTIFIKASI FAKTOR PENCETUS TERJADINYA HIPERGLIKEMIA BERULANG PADA PASIEN DIABETES MELLITUS

TIPE 2 DI RS. TINGKAT III BRAWIJAYA SURABAYA (Doctoral dissertation, Universitas Muhammadiyah Surabaya).

- Prakoso, A. S., & Churiyah, M. (2023). Strategi Peningkatan Keseimbangan Kehidupan Kerja Untuk Kesejahteraan Karyawan UMKM CV Jati Furniture Kemirahan Malang. *Jurnal Manajemen Riset Inovasi*, 1(2), 86-102.
- Quan, M., Xun, P., Wu, H., Wang, J., Cheng, W., Cao, M., ... & Chen, P. (2021). Effects of interrupting prolonged sitting on postprandial glycemia and insulin responses: A network meta-analysis. *Journal of Sport and Health Science*, 10(4), 419-429.
- Widiastuti, W., Zulkarnaini, A., & Mahatma, G. (2024). Review Artikel: Pengaruh Pola Asupan Makanan Terhadap Resiko Penyakit Diabetes. *Journal of Public Health Science*, 1(2), 108-125.
- Yarmmani, Y., Anindita, S. M., & Hasanati, M. (2021, June). Employee Assistance Programme (EAP): Layanan Organisasi dalam Mengurangi Stres Karyawan pada Masa Pandemi COVID-19. In *UNUSIA CONFERENCE* (Vol. 1, No. 1, pp. 55-76).
- Yuwanti, Y., Mulyaningrum, F. M., & Susanti, M. M. (2021). Faktor-faktor yang mempengaruhi stunting pada balita di Kabupaten Grobogan. *Jurnal Keperawatan Dan Kesehatan Masyarakat Cendekia Utama*, 10(1), 74-84..