

Identification of Subjective Fatigue Accompanied by Hypertension in Female Workers Making Tiles in Indonesia: A Cross-Sectional Survey

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ABSTRACT

Introduction: The home industry has production process activities that are carried out manually. The release of the hormone adrenaline increases blood pressure through an increase in heart rate and arterial contractions, thereby accelerating the feeling of tiredness. Women's muscles and body size are relatively smaller due to hormonal influences. As a result, female workers risk getting tired faster than men. Fatigue can lead to a decrease in productivity, poor quality of work, negatively affect the safety of workers, and increase the risk of work accidents. It aims to analyze the risk factors for subjective fatigue in female workers who have hypertension.

Methods: This was a quantitative research with a cross-sectional design. The sampling technique used is the entire population of 278 female home-industry workers who have hypertension. The research location is at Karangasem Village Tile Making Home Industry Center, Wirosari District, Grobo-gan, Indonesia. The study lasted for three months. The data analysis including the Chi-square test was done using Statistical Package for Social Sciences version 21.

Results: Of a total of 278 female workers, most were married (85.3%), did not smoke (98.9%), did not consume alcohol (96%), worked longer than 8 hours (93.5%), worked more than five years (80.9%), heavy workload (80.6%). The risk factors related to subjective fatigue were alcohol consumption habits (0.019), exercise habits (0.000), body mass index (0.000), working period (0.000), and workload (0.000). Meanwhile, other risk factors were not related, age (0.315), marital status (0.744), education level (0.811), smoking habits (0.236), disease history (0.762), length of work (0.530), type of work (0.393) and work stress (0.451).

Conclusion: Risk factors that have a relationship with subjective fatigue are workload, BMI, alcohol consumption habits, exercise habits, and length of service.

Keywords: Fatigue, Female Workers, Home Industry, Hypertension.

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Introduction

The home industry has production process activities that are carried out manually. One of them is the tile industry made from clay. Making tiles is generally carried out through four main stages: material selection and mixing, molding,

drying with wind and sunlight, burning in furnaces, and smoothing tiles.¹ No machine helps the production process resulting in workers potentially experiencing work fatigue. The body's muscles will work optimally due to the lack of

supporting equipment. The release of the hormone adrenaline increases blood pressure through an increase in heart rate and arterial contractions, thereby accelerating the feeling of tiredness.²

Subjective fatigue is defined as the complaints that workers feel because of their work activities.³ Workers find it hard to start and finish work, causing prolonged working hours, leading to chronic fatigue syndrome symptoms.⁴ When experienced for a long period (more than one month), fatigue is associated with functional impairment and a decrease in the quality of life and is a common complaint.⁵

Fatigue over a long period will cause health risks, including anxiety, heart disease, diabetes, high blood pressure, gastrointestinal disorders, decreased fertility, and depression.⁶⁻⁸ In addition, fatigue can lead to a decrease in productivity, poor quality of work, negatively affect the safety of workers, and increase the risk of work accidents.^{9,10} Therefore, fatigue is a hazard in the workplace and can be attributed to the safety and health of workers.¹¹ This affects not only individual workers but also colleagues in one industry. Fatigue has many factors that are the originators ranging from individual characteristics, habits, and work aspects.^{12,13}

Female workers have a risk of getting tired faster than men, and this is because women's body and muscle sizes are relatively smaller due to hormonal influences.¹⁴ Female hormones cause a woman's physique to be smoother with somewhat smaller sizes, such as the composition of bone mass and smaller pipe bone sizes in women.¹¹ In addition, women usually experience exacerbations of other psychiatric symptoms (which are not associated with fatigue) during the luteal phase of the menstrual cycle and report a greater prevalence of fatigue than men. In addition, women who work have a double burden in their activities because, in addition to working outside the home, they also become housewives burdened by many household tasks.^{15,16} Therefore, a lot of research on fatigue has been carried out, both survey research and experiments. Still, no

one has revealed fatigue research on women with hypertension regarding individual characteristic factors, individual habits, and work factors.

