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ANALYSIS OF ERGONOMIC RISK FACTORS WITH THE INCIDENT OF FLANK PAIN IN BANK TELLERS

Dewi Zuniawati*, Poppy Farasari
STIKes Hutama Abdi Husada Tulungagung, Jl. Dr. Wahidin Sudiro Husodo No.1, Kedung Indah, Kedungwaru, Tulungagung, East Java 66224, Indonesia
*zuniawati1395@gmail.com

ABSTRACT
Office ergonomics is one of the potential causes of pelvic pain which can threaten office workers such as bank tellers. Ergonomic dangers when pelvic pain occurs can come from Work Load, Work Posture, Frequency, Length of Work. Pelvic pain is back pain caused by incorrect ergonomic positions. In this study, researchers wanted to reduce the ergonomic risks experienced by bank teller employees. By reducing ergonomic risks, the health and welfare of employees will improve and can increase work productivity, the company will also improve product quality in the form of services. This research aims to: Analyze ergonomic risk factors with the incidence of flank pain in bank tellers in the X district. Research method: this research uses quantitative descriptive surveys, the sample in this study uses a purposive sampling technique, totaling 30 bank tellers throughout the X District. This research was carried out on January 15 - March 5 2024. The data in this research was obtained by directly observing the results of a walk through survey made in the form of a checklist and analyzed in the form of photos, videos, with a caution zone measuring instrument, then the data that has been collected analyzed using univariate. Results from a walk through survey in the form of a checklist and caution zone assessment, the results of the independent variables are ergonomic risks: Work Load (73.6%), Work Posture (75.6%), frequency (38.1%) and Duration (69.4%) and the dependent variable is the incidence of flank pain (63.1%). Office ergonomics is important to pay attention to because it is one of the potential dangers in the incidence of flank pain, the most dominant factor influencing the incidence of flank pain is the ergonomics factor of incorrect working posture when sitting which will later threaten bank tellers.

Keywords: ergonomic factors; flank pain; frequency; work duration; work load; work posture

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INTRODUCTION

Occupational Safety and Health (K3) is all activities to guarantee and protect the safety and health of workers through efforts to prevent work accidents and work-related diseases (Arendi, 2015) Through the implementation of K3, it is hoped that a safe and healthy workplace will be created which includes the individuals of employees and customers. and visitors from a work location so that they can reduce or be free from work accidents and (PAK) work-related diseases (Kemenkes RI, 2015). According to the International Labor Organization (ILO) (2015) ergonomics is the application of human biological science with engineering knowledge to achieve a number of adjustments and feedback for workers, both women and men, in carrying out their work, the benefits of which can be measured in terms of efficiency, health and welfare (Alfina , 2016).

One of the keys to progress in the field of Occupational Safety and Health is improving the work environment. This requires managing various potential health hazards in the workplace,

both chemically, physically, biologically, psychologically and ergonomically. One example of an ergonomic hazard is flank pain (back pain) (Defriyan,2011). Flank pain is a feeling of discomfort in the area between the lower ribs and the pelvic bone. This pain can appear suddenly or gradually and get worse. Flank pain occurs when the pain teller sits in the wrong position (Fathoni,2009). Improving the work capacity of a bank teller requires promoting the health of workers so that they are more adequate and able to work safely, comfortably and productively (Arendi, 2016).

In efforts to implement occupational health, improving ergonomics is a preventive effort so that workers can work comfortably and avoid PAK (occupational diseases). PAK is a health condition caused by work and/or the work environment (Diana, 2015). Improve the environment by adjusting task demands to the physical and mental abilities of bank tellers and controlling ergonomic risk factors which will later lead to PAK flank pain originating from work (Zuniawati, 2023). Various examples, sitting position, hand tools, workload that ensure that bank tellers avoid awkward postures which can cause musculoskeletal disorders with flank pain. (Qureeballa,2018).

