



The role of nutritional status in mediating the relationship between dietary patterns and work productivity in workers at factory X

Nadya Meilinda TS¹, Sapja Anantanyu², and Tri Rejeki Andayani³

¹Master Program of Nutrition Science, School of Postgraduate, Universitas Sebelas Maret;
Jl. Ir. Sutami No.36, Surakarta 57126

²Department of Development and Community Empowerment Extension, Faculty of Agriculture, Universitas Sebelas Maret; Jl. Ir. Sutami No.36, Surakarta 57126

³Department of Psychology, Faculty of Psychology, Universitas Sebelas Maret; Jl. Ir. Sutami No.36, Surakarta 57126

*Correspondence: meilindanadia1@gmail.com

ABSTRAK

Latar Belakang: Salah satu masalah yang sering dialami oleh pekerja pabrik adalah penurunan produktivitas kerja yang disebabkan oleh pola makan yang kurang maupun status gizi yang buruk atau berlebih. Penurunan produktivitas kerja akan berdampak buruk bagi perusahaan.

Tujuan: Penelitian ini bertujuan untuk menganalisis peran status gizi sebagai mediator antara pola makan dan produktivitas kerja pada pekerja di Pabrik X.

Metode: Penelitian ini menggunakan jenis penelitian kuantitatif dengan rancangan Cross Sectional. Populasi penelitian ini sebanyak 206 pekerja pabrik. Sampel pada penelitian ini yaitu 136 peserta dengan Teknik Simple Random Sampling. Penelitian ini dilakukan bulan Agustus 2022 di salah satu Pabrik Daerah Palur, Karanganyar. Analisis data pada penelitian ini menggunakan Path Analysis.

Hasil: Hasil penelitian ada hubungan secara langsung antara pola makan dengan produktivitas kerja ($\beta=0.332;p=0.000$), antara status gizi dengan produktivitas kerja ($\beta=-0.284;p=0.001$) pola makan dengan status gizi ($\beta=0.421;p=0.000$), maupun peran status gizi dalam hubungan tidak langsung antara pola makan dengan produktivitas kerja ($\beta=-0.119;p=0.006$).

Kesimpulan: Status gizi terbukti berperan sebagai mediator dalam hubungan pola makan dengan produktivitas kerja.

KATA KUNCI: pola makan; produktivitas kerja; status gizi



ABSTRACT

Background: One of the problems that is often experienced by workers is a decrease in work productivity caused by an inadequate dietary pattern or poor or excessive status. A decrease in work productivity will have a negative impact on the company.

Objectives: This study aimed to analyze the role of nutritional status as a mediator between dietary patterns and work productivity in workers at Factory X.

Methods: This study used a type of quantitative research with a cross-sectional design. The population of this study was 206 factory workers. The samples in this study were 136 participants using a Simple Random Sampling Technique. This research was conducted in August 2022 at one of the Palur Regional Factories, Karanganyar. Data analysis in this study used Path Analysis.

Results: The results showed that there was a direct relationship between dietary pattern and work productivity ($\beta=0.332;p=0.000$), between nutritional status and work productivity ($\beta=-0.284;p=0.001$), dietary pattern and nutritional status ($\beta=0.421;p=0.000$), and the role of nutritional status in the indirect relationship between dietary pattern and work productivity ($\beta=0.119;p=0.006$).

Conclusions: Nutritional status is proven as a mediator between dietary patterns and work productivity.