Methods

This research is a type of quantitative research with a cross-sectional design. The respondents in this study were female workers who were hypertensive at the Karangasem Village Tile Making Home Industry Center, Wirosari District, Grobogan, Indonesia. Although the total of female workers was 398 respondents, workers were according to the inclusion criteria, namely having hypertension and not being pregnant; the number of samples in this study was 278. The sampling technique used is the entire population of female workers who have hypertension independent variables in the study were individual characteristics (age, gender, level of education, BMI (Body Mass Index), marital status, history of disease), personal habits (sports habits, smoking habits, and alcohol consumption habits), and work factors (length of work, length of employment, type of work, workload, work stress). Meanwhile, the dependent variable of this study is subjective fatigue.

The independent variables instrument uses questionnaires (age, gender, level of education, marital status, history of disease, length of service, length of work, type of work, sports habits, smoking habits, alcohol consumption habits, and work stress). BMI with weight measurement using Omron HN 289 Digital Scales and height using Stature Adult Height Meter MT-701. The pulse measures the workload. As well as subjective work fatigue bound variables using the Questionnaire Measuring Feelings of Work Fatigue.

Bivariate test analysis used chi-square and multivariate analysis using multiple logistic regression using the SPSS 21 computer program. This research has received ethical approval from the Ethics Committee for Health Research, Faculty of Public Health, University of Muhammadiyah Semarang, with certificate number 537/KEPK-FKM/UNIMUS/2021. The study lasted for three months from August to November, starting when

respondents had signed informed consent, after which a questionnaire interview was conducted, then BMI measurement and workload measurement ended.

Results

Workers who experience high blood pressure if the examination results are greater than 140/90 mmHg. The worker's mean blood pressure was 150.66/96 mmHg. The age of respondents was mostly less than 35 years old as much as 72.7% and those over 35 years old as much as 27.3%. The

majority of the respondents are married (85%), 12% are unmarried, and 2.5% are widowed. Most of the respondents have attained high school education (46%), while 41% did not graduate from elementary school. Only fifty-three percent of the respondents have a normal BMI. Meanwhile, those with a history of disease are 74.5% and those who have no history of disease are 25.5% (Table 1).

In the personal habits of the respondents, 99% did not smoke, 96% did not consume alcohol, and 77% participated in exercise and sports (Table 2).

Table 1. Individual Characteristics (n=278)

Variables	Category	f (%)
Age	≤ 35 years	76 (27.3)
	> 35 years	202 (72.7)
Marital status	Single	34 (12.2)
	Married	237 (85.3)
	Widower/Widow	7 (2.5)
Level of Education	Senior High School	128 (46.0)
	Junior High School	5 (1.8)
	Primary School	31 (11.2)
	No School	114 (41.0)
BMI (Body mass index)	Ideal	147 (52.9)
	Not ideal	131 (47.1)
Disease history	Absent	71 (25.5)
	Present	207 (74.5)

Table 2. Personal Habits (n=278)

Variables	Category	f (%)
Smoking habit	Do not smoke	275 (98.9)
	Smoke	3 (1.1)
Alcohol consumption habits	No consumption	267 (96.0)
	Consumption	11 (4.0)
Sports habits	Often	63 (22.7)
	Seldom	215 (77.3)

The length of work of respondents who were more than 8 hours was 93.5% and those who were less than 8 hours were 6.5%. The service period of more than 5 years is 80.9% and those less than 5 years are 19.1%.

The type of raw material processing work is 22.7%, the printing of tiles is 68.3% and the burning of tiles is 9%. There were 15.5% of respondents experienced work stress and had a heavy workload of 80.6% (Table 3).

Table 3. Work Factors (n=278)

Variables	Category	f (%)
Length of working	≤ 8 hour	18 (6.5)
	> 8 hour	260 (93.5)
Years of service	≤ 5 years	53 (19.1)
	> 5 years	225 (80.9)
Type of work	Raw material processing	63 (22.7)
	Tile printing	190 (68.3)
	Tile burning	25 (9.0)
Work stress	No stress	235 (84.5)
	Stress	43 (15.5)
Workload	Light workload	54 (19.4)
	Heavy workload	224 (80.6)

Table 4. Subjective Fatigue Factors (n=278)

Variables	Category	f (%)
Subjective Fatigue	No Fatigue	88 (31.7)
	Fatigue	190 (68.3)

A total of 68.3% of respondents experienced subjective fatigue (Table 4). In question number 3 as many as 35.5% of respondents rather often feel flustered moment facing something. Besides that,

as much as 41.7% of the whole respondent often feel their whole body tired (number 12). Nearly 26% of the respondents often feel tired before work already (number 15) (Table 5).