Data from the International Labor Organization (ILO) published in commemoration of World Work Safety Day in 2010 shows that in the world 270 million workers experienced work accidents, 160 million workers experienced occupational diseases, work accidents amounting to 1.25 trillion USD per year (Arendi, 2016). In Indonesia, based on survey results from the Indonesian Ministry of Health, the number of cases of occupational diseases in 2011-2014 decreased (in 2011 = 57,929, in 2012 = 60,322, in 2013 = 97,144, in 2014 = 40,694). Based on these data, there has been a decline in cases of occupational diseases in Indonesia, and the provinces with the highest number of cases of occupational diseases in 2011 were the provinces of Central Java, North Sulawesi and East Java, in 2012 were the provinces of North Sumatra, South Sumatra and West Java. , in 2013 it was the provinces of Banten, Gorontalo and Jambi, in 2014 it was the provinces of Bali, East Java and South Sulawesi. (Kemenkes RI, 2015). Based on data on occupational PAK cases from workers who often sit at risk of developing Flank Pain in East Java, the number is approximately 1,019 (Zuniawati, 2023) From this preliminary study, the researcher aims to conduct research on "Analysis of Ergonomic Risk Factors with the Incident of Flak Pain in Bank Tellers"

METHOD

The research design used by researchers is quantitative research. The population in this study were all bank tellers in the X Regency area, 30 bank teller employees. The sampling technique in this research was carried out using the purposive sampling method. This research uses quantitative descriptive surveys, the sample in this research uses a purposive sampling technique, totaling 30 bank tellers throughout the X Regency area. This research was carried out on January 15 - March 5 2024 in the X Regency area. The data in this research were obtained using Observe directly from the results of the walk through survey, made in the form of a checklist and analyzed in the form of photos, videos, using warning zone measuring instruments, then the data that has been collected is analyzed using univariate. Data that is processed and analyzed using certain techniques, namely using quantitative analysis techniques, through a computerized process.

Univariate analysis is carried out by looking at the frequency and percentage distribution of each category of independent variables (ergonomic factors: work posture, work load, work frequency, work duration,). Bivariate analysis aims to see the relationship between independent variables (ergonomic factors: work posture, work load, frequency, work

duration) and the dependent variable (incidence of flank pain) using the chi square test (chi square) statistics using significance limits. $\alpha > 0.05$ and the confidence level (confidence interval (CI) or 95%). With the condition that $p > \alpha$ ($p \geq 0.05$), the Ho decision is accepted, meaning there is no significant relationship between the independent variable and the dependent variable, and vice versa, if the p value $\leq \alpha$ ($p < 0.05$), then the Ho decision is rejected. This means that there is a relationship between the independent variable and the variable.

RESULTS

Data analysis techniques for one variable independently will be carried out to determine the frequency distribution of each variable, namely the ergonomic factor variable: work posture, workload, frequency, duration of work, flank pain incidence variables.Work Posture :Based on the results of research and data processing that has been carried out, work posture variables are categorized into 2 (two) which are at risk and not at risk.Workload :Based on the results and data processing that has been carried out, the workload variable is categorized into 2 (two), namely at risk and not at risk.Frequency of work:Based on the results of data research that has been carried out, the work frequency variable is categorized into 2 (two), namely risky and not risk.Working Duration :Based on the results of data research that has been carried out, the work duration variable is categorized into 2 (two), namely risky and not risk.Flaik Pain Incident :Based on the results of data research that has been carried out, the Flank Pain Incident variable is categorized into 2 (two), namely risky and not risk.

Table 1.
Variable Frequency Distribution According to Ergonomic Factors: Work Posture, Work Load, Frequency and Duration of Work, Incident of Flank Pain (n=30)

Variable	f	%
Work Posture		
Risk	22	75,6
No Risk	8	24,4
Workload		
Risk	13	73,6
No Risk	17	26,4
Frequency of Work		
Risk	9	18,1
No Risk	21	81,9
Duration of Work		
Risk	18	69,4
No Risk	12	30,6
Occurrence Of Flank Pain		
Risk	17	63,1
No Risk	13	36,9