KEYWORD: dietary patterns; nutritional status; work productivity

Article info:

Article submitted on July 28, 2023

Articles revised on November 11, 2023

Articles received on December 23, 2023

INTRODUCTION

Factory workers are a group that is vulnerable to work problems. One of the problems often experienced by factory workers is work productivity (1). According to The World Bank (2021), world work productivity growth reached 2% in 2018 (2). According to the APO (Asian Productivity Organization) (2020), the total work productivity of ASEAN in 2018 was 1% (3). The Covid-19 pandemic greatly impacted worker productivity in Indonesia due to reductions in working hours, layoffs, quarantine, and massive business closures (4). The percentage of work productivity in Indonesia decreased by around 3.55% in 2020 compared to 2019 (5). According to Ningrum and Muniroh (2017), in research conducted on 39 workers, as many as 21.1% or 8 workers experienced problems with low

productivity (6). The results of a preliminary study by researchers at a textile factory producing napkin products in December 2021 showed that the productivity level of 185 workers, amounting to 38% with 71 people, was classified as low (7).

One factor that affects factory workers' work productivity is dietary patterns (8). Dietary patterns affect nutritional status and impacts factory workers' productivity (9)(10). Good factory worker's dietary patterns will affect the quality and quantity of food and drink consumed, impacting nutritional status (11). Fulfillment of good nutrition based on the type of food ingredients, frequency, and amount of food consumed by factory workers will form a balance of nutrients in the body (12). The balance of quality and quantity of food and drink consumed impacts nutritional status (11).

Work productivity is directly affected by the nutritional status of workers. Research conducted

by Shafitra et al., (2020) showed a relationship between nutritional status, dietary patterns, and physical activity on work productivity at PT. Gatra in 2019 (10). Suppose the body gets adequate balanced nutrition from food. In that case, the nutritional status of factory workers will be good and optimal so that workability, health, and physical growth will be at a fairly high level. Conversely, if the body experiences a deficiency of one or more of the nutrients needed, the nutritional status of workers becomes less. (13). The body's condition when it lacks nutrients, especially energy, will result in energy reserves in the muscles being used continuously (14). If it lasts for a long time, lack of energy intake will result in weight loss and poor nutritional status (15). This situation, if sustained, can result in a decrease in work productivity (16).

Previous research only focused on the direct relationship between dietary patterns and work productivity. In contrast, this study focused on the relationship between dietary patterns and work productivity with nutritional status as a mediator variable. In addition, no research examines the relationship between dietary patterns and nutritional status in factory workers. Based on this description, this study aimed to analyze the relationship between dietary patterns, nutritional status, and work productivity of workers at Factory X.

MATERIALS AND METHODS

The study design, time of research and participants characteristic

This study used quantitative research with a Cross-sectional design. Subjects were factory workers in one of the Palur Regional Factories, Karanganyar Regency, who have passed the inclusion and exclusion criteria. This research was conducted in August 2022. Inclusion criteria in this study were workers of productive age aged 18-64 years and having work targets. Exclusion criteria in this study were workers who were pregnant and workers who refused to be respondents in the study. The research was conducted after the approved by the Faculty of Medicine Universitas Sebelas Maret with register number 85/UN27.06.11/KEP/EC/2022.

Sampling procedures & sampling size

The population in the study was 206 people. The sample selection was done by selecting workers with work targets and who were of productive age. 185 people were found. After that, the Simple Random Sampling technique was carried out. Subjects obtained based on inclusion and exclusion criteria were 136 workers in one of the Palur Regional Factories, Karanganyar.

The sample was calculated based on the following formula (17) :

$$n=N/(1+Ne^2)$$

$$n=206/(1+ (206 (0.05)^2)$$

$$n=206/(1+(206 \times 0.0025)$$

$$n=206/(1.515)$$

$$n=135.9 = 136$$

Notes:

N = Population Size/Total Population

n = Number of Samples

e = Error tolerance limit of 5% or 0.05

Measuring instrument

Dietary patterns were measured using the SQ-FFQ Form (Semi-Quantitative Food Frequency Questionnaire). This questionnaire was used to determine the frequency, type of food ingredients, and amount of food consumed containing 156 items. Dietary patterns are said to be more if it is >100% RDA, 80-100% RDA is enough, and less if <80% (18).