Table 5. Subjective Fatigue (n=278)

Questions	VO	O	SO	R	RO	NE
	f (%)	f (%)	f (%)	f (%)	f (%)	f (%)
Are you feel hard thinking?	14 (5.0)	12 (4.3)	29 (10.4)	78 (28.1)	71 (25.5)	74 (26.6)
Are you tired of talking?	0 (0.0)	0 (0.0)	9 (3.2)	53 (19.1)	77 (27.7)	139 (50.0)
Do you feel nervous about something?	9 (3.2)	20 (7.2)	98 (35.3)	54 (19.4)	52 (18.7)	45 (16.2)
Do you feel that you never concentrate on doing a job?	22 (7.9)	33 (11.9)	56 (20.1)	127 (45.7)	0 (0.0)	40 (14.4)
Do you feel like you don't care about something?	0 (0.0)	0 (0.0)	10 (3.6)	78 (28.1)	83 (29.9)	107 (38.5)
Do you feel inclined to forget something?	9 (3,2)	26 (9,4)	59 (21,2)	122 (43,9)	35 (12,6)	27 (9,7)
Do you feel less confident in your own abilities?	0 (0.0)	8 (2.9)	34 (12.2)	60 (21.6)	69 (24.8)	107 (38.5)
Do you feel disinterested in carrying out your work?	0 (0.0)	0 (0.0)	18 (6.5)	32 (11.5)	89 (32.0)	139 (50.0)
Do you feel reluctant to look other people's eyes?	14 (5)	0 (0.0)	21 (7.6)	22 (7.9)	91 (32.7)	130 (46.8)
Do you feel reluctant to work deftly?	0 (0.0)	22 (7.9)	21 (7.6)	48 (17.3)	58 (20.9)	129 (46.4)
Do you feel uneasy at work?	0 (0.0)	0 (0.0)	48 (17.3)	110 (39.6)	66 (23.7)	54 (19.4)

Questions	VO	O	SO	R	RO	NE
	f (%)	f (%)	f (%)	f (%)	f (%)	f (%)
Do you feel your whole body is tired?	69 (24.8)	116 (41.7)	35 (12.6)	35 (12.6)	9 (3.2)	14 (5.0)
Do you feel like you are acting sluggishly?	17 (6.1)	21 (7.6)	18 (6.5)	102 (36.7)	42 (15.1)	78 (28.1)
Do you feel like you can't walk anymore?	29 (10.4)	61 (21.9)	54 (19.4)	55 (19.8)	2 (0.7)	77 (27.7)
Do you feel tired before work?	59 (21.2)	72 (25.9)	22 (7.9)	107 (38.5)	10 (3.6)	8 (2.9)
Do you feel your thinking power is decreasing?	0 (0.0)	0 (0)	74 (26.6)	76 (27.3)	44 (15.8)	84 (30.2)
Do you feel anxious about something?	0 (0.0)	9 (3.2)	81 (29.1)	82 (29.5)	56 (20.1)	50 (18.0)

*Description: VO(Very Often), O(Often), SO(Somewhat Often), R(Rarely), RO(Rarely Once), NE(No Ever)

Table 6. Result of Bivariate (n=278)