DISCUSSION

Based on table 1 above, the frequency distribution results were obtained from 30 respondents, variables from 30 respondents were 22 (75.6%) respondents who carried out risky work postures and respondents who carried out less work postures were 8 (24.4%) respondents. Posture refers to a body posture that is perceived to be either supported by muscle activity or as a result of coordinated actions performed by a group of muscles to maintain stability. There are two types of body posture, namely dynamic and static body posture. (Gamez, L., & Cybis, W. A, 2020). Based on Table 1, out of 30 respondents, there were 13 (73.6%) respondents with risky workloads and 17 (26.4%) respondents with non-risk workloads. Dynamic body

posture is related to how a person maintains their body position when moving, such as walking, running, bending, or picking up something. This posture is important to support ease of movement. Muscles, bones and joints need to work together to adapt to changing conditions. (Grandjean, E, 2022).

Based on Table 1, out of 30 respondents, 9 (18.1%) respondents had a risky work frequency and 21 (81.9%) respondents had a non-risky work frequency. Excessive workload (work-overload) is a condition that occurs when the environment places demands that exceed an individual's abilities. Excessive workload can make workers experience stress and trigger other mental disorders. The reason is, excessive workload can increase emotional fatigue (Helander, M. G., & Shuan, L, 2019). Based on Table 1 of 30 respondents, 18 (69.4%) respondents had risky work duration and 12 (30.6%) respondents had non-risk work duration. Workers with longer years of service will have more experience, broader knowledge and better skills so that these workers are less likely to experience work accidents. Meanwhile, workers who work longer with incorrect ergonomics will result in work-related illnesses such as flank pain (Zuniawati, 2023) Based on Table 1 of 30 respondents, 17 (63.1%) respondents had flank pain and 13 (36.9%) respondents who had flank pain were not at risk. Nyeri punggung termasuk salah satu faktor ergonomi. Bahaya ergonomi merupakan bahaya yang disebabkan oleh hubungan antara aktivitas kerja, penggunaan alat/fasilitas, dan lingkungan kerja yang tidak baik sehingga menyebabkan cedera atau penyakit pada pekerja seperti flank pain (Zuniawati, 2023)

Frequency Distribution Based on Work Posture

From the research results, it was found that there were 22 respondents who had risky work postures (75.6%), more than the respondents who had non-risky work postures, namely 8 people (24.4%). According to Evelina (2012), awkward posture will cause mechanical stress on skeletal muscles. In addition, awkward postures will require greater energy in some parts of the muscles, thereby increasing the work of the heart and lungs to produce energy. The longer you work in an awkward posture, the more energy is needed to maintain this condition, so that the resulting damage to the skeletal muscles becomes stronger, which will eventually lead to flank pain. Flank pain is a common, painful condition that affects the lower part of the spine (lailani, 2015). Lower back pain, also known as flank pain, is caused by muscle (strain) or ligament (sprain) injuries. Common causes include incorrect lifting, poor posture. Bad posture, such as awkward posture, includes: bent forward, that is, the back and chest lean forward to form $\geq 20^{o}$ to the vertical line. Rotating (twisted) is a body position that rotates to the right and left where the vertical line becomes the axis without taking into account how many degrees of rotation is carried out (Muttaqin,2010). Oblique (bent sideway) is any deviation of the median plane of the body from the vertical line without taking into account the size of the angle formed. There is flexion of parts of the body, usually to the front or to the side and awkward postures of the hands and wrists (left and right) (Noor,2013).

The results of this study are not much different from research conducted by Sari (2015), regarding the relationship between the risk of working posture and complaints of Musculoskeletal Disorders (MSDs) in oil palm harvesters at PT. Synergy Perkebunan Nusantara, it was found that the work posture of the highest number of oil palm harvesters had a high risk, namely 35 people (76.1%). Meanwhile, the number of harvesters with a non-risk work posture was 11 people (34.4%), only 11 people had a low risk (23.9%). Based on the results of research, theory and related research, the researcher believes that the cause of work ergonomic risks for bank tellers in this study is the result of incorrect work posture or body position when carrying out work activities so that there is a risk of flank pain (Ramdan,