Nutritional status was calculated using a scale for weight and a microtoise for height. After that, it was followed by using the BMI (Body Mass Index) formula: body weight (kg) divided by height (m)² (11). The classification of nutritional status is said to be thin <18.5 kg/m², normal> 18.5-25 kg/m², and mild fat> 25 kg/m² (11).

Measuring work productivity can be done by looking at the results of the product produced/working hours (in a unit of workers), and this is compared with the target/working hours (in a unit of workers). The results of productivity if the product produced is less than the specified working hours, then productivity is low. Conversely, if the product produced is the same as the work target/working hours, the productivity is moderate, and if it is more than the target, it is high productivity (19).

Data analysis

The data analysis technique in this study used path analysis using STATA 14 with significance level of 5%, which is useful for testing the correctness of structural models. Path analysis is a special form of linear regression method. This technique is used to determine the magnitude of

the influence of a variable, either directly or indirectly, one of which is through intervening variables or mediators. The path coefficient itself has no units, so it can be concluded that the greater the path coefficient, the greater the influence given to this variable.

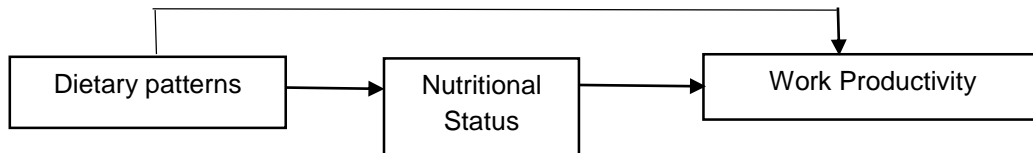


Figure 1. Graphic illustration of the relationship between dietary patterns, nutritional status, and work productivity

RESULTS AND DISCUSSIONS

Table 1. Characteristics of Respondents

Characteristics of Respondents	Total Number (n)	Percentage (%)
Age		
Late teens (17-25 years)	25	18
Early adulthood (26-35 years)	22	16
Late adulthood (36-45 years)	41	30
Early Elderly (46-55 years)	41	30
Late Elderly (56-64 years)	7	5
Gender		
Female	111	82
Male	25	18
Level of education		
No school	1	1
Public Primary School/Islamic Elementary School/ equivalent	25	18
Junior High School/Islamic Junior High School/equivalent	38	28
Senior High School/Islamic Senior High School/Vocational School/equivalent	70	51
D3	2	1
Years of service		
New (1-5 years)	41	30
Moderate (6-10 years)	21	15
Old (>10 years)	74	54

Characteristics of Respondents	Total Number (n)	Percentage (%)
Nutritional status		
Thin	23	17
Fat	48	35
Normal	65	48
Dietary patterns		
Less (< 80% RDA)	17	13
Enough (80-110% RDA)	52	38
More (>110% RDA)	67	49
Work productivity		
Low (< target)	55	40
Moderate (= target)	64	47
High (> target)	17	13

Table 1 shows the frequency distribution of age, gender, education level, years of service, nutritional status, frequency of meals, types of foodstuffs, amount of food, overall eating patterns, and work productivity. Most are in late adulthood (30%) and early elderly (30%). The highest gender is female (82%). The highest level of education is Senior High School/Islamic Senior High School/Vocational School/equivalent (51%). The highest working period is >10 years (54%). The highest nutritional status is in the fat category (35%). The highest eating pattern is in more category (49%). The highest productivity is medium (47%).

This test used path analysis with the Stata 14 application there is a direct effect between dietary patterns affects to work productivity, nutritional status affects to work productivity and dietary patterns affects to

nutritional status and there is an indirect effect between dietary patterns and work productivity through nutritional status mediators. This can be seen in **Table 2**. This causes a condition of reduced muscle glycogen which can cause fatigue and will be directly proportional to the decrease in muscle glycogen levels. Fatigue is often experienced by someone after doing activities. Tiredness, drowsiness, boredom, and thirst usually accompany symptoms of fatigue (8). Work fatigue is one of the common problems often encountered in the workforce. Work fatigue can affect occupational health and reduce work productivity (21).