Variables	Subjective Fatigue				Total		p
	No Fatigue		Fatigue		f	%	
	f	%	f	%			
Age							
≤ 35 years	28	36.8	48	63.2	76	100	0.319
> 35 years	60	29.7	142	70.3	202	100	
Marital status							
Single	11	32.4	23	67.6	34	100	0.744
Married	76	32.1	161	67.9	273	100	
Widower/Widow	1	14.3	6	85.7	7	100	
Level of Education							
Senior High School	43	33.6	85	66.4	128	100	0.811
Junior High School	2	40.0	3	60.0	5	100	
Primary School	10	32.2	21	67.7	31	100	
No School	33	28.9	81	71.1	114	100	
Smoking Habit							
Do not Smoke	86	31.3	189	68.7	275	100	0.236
Smoke	2	66.7	1	33.3	3	100	
Alcohol Consumption Habits							
No Consumption	88	33.0	179	67.0	267	100	0.019
Consumption	0	0.0	11	100.0	11	100	
Sports Habits							
Often	40	63.5	23	36.5	63	100	0.000
Seldom	48	22.3	167	77.7	215	100	
BMI (Body Mass Index)							
Ideal	87	59.2	60	40.8	147	100	0.000
Not ideal	1	0.8	130	99.2	131	100	
Disease History							
Haven't	24	33.8	47	66.2	71	100	0.762
Have	64	30.9	143	69.1	207	100	
Length of Working							
≤ 8 hour	4	22.2	14	77.8	18	100	0.530
> 8 hour	84	32.2	176	67.7	260	100	
Years of Service							
≤ 5 years	48	90.6	5	9.4	53	100	0.000
> 5 years	40	17.8	185	82.2	225	100	

Variables	Subjective Fatigue				Total		p
	No Fatigue		Fatigue		f	%	
	f	%	f	%			
Type of Work							
Raw Material Processing	16	25.4	47	74.6	63	100	0.393
Tile Printing	65	34.2	125	65.8	190	100	
Tile Burning	7	28.0	18	72.0	25	100	
Work Stress							
No stress	77	32.8	158	67.2	235	100	0.451
Stress	11	25.6	32	74.4	43	100	
Workload							
Light Workload	49	90.7	5	9.3	54	100	0.000
Heavy Workload	39	17.4	185	82.6	224	100	

Based on the results of the selection of variables that will be candidate models for the multivariate test are variables that have a p-value (<0.25), namely workload, sports habits, years of service, and BMI (Table 7). Then, the multivariate test was

continued on the candidate models to determine the most influential variables. The results of the multivariate test explained that the influential variables were workload, years of service, and BMI (Table 8).

Table 7. Sorting of Candidate Models for Multivariate Tests

Variables	β	p	Exp β (CI 95%)
Workload	2.761	0.000	15.816 (4.147-60.315)
Sports Habits	1.260	0.036	3.526 (1.083-11.484)
Years of Service	3.516	0.000	33.661(7.062-160.448)
Body Mass Index	5.625	0.000	277.189(15.528-4948.174)
Alcohol Consumption Habits	17.298	0.999	3.255 (-)

*Candidate models = P Value < 0,25

Table 8. Results of Multivariate

Variables	β	p	Exp β (CI 95%)
Workload	2.783	0.000	16.160 (4.230-61.740)
Sports Habits	1.283	0.033	3.607 (1.107-11.747)
Years of Service	3.525	0.000	33.964 (7.160-161.107)
Body Mass Index	5.710	0.000	301.912 (17.435-5228.096)

Discussion

In this study, we sought to identify subjective fatigue accompanied by hypertension in female workers in the tile-making household industry. In a previous study, it was explained that as many as 84.2% of female workers experienced fatigue compared to men.¹⁷ Severe hypertension can cause, nausea, vomiting, confusion, anxiety, chest pain, muscle tremors, and fatigue. Work burnout is still part of a common problem often found in the workforce. Fatigue was significantly related to

subjective reports of poor performance efficiency and presenteeism, which could increase the risk of accidents. Also, fatigue was associated with negative work-life balance and negative well-being outcomes in both daily lives and work life, including life satisfaction, job satisfaction, life stress, job stress, life happiness, life depression and anxiety, and job depression and anxiety.¹⁸

The chi-square test results in this study explained that there were five risk factors for subjective work loss in female workers with hypertension.

These risk factors include workload, BMI, alcohol consumption, exercise, and length of service. Female workers who had a heavy workload (82.6%) experienced fatigue. Excess workload levels can lead to work burnout.¹² This can arise due to a less ergonomic work environment, the monotony of work, inappropriate rest work time, and improper work tools and infrastructure with the anthropometry of its workers.^{19,20}

Workers with good nutritional status have a better recovery mechanism from work fatigue. This will reduce the cumulative effect of fatigue so that the fatigue that occurs will be lower. Good nutritional status has a positive effect on the work power of workers, while if the worker's calorie intake is not following the needs, the worker will experience fatigue faster.²¹ Although BMI can measure nutritional status, this study resulted in as many (99.2%) respondents not having an ideal weight, which causes workers who are not ideal in their weight to experience fatigue. This is in line with previous research conducted on office workers²²

Alcohol consumption risks subjective fatigue in workers. Previous research has proven that a person who consumes alcohol will feel tired quickly compared to those who do not consume alcohol.²³ The results obtained in this study explain that there is a relationship between the habit of alcohol consumption and subjective fatigue. Most of the respondents did not consume alcohol, but based on the results of tests that had been carried out, it was found that respondents who consumed alcohol (100%) experienced fatigue.