2018). Apart from that, there is a load on the muscles that are repeatedly placed in an awkward position, causing flank pain (Todingan, 2015) . Flank pain can damage soft tissue and the nervous system. Flank pain will form a fairly large injury which is then expressed as pain or tingling, soreness, tenderness, swelling and muscle weakness (Umami,2014)

Frequency Distribution Based on Workload

From the research results, it was found that 17 respondents (26.4%) had non-risky workloads compared to 13 respondents (73.6%) who had risky workloads. Load is the effort required to perform a movement. Work that requires the use of a lot of force will put a burden on the muscles, tendons, ligaments and joints. Objects are one of the factors that influence the occurrence of musculoskeletal disorders. Musculoskeletal disorders are included in the ergonomic hazard category. Incorrect ergonomics will cause problems that can cause PAK, one of which is flank pain. According to the ILO, the maximum weight a person is allowed to lift is 23-25 kg. (Zuniawati, 2021) The results of this research are not much different from research conducted by syuhada (2018), regarding the relationship between ergonomic factors and workload among traditional rice farmers in Congko Village, Marioriwawo District, Soppeng Regency. 8 people (61.5%) met the requirements. Based on research results, theory and related research, the researcher believes that workload is influenced by the different abilities of each bank teller even though the worker works in the same place and has the same experience. This difference is caused because the capacities of these people are different (Sumekar). Fatigue due to work is often interpreted as a process of decreased efficiency, work performance and reduced physical strength/endurance of the body to continue the activities that must be carried out. Recognizing and understanding various aspects of occupational disease as one of the risks resulting from work or the work environment, is the first step to minimizing unwanted PAK (Widjayani,2013)

Frequency Distribution Based on Working Frequency

From the research results, it was found that the respondents who had a work frequency that was not at risk were 21 people (81.9%), more than the respondents who had a risk work frequency, namely 9 people (18.1%). Incorrect posture with frequent work frequency can result in the body's lack of blood supply, accumulated lactic acid, inflammation, stress on muscles, and mechanical trauma. This mechanical trauma is one of the occupational diseases which is included in the lumbago category (Zuniawati, 2021). The frequency of awkward postures is related to the occurrence of repetitive motion in carrying out work. Muscle complaints occur because the muscles receive pressure due to continuous workload without relaxing. (Evelina, 2012) The results of this research are not much different from research conducted by Wijana (2016), The results obtained were that respondents did a power grip when holding a hammer, but the load is not ≥4,535.9 gr. All respondents (100%) performed pinch grip with a frequency of ≥2 times/minute. Based on the results of research, theory and related research, the researcher believes that frequency can be interpreted as the number of movements carried out in a period of time while working. If bank teller activities are carried out repeatedly with the wrong sitting position, then it can be called repetitive (Santoso,2013). Repetitive movements in work, can be characterized either as the speed of body movement, or can be expanded as movements that are carried out repeatedly without any variation in movement, so that it can possibly result in flank pain (Zuniawati,2023)

Frequency Distribution Based on Work Duration

From the research results, it was found that 18 respondents had risky work duration (69.4%), more than 12 respondents (30.6%) who had non-risk work duration. In a static working position that requires 50% of maximum strength, it cannot last more than one minute. If less

than 20% of maximum strength is used then the contraction will continue for some time (Evelina, 2012) The results of this research are not much different from research conducted by Tarwaka (20118), on the right hand is a pinch grip posture, finger press, with a duration of more than 10 seconds and a frequency of 30 movements per minute. The right hand and wrist are often used for work. So all the odd postures contained in the BRIEF Survey worksheet were found in the hand postures of construction workers. Based on the results of research, theory and related research, researchers are of the opinion that the length of working time or duration of work is related to the physical condition of the worker's body. Heavy physical work will affect the work of the cardiovascular muscles, respiratory system and others. If work continues for a long time without rest, the body's abilities will decrease and can cause pain in the limbs (Parjoto,2013) If repetitive movements of muscles become too rapid to allow adequate oxygen to reach the tissues or allow calcium uptake, muscle fatigue occurs. Muscle fatigue can cause injury which over time can cause flank pain.