Dietary patterns will affect the balance of nutrients. Balanced nutrition will form optimal nutritional adequacy so that it will affect a person's nutritional status (22).

Table 2. Direct and Indirect Effect Between Variables

Direct Effect between Variables	β	p-value
Dietary patterns → Work Productivity	0.332	0.000
Nutritional Status → Work Productivity	-0.284	0.001
Dietary patterns → Nutritional Status	0.421	0.000
Indirect Effect Between Variables		
Dietary patterns → Nutritional Status → Work Productivity	-0.119	0.006

A person's nutritional status will affect health status and nutritional status. Health status and nutritional state will affect the body's capacity and endurance, so it impacts work productivity (10).

Nutritional status affects work productivity with a p-value of 0.001 ($p < 0.05$) and a beta coefficient of -0.284. Nutritional status has a negative relationship with work productivity, where the value of nutritional status increases, or the fatter a person is, the productivity decreases. This is in accordance with research (Maghfiroh, 2019), undernutrition or excess nutritional status has less physical ability and lacks enthusiasm, is slow, can reduce work productivity (23). Poor nutrition reflects a lack of intake of nutrients in the body so it produces less energy production. As a result, the body becomes lethargic, less enthusiastic about carrying out various activities from such a condition of the body, which will cause many losses (sensitive to various diseases), laziness to work, which will ultimately reduce work productivity (10). Meanwhile, a worker who has excessive nutritional intake can cause the worker to be unable to achieve good work productivity. This is related to nutritional status: the balance between the food that enters the body (nutrient input) and the body's needs (nutrient output) for these nutrients (24)(25). Excessive energy intake in the long term can cause a person to have more nutritional status or be overweight to obesity. A worker with more nutritional status can cause his work productivity to decrease, as can be seen by slow movements, less agile, and easily tired (26). Workers with good nutritional conditions will also have better work capacity and endurance because the nutrients from their food are balanced (27). According to Ravika et al., (2022), workers with good nutritional conditions will also have better work capacity and body resistance because the nutrients from their food are balanced (28). Workers' health must also be considered because it can affect physical fitness and mental ability to work more actively, productively, and thoroughly.

Dietary patterns have a direct effect on nutritional status with a p-value of 0.000 ($p < 0.05$) and a beta coefficient of 0.421. According to the research results by Katmawanti et al., (2019), dietary patterns are the most important behavior that can affect nutritional status (22). This is because the quantity and quality of food and beverages consumed are in accordance with balanced nutrition guidelines. The balance of food intake will affect the level of nutritional adequacy in the body (29). Based on the general message of balanced nutrition, the quality of nutrition and the completeness of nutrients are influenced by the variety of food consumed. The more complete the food consumed the easier it is to meet nutritional needs (30)(31). When nutrients from food are consumed in full, it will be easier for the body to obtain various other useful substances. Adequate nutrition will have a good impact on nutritional status. This situation is called nutritional status (32).

Nutritional status as a mediator of the indirect effect between dietary patterns and work productivity has a p-value of 0.006 ($p < 0.05$) with a beta coefficient of -0.119. In accordance with the research of Katmawanti et al., (2019), dietary patterns are related to nutritional status. Good dietary patterns will improve a person's nutritional status (22). Meanwhile, according to research by Fransiske et al., (2022), nutritional status correlates with work productivity, where normal nutritional status will increase worker productivity (33). Dietary patterns show how to meet a person's nutritional needs, manifested in the form of consumption of types of food, amount of food, and frequency of eating (34). Good dietary patterns should be in conjunction with a balanced nutritional pattern so that the adequacy of the nutrients needed by the body is met through daily food. Foodstuffs that are sources of balanced nutrition are grouped: sources of energy, builder substances, and regulatory substances. Foodstuffs are staple foods, animal and vegetable protein side dishes, vegetables, and fruits (35).