The period of work is a picture of the length of time a worker carries out the same work activities. Work activities that are carried out continuously will cause health complaints in workers, especially work that involves heavy physical stress. Physical stress within a certain period will lead to muscle fatigue. The longer the physical pressure accumulates, the more it accumulates, it will cause serious pain complaints in the limbs that receive pressure or complaints of a chronic nature.²⁴ A total of (82.2%) of respondents with a service life of more than five years in this study

experienced fatigue.

Exercise habits are related to work fatigue, this happens because a person who is not used to doing sports has a body condition that is not fit so s/he tends to get tired easily and get sick compared to people who are used to exercising.²⁵ The theory is in line with this study that as many as (77.7%) of respondents who rarely exercise experience fatigue. The results of the bivariate test explained that factors of age, marital status, level of education, smoking habits, disease history, length of work, type of work, and work stress were not risk factors in this study. Age is not related to the incidence of work fatigue in female workers who have hypertension, Marital status is one of the factors that are suspected to affect fatigue in workers. However, from the results of this study, it was explained that there was no relationship between marital status and subjective fatigue.

Previous studies conducted on nineteen smokers and six of them were women, resulted in a link between smoking and fatigue. This is caused by the nicotine contained in cigarettes causing an increase in heart rate, resulting in high blood pressure in the body.²⁶ This is not in line with this study because there is no relationship between smoking habits and subjective fatigue, the results state that workers who do not smoke experience subjective fatigue. This happens because there are still other stronger factors. Meanwhile, this is the opposite of the theory, which explains that smoking can reduce the capacity of the lungs so that the ability to consume oxygen decreases and as a result, the level of freshness also decreases, so it will be easy to experience fatigue.²⁷

This type of work is unrelated because most female workers are in the raw material processing work section whose activities are included in the light workload. The length of work is not related to subjective fatigue because most workers who work less than 8 hours feel tired. The work stress experienced by workers varies from worker to worker depending on the level of work and the problems faced by workers. The high prevalence of stress in the workplace is caused by several

factors, namely socio-demographic characteristics, work environment, and occupational factors.²⁸ In a previous research on female health workers as many as 45% experience anxiety while working.²⁹ In addition, strategies to support and recognize women's efforts must be put in place to reduce psychosocial constraints and ensure their continued employment.²⁸

Conclusions

Risk factors related to subjective fatigue are workload, BMI, alcohol consumption habits, exercise habits, and length of service. For example, female tile-making workers who have hypertension must always maintain their weight to match their height, not consume alcohol, and exercise regularly every day for 30 minutes.