Frequency Distribution Based on the Occurrence of Flank Pain

From the results of the research conducted, it was found that 17 respondents had ergonomics at risk of flank pain (63.1%), more than respondents who had ergonomics without a risk of flank pain, namely 13 people (36.9%). According to Tarwaka (2018), ergonomics is a science, art and technology that seeks to harmonize tools, methods and work environments with human abilities, capabilities and all limitations, so that humans can work optimally without negative influences from their work (Tarwaka, 2018). From an ergonomics point of view, task demands and work capacity must always be in balance so that high work performance is achieved. In other words, job task demands should not be too low (underload) nor too excessive (overload). Because both underload and overload will cause stress. Several dangerous ergonomic factors that can have an impact on workers' health include improper body posture, muscle fatigue, muscle fatigue can cause injury to the spine called flank pain. Fanch pain is lower back pain caused by muscle injury (strain) or ligament (sprain). Common causes include lifting weights incorrectly, poor posture, not exercising regularly, fracture, ruptured disc, or arthritis. Flank pain goes away on its own in 2-4 weeks depending on conditions (Zuniawati, 2023)

The results of this research are not much different from research conducted by Afiani (2016), regarding analysis of ergonomic risk levels and subjective complaints of cumulative trauma disorders in inflate inspection workers at PT. Bridgestone Tire Indonesia, Bekasi Plant, the general results show that the risk level for Cumulative Trauma Disorders in this work based on the REBA score is at a "High" risk level. This is caused by posture variables in both group A, namely the back (trunk), neck (neck) and legs (leg), and group B, namely the upper arm (upper arm), lower arm (lower arm) and wrist (wrist).) which gets a higher score than other variables. If the scores on these variables are added up, it will be known that the score on the group A variable has the highest score, followed by the score on the group B variable

Based on the results of research, theory and related research, researchers are of the opinion that the risk of Flank Pain in bank tellers is found in neck posture that often looks down or up, back posture that often bends, arm posture that is always at the table and wrists that are used to grasp objects and type (Reo No, 2018) . Meanwhile, the factor that contributes the least to the risk level of a bank teller's job is lack of activity. Lack of activity is an ergonomics problem. Ergonomics is important to discuss because office workers are in the office for 8 hours, which means that 1/3 of the day is in the office environment and the health problems that occur most often in the office are musculoskeletal disorders. This is because the job of a

bank teller is a sedentary job. without activities and always moving around so the chances of developing flank pain are quite high (Zuniawati, 2023).

CONCLUSION

Office ergonomics is important to pay attention to because it is one of the potential dangers that can cause occupational diseases, so the researcher aims to examine analysis of ergonomic risk factors with the incident of flak pain in bank tellers.

REFERENCES

Alfiani, L. & B. S. K. (2016). IMT Dan Masa Kerja Terhadap Keluhan Nyeri Punggung Bawah Pada Buruh Panggul Masyarakat. Jurnal Kesehatan Masyarakat.

Arendi, Ario. 2015.Analisis Faktor Risiko Ergonomi Terhadap Gangguan MSDs pada Pekerja Kuli Angkut Beras di PT BPR II.Skripsi Kesehatan STIKes Bina Husada. Palembang

Defriyan A. (2011). Faktor-Faktor yang Berhubungan dengan Keluhan Nyeri Punggung Bawah Pada Proses Penyulaman Kain Tapis di Sanggar Family Art Bandar Lampung.

Diana Ari. (2015). Faktor-Faktor yang Mempengaruhi Keluhan Low Back Pain Pada Kegiatan Mengemudi Tim Ekspedisi PT Y. Universitas Islam Negeri Syarif Hidayatullah.

Evelina, Nuri. (2012). Analisis Tingkat Risiko Ergonomi dan Keluhan Subjektif MSDs pada Pengrajin Sepatu, Bengkel Sepatu Tata Kampung Cioma Bogor.