Adequacy of nutrients will have an impact on the nutritional status of a worker (6). This is in line with field research, where workers with sufficient energy consumption, good frequency, and complex food ingredients have good nutritional status and good productivity. This will impact the work performed, where workers who have good nutritional status on average carry out the tasks assigned according to the target. According to Farikha & Ardyanto's research (2017), obese workers experience a decrease in quantity in achieving production targets (36). Meanwhile, according to Shafitra et al., (2020), workers who experience malnutrition are 5x slower to work than those with normal nutritional status (10). The nutritional status will describe the good or bad nutritional status of a person, whether the person is sick or healthy so that it impacts the capacity and resilience of the worker's body. In addition, nutritional status describes the level of food consumption, especially energy intake (19). Deficiency or excess of energy in the body will affect the level of energy reserves in cells. Improper consumption of food for a certain period will have a negative effect on the nutritional status of workers. Workers who eat less food with poor nutritional status will become sluggish, inactive, have work accidents, fatigue, or absence from work (37). This condition will lead to physical fitness and mental power to work more actively, productively, and thoroughly. Unproductive workers will impact the daily production target, so that there is a decrease in work productivity. This can reduce the target owned by a company (26).

CONCLUSIONS AND RECOMMENDATIONS

This study concludes a direct relationship between dietary patterns and nutritional status with work productivity and dietary patterns with nutritional status. There is an indirect relationship between dietary patterns and work productivity, with nutritional status as a mediator. The suggestion from this study is that it is necessary to conduct further research to find out other factors that affect work

productivity with SEM (Structural Equation Model) analysis because this research does not compile direct or indirect relationships with other variables that affect work productivity besides dietary patterns and nutritional status.

REFERENCES

1. Indrawati A, Pradhanawati A. Peran Ganda dan Fleksibilitas Jam Kerja terhadap Produktivitas Kerja Buruh Perempuan pada UKM Konveksi Batik Semarang 16. *J Phys A Math Theor* [Internet]. 2011;44(8):51. Available from: <https://ejournal3.undip.ac.id/index.php/jiab/article/view/24998>
2. The World Bank. *Global Productivity: Trends, Drivers, and Policies*. In: *Global Productivity: Trends, Drivers, and Policies*. Washington DC; 2021.
3. APO. APO (Asian Productivity Organization) *Productivity Data Book 2020* [Internet]. Tokyo: Keio University Press Inc; 2020. Available from: <https://www.apo-tokyo.org/publications/ebooks/2020-apo-productivity-databook/>
4. ILO. *Pemantauan ILO: COVID-19 dan Dunia Kerja (Estimasi dan Analisis Terbaru)*. *Int Labour Organ* [Internet]. 2020;4:1–28. Available from: https://www.ilo.org/jakarta/whatwedo/publications/WCMS_746982/lang-en/index.htm
5. Kemnaker RI. *Peraturan Menteri Ketenagakerjaan Republik Indonesia Nomor 10 Tahun 2021 Tentang Rencana Strategis Kementerian Ketenagakerjaan Tahun 2020-2024*. In Jakarta: Kementerian Ketenagakerjaan Republik Indonesia; 2021. p. 1–70. Available from: <http://journal.unilak.ac.id/index.php/JIEB/article/view/3845%0Ahttp://dspace.uc.ac.id/handle/123456789/1288>
6. Ningrum D, Muniroh L. *The Relationship Between Consumption Patterns and Anemia Status With Productivity in Female Workers in the Production Part of Cv Surya Nedika Isabella*. *Sci J Nurs* [Internet]. 2017;3(1):<http://journal.stikespemkabjombang.ac.id/index.php>. Available from: <http://journal.stikespemkabjombang.ac.id/index.php/jikep/article/view/5>
7. Meilinda N. *Data Primer (Studi Pendahuluan)*. Karanganyar; 2021.