References

- Ahmed MM, Abadir MF, Yousef A, El-Naggar KAM. The use of aluminum slag waste in the preparation of roof tiles. *Mater Res Express* [Internet]. 2021;8(12):125501. Available from: <http://dx.doi.org/10.1088/2053-1591/ac3bf7>.
- Aho AJ, Linna MI, Salmivalli M, Grönroos M, Möttönen M, Paul R. Role of adrenal hormones (adrenaline and DOCA) in experimental hypertension - A Histopathological Study. *Res Exp Med*. 1985;185(4):309–17. Available from : <https://doi.org/10.1007/bf01851956>
- Khalvati M, Ostadhashemi L, Saidi A, Ghorbani SM, Javadi SM, Sabzi Khoshnami M, et al. Multidimensional fatigue in Iranian social workers. *Iran Occupational Health*. 2020;17(1):1086-97. Available from: <https://ioh.iuums.ac.ir/article-1-3000-en.html>
- Kujawski S, Słomko J, Godlewska BR, Cudnoch-Jędrzejewska A, Murovska M, Newton JL, et al. Combination of whole body cryotherapy with static stretching exercises reduces fatigue and improves functioning of the autonomic nervous system in Chronic Fatigue Syndrome. *J Transl Med*. 2022;20(1):273. Available from: <https://doi.org/10.1186/s12967-022-03460-1>
- Gong G, Mao J. Health-Related Quality Of Life Among Chinese Patients With Rheumatoid Arthritis: The Predictive Roles Of Fatigue, Functional Disability, Self-Efficacy, And Social Support. *Nursing Research*. 2016.;65(1):55-67. Available from:
- Louati K, Berenbaum F. Fatigue In Chronic Inflammation - A Link To Pain Pathways. *Arthritis Research And Therapy*. Biomed Central Ltd. 2015;17:254. Available from: <https://arthritis-research.biomedcentral.com/articles/10.1186/s13075-015-0784-1>
- Lee G, Lee S, Brogmus G. Feasibility Of Wearable Heart Rate Sensing-Based Whole-Body Physical Fatigue Monitoring For Construction Workers. In: *Lecture Notes In Civil Engineering*. Springer Science And Business Media Deutschland GmbH. 2023 ; 251:301–12. Available from: https://doi.org/10.1007/978-981-19-1029-6_23
- Montag C, Rozgonjuk D, Riedl R, Sindermann C. On The Associations Between Videoconference Fatigue, Burnout And Depression Including Personality Associations. In: *Journal Of Affective Disorders Reports*. Elsevier B.V. 2022;10:1-5. Available from: <https://doi.org/10.1016/j.jadr.2022.100409>.
- Hamja A, Maalouf M, Hasle P. The Effect Of Lean On Occupational Health And Safety And Productivity In The Garment Industry—A Literature Review. *Prod Manuf Res*. 2019;1;7(1):316–34. Available from : <https://doi.org/10.1080/21693277.2019.1620652>
- Na W, Park S, Shivappa N, Hébert JR, Kim MK, Sohn C. Association between inflammatory potential of diet and bone mineral density in