Fathoni et all. (2009). Kejadian Low Back Pain Pada Mekanik Di Dinas Tanaman Pangan Dan Hortikultur.

Gamez, L., & Cybis, W. A. (2020). An Ergonomic Approach to Educational Software Evaluation. Scott, PA; Bridger, RS; Chartevis, J. Global Ergonomic. Amsterdam: Elsevier, 601–605.

Grandjean, E. (2022). Fitting the task to the Man. A Texbook of Occupational Ergonomics. Taylor & Francis. London.

Helander, M. G., & Shuan, L. (2019). Reducing Design Complexxity Will Improve Usability in Product Design. In Proceeding of Seaes IPS Conference (pp. 23–25).

ILO. (2015). Low Back Pain. Priority Medicines for Europe and The World.

Kemenkes RI. 2015.Situasi Kesehatan Kerja .infodatin (online) Jilid 4.

Kuswana, Wowo Sunaryo. 2014.Ergonomi dan Kesehatan & Keselamatan Kerja.PT Remaja Rosdakarya. Bandung

Lailani, M. T. (2015). Hubungan antara peningkatan indeks massa tubuh dengan kejadian nyeri punggung bawah pada pasien rawat jalan di poliklinik saraf RSUD Dokter Soedarso Pontianak.

Muttaqin, A. (2010). Buku Ajar Asuhan Keperawatan dengan Gangguan Sistem Persyarafan. Salemba Medika.

Noor Z.H. (2013). Buku Ajar Gangguan Muskuloskeletal. Salemba Medika.

Parjoto, S. (2013). Pentingnya Memahami Sikap Tubuh dalam Kehidupan. IFI Graha Jati Asih.

Qareeballa at all. (2018). Pravalence Of Low Back Pain Among Female Nurses Working In Secondary And Tertiary Healthcare. Kindom Of Bahrain.Arabian Gulf University.

Ramdan, J. (2018). Prevalence And Risk Factors Of Low Back PainDepartment of General Medicine.

Reo No. (2018). Sociation Between Metabolic Syndrome And Disability Due To Low Back Pain Among Care Workes. Kobe University.Japan.

Santoso, G. (2013). Ergonomi Terapan. Prestasi Pustaka.

Sari, Theresia, I., &Engeline, A. (2015). Analisis tingkat risiko Musculoskeletal Disorders (MSDs) dengan The brief TM survey dan karakteristik individu terhadap keluhan MSDs pembuat wajan di Desa Cepogo Boyolali

Sumekar DW, natalia D. (2010). Nyeri Punggung Pada Operator Komputer Akibat Posisi dan Lama Duduk. Fakultas Ilmu Kedokteran Universitas Lampung.

Syuhada, D. (2018). hubungan risiko postur kerja dengan keluhan Musculoskeletal Disorders (MSDs) pada pemanen kelapa sawit di PT. Sinergi Perkebunan Nusantara.

Tarwaka. (2018). Keselamatan dan Kesehatan Kerja, Manajemen dan implementasi K3 di tempat kerja. Harapan Press.

Todingan, M. (2015). Lapsus Low Back Pain. Erlangga.

Umami AR, Hartanti RI, D. A. (2014). Hubungan Antara Karakteristik Responden dan Sikap Kerja Duduk dengan Keluhan Nyeri Punggung Bawah Pada Pekerja Batik Tulis. E-Jurnal Pustaka Kesehatan.

Widjayanti et all. (2013). Faktor- Faktor yang Berhubungan Dengan Kejadian Low Back Pain Pada Pekerja Furniture.

Wijana, N. (2016). Pengelolaan Lingkungan Hidup. Plantaxia.

Zuniawati, D. (2021). Analisis Faktor Resiko Pekerjaan dengan Kejadian Low Back Pain pada Supir Bus di Po Harapan Jaya. Permas.

Zuniawati, D. (2023). Risk Factors for Tailor Workers with the Incident of Flak Pain at Pt X. Prisma Sains: Jurnal Pengkajian Ilmu dan Pembelajaran Matematika dan IPA IKIP Mataram.