8. Andreyani NLPM, Sutajaya IM, Dewi NPSR. Pola Konsumsi Yang Tidak Teratur Mengakibatkan Kelelahan Dini Dan Peningkatan Beban Kerja Penenun Di Desa Gelgel Klungkung Bali. *J Pendidik Biol Undiksha* [Internet]. 2019;6(3):112–22. Available from: <https://doi.org/10.23887/jjpb.v6i3.21978>
9. Din ZU, Khan Z, Haq ZU, Iqbal M, Iqbal Z, Khan I, et al. Dietary Patterns, Nutritional Status and Agricultural Work Performance of Small-Scale Farmers in North West Pakistan. *Prog Nutr*. 2019;21(1):359–69.
10. Shafitra M, Permatasari P, Agustina A, Ery M. Hubungan Status Gizi, Pola Makan dan Aktivitas Fisik dengan Produktivitas Kerja Pada Pekerja di PT Gatra Tahun 2019. *Media Kesehat Masy Indones*. 2020;19(1):50–6.
11. Kemenkes. Peraturan Menteri Kesehatan Republik Indonesia Nomor 41 Tahun 2014. In Jakarta: Kementrian Kesehatan RI; 2014. Available from: <https://peraturan.bpk.go.id/Home/Details/119080/permenkes-no-41-tahun-2014>
12. Triana E, Ekawati, Wahyuni I. Hubungan Status Gizi, Lama Tidur, Masa Kerja Dan Beban Kerja Dengan Kelelahan Kerja Pada Mekanik Di Pt X Plant Jakarta. *J Kesehat Masy* [Internet]. 2017;5(5):146–55. Available from: <http://ejournal3.undip.ac.id/index.php/jkm%0AHUBUNGAN>
13. Maulana I, Mulyasari I, Pontang GS. The Correlation Between Workload and Energy Intake with Body Mass Index on Males Workers at CV. Karoseri Laksana. *JGK*. 2019;11(26):105–14.
14. Utami HD, Kamsiah K, Siregar A. Hubungan Pola Makan, Tingkat Kecukupan Energi, dan Protein dengan Status Gizi pada Remaja. *J Kesehat* [Internet]. 2020;11(2):279. Available from: <https://ejurnal.poltekkes-tjk.ac.id/index.php/JK/article/view/2051>
15. Ramadhanti AA. Status Gizi dan Kelelahan terhadap Produktivitas Kerja. *J Ilm Kesehat Sandi Husada*. 2020;11(1):213–8.
16. Himaya, Wirjatmadi RB. Hubungan antara Kecukupan Energi dan Status Gizi dengan Produktivitas Kerja (PT. Timur Megah Steel Gresik Tahun 2019). *Amerta Nutr*. 2019;3(4):269.
17. Slovin MJ. *Sampling*. New York: Simon and Schuster Inc; 1960.
18. Afrilia DA, Festilia S. Hubungan Pola Makan Dan Aktifitas Fisik Terhadap Status Gizi Di Siswa Smp Al-Azhar Pontianak. *Pontianak Nutr J*. 2018;1(1):10.
19. Purbaya H, Paskarini I. Correlation of Nutritional Status and Subjective Fatigue with the Productivity of Labourers. *Indones J Occup Saf Heal*. 2020;9(1):1.
20. Ghodang H. *Path Analysis (Analisis Jalur): Konsep & Praktik dalam Penelitian*. Cetakan 1. Medan: PT. Penerbit Mitra Grup; 2020.
21. Dewanti NP, Jingga NA, Wahyudiono YDA. The Relationship between Work Shifts and Work Environment with Nurse Fatigue in the Emergency Department. *Indones J Occup Saf Heal*. 2022;11(August):178–86.
22. Katmawanti S, Supriyadi S, Setyorini I. Hubungan Pola Makan Dan Aktivitas Fisik Dengan Status Gizi Siswi Kelas Vii Smp Negeri (Full Day School). *Prev Indones J Public Heal*. 2019;4(2):63.
23. Maghfiroh AL. Hubungan Asupan Energi Dan Tingkat Aktivitas Fisik Dengan Produktivitas Pada Tenaga Kerja Berstatus Gizi Lebih Bagian Packaging Di PT Timur Megah Steel. *Amerta Nutr*. 2019;3(4):315–21.
24. Supariasa IDN, Bakri B, Fajar I. *Penilaian Status Gizi*. 2nd ed. Jakarta: EGC; 2016.
25. Hawaij T, Khomsan A. Pemberdayaan Perempuan, Pola Konsumsi Pangan, dan Status Gizi Pekerja Bordir di Tasikmalaya. *J Gizi Diet*. 2022;1(2):81–7.
26. Stitaprajna A, Aslam M. Hubungan Status Gizi dan Asupan Energi dengan Produktivitas Kerja pada Pekerja PT . Propack Kreasi Mandiri Cikarang. *J Nutr*. 2020;22(2):86–93.
27. Sumigar JT, Kawatu P, Korompis G. Hubungan Antara Motivasi Kerja Dan Status Gizi Dengan Produktivitas Kerja Pada Pekerja Bagian Open Area Di Pt. Tropica Cocoprime Desa Lelema Kabupaten Minahasa Selatan. *Kesmas* [Internet]. 2020;9(4):195–201. Available from:

- <https://ejournal.unsrat.ac.id/index.php/kesmas/article/view/29886>
28. Ravika D, Ratnawati, Reski S. Hubungan Antara Pengetahuan Gizi dengan Penerapan 4 Pilar Gizi Seimbang pada Pekerja Di PT Multi Kusuma Cemerlang Kota Samarinda. *Indones Heal J*. 2022;1(2):44–54.
 29. Laminia D, Muniroh L. Hubungan Motivasi dan Masa Kerja dengan Produktivitas Pekerja Di Home Industry. *Indones J Occup Saf Heal*. 2018;7(2):241–8.
 30. Pratami TJ, Widajanti L, Aruben R. Hubungan Penerapan Prinsip Pedoman Gizi Seimbang Dengan Status Gizi Mahasiswa S1 Departemen Ilmu Gizi. *J Kesehat Masy*. 2016;4(4):561–70.
 31. Wahyuningsih N, Martaningsih ST, Supriyanto A. Makanan Sehat dan Bergizi bagi Tubuh. Cetakan 1. Yogyakarta: K-Media; 2021.
 32. Setyandari R, Margawati A. Hubungan asupan zat gizi dan aktivitas fisik dengan status gizi dan kadar hemoglobin pada pekerja perempuan. *J Nutr Coll*. 2017;6(1):61.
 33. Fransiske S, Nanang N, Fatmawati I. Status Gizi dan Faktor Lainnya dengan Produktivitas Kerja Tenaga Kerja Pada Masa Pandemi Covid-19. *J Ilm Kesehat Sandi Husada*. 2022;11(2):417–23.
 34. Nurwijayanti N. Pola Makan, Kebiasaan Sarapan dan Status Gizi Berhubungan Dengan Prestasi Belajar Siswa SMK di Kota Kediri. *Care J Ilm Ilmu Kesehat*. 2018;6(1):54.
 35. Almatsier S. Prinsip Dasar Ilmu Gizi. Jakarta: PT. Gramedia Pustaka Utama; 2013.
 36. Farikha RRP, Ardyanto D. Hubungan Status Gizi, Karakteristik Individu Dengan Produktivitas Pekerja Sorting Dan Packing. *Indones J Occup Saf Heal*. 2017;5(1):71.
 37. Grimani A, Aboagye E, Kwak L. The effectiveness of workplace nutrition and physical activity interventions in improving productivity, work performance and workability: A systematic review. *BMC Public Health*. 2019;19(1):1–12.