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- Korean postmenopausal women: Data from fourth and fifth Korea national health and nutrition examination surveys. *Nutrients*. 2019;11(4):1–10. Available from: <https://doi.org/10.3390/nu11040885>
11. Lim SM, Chia SE. The Prevalence Of Fatigue And Associated Health And Safety Risk Factors Among Taxi Drivers In Singapore. *Singapore Med J*. 2015;56(2). Available from: <https://doi.org/10.11622/smedj.2014169>
 12. Jufri SA, Wahyuni A, Rahim MR. Factors Related To The Fatigue In Workers In The Cargo Unit Of Pt. Angkasapura Logistic Makassar. *Indian J Public Health Res Dev*. 2019 Jul;1;10(7):1115–9. Available from: <https://ijphrd.com/scripts/IJPHRD%20July%202021%209.pdf>
 13. Hamja A, Maalouf M, Hasle P. The Effect Of Lean On Occupational Health And Safety And Productivity In The Garment Industry—A Literature Review. *Prod Manuf Res*. 2019;1;7(1):316–34. Available from: <https://doi.org/10.1080/21693277.2019.1620652>
 14. Cunningham TR, Guerin RJ, Ferguson J, Cavalleri J. Work-Related Fatigue: A Hazard For Workers Experiencing Disproportionate Occupational Risks. *Am J Ind Med*. 2022;65(11):913-925. Available from: <https://doi.org/10.1002/ajim.23325>
 15. Pallavi LC, Souza UJD, Shivaprakash G. Assessment Of Musculoskeletal Strength And Levels Of Fatigue During Different Phases Of Menstrual Cycle In Young Adults. *Journal Of Clinical And Diagnostic Research*. 2017;11(2):1-3. Available from: <https://doi.org/10.7860/ICDR/2017/24316.9408>
 16. Manimekhalai K, Post S, Fellow D, Geetha S. Working Mothers, And Parenting: Health Status In India. *International Journal Of Applied Research*. 2019;5(9):168-173. Available from: www.allresearchjournal.com
 17. Prasetyo DB, Setyaningsih, Y, Suhartono S, Suroto S. (2023). Individual, Habits, and Work Environment Factors Associated with Blood Lactic Acid Levels in Roof Tile Manufacturing Workers. *Malaysian Journal of Public Health Medicine*, 2023;23(1):253–260. Available from: <https://mjphm.org/index.php/mjphm/article/view/1868>
 18. Hendra NMA, Nasri SM. Analysis Of Work Related And Non-Work Related Factors Relationship With Fatigue Among Stamping Workers In Automotive Industry. *Indian J Public Health Res Dev*. 2019;10(5):1504-10. Available from: [https://ijphrd.com/scripts/IJPHRD%20May%202021%209%20Full%20\(complete\)%20as%20on%2027.05.2019.pdf](https://ijphrd.com/scripts/IJPHRD%20May%202021%209%20Full%20(complete)%20as%20on%2027.05.2019.pdf)
 19. Aryal A, Ghahramani A, Becerik-Gerber B. Monitoring Fatigue In Construction Workers Using Physiological Measurements. *Autom Constr*. 2017;82: 154-165. Available from: <https://doi.org/10.1016/j.autcon.2017.03.003>
 20. Susihono W, Adiatmika IPG. The Effects Of Ergonomic Intervention On The Musculoskeletal Complaints And Fatigue Experienced By Workers In The Traditional Metal Casting Industry. *Heliyon*. 2021;7(2): 1-10. Available from: <https://doi.org/10.1016/j.heliyon.2021.e06171>
 21. Mehta RK, Cavuoto LA. Relationship Between BMI And Fatigability Is Task Dependent. *Hum Factors*. 2017;59(5): 722-33. Available from: <https://doi.org/10.1177/0018720817695194>
 22. Thorp AA, Kingwell BA, Owen N, Dunstan DW. Breaking Up Workplace Sitting Time With Intermittent Standing Bouts Improves Fatigue And Musculoskeletal Discomfort In Overweight/Obese Office Workers. *Occup Environ Med*. 2014;71(11): 765-71. Available from: <https://doi.org/10.1136/oemed-2014-102348>
 23. Van Drongelen A, Boot CRL, Hlobil H, Smid T, Van Der Beek AJ. Risk Factors For Fatigue Among Airline Pilots. *Int Arch Occup Environ Health*. 2017;90(1): 39-47. Available from: <https://doi.org/10.1007/s00420-016-1170-2>
 24. O'Mahony S, Ziadni M, Hoerger M, Levine S, Baron A, Gerhart J. Compassion Fatigue Among Palliative Care Clinicians: Findings On Personality Factors And Years Of Service. *American Journal Of Hospice And Palliative Medicine®*. 2017;28;35(2):343–7. Available from: <https://doi.org/10.1177/1049909117701695>
 25. Sveaas SH, Dagfinrud H, Berg IJ, Provan SA, Johansen MW, Pedersen E, Et Al. High-Intensity Exercise Improves Fatigue, Sleep, And Mood In Patients With Axial Spondyloarthritis: Secondary Analysis Of A Randomized Controlled Trial. *Phys Ther*. 2020;100(8):1323-32. Available from: <https://doi.org/10.1093/ptj/pzaa086>.
 26. Sofuoglu M, Waters AJ, Mooney M. Modafinil And Nicotine Interactions In Abstinent Smokers. *Hum Psychopharmacol*. 2008;23(1):21-30. Available from: <https://doi.org/10.1002/hup.878>.
 27. Fırat YE, Akçalı A, Geyik S, Çomruk G, Cengiz EK,

- Erten M. Relationship Of smoking with fatigue and depression in patients with multiple sclerosis. *Turk J Neurol.* 2021;27(3): 289-94. Available from: <https://dx.doi.org/10.4274/tnd.2021.24119>.
28. Mikponhoue, R., Hinson, A. V., Ismaël, A. D., Adjobimey, M., & Ayelo, P. A. (2022). Stress Prevalence and associated Factors among Bank Employees in Niamey, Niger. *International Journal of Occupational Safety and Health*, 12(2), 67–74. Available from: <https://doi.org/10.3126/ijosh.v12i2.39315>.
29. Lalrinzuala, H. Elizabeth. (2022). Risks and Safety of Women Healthcare Workers in Aizawl District, Mizoram, India. *International Journal of Occupational Safety and Health*, 12(2), 111–116. Available from: <https://doi.org/10.3126/ijosh.v12i2.39794>.