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Investigating Related Risk Factors of Low-Back Pain Incidents Amongst Home-Tailors: A Cross-Sectional Study

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Abstrak

Sebanyak 3,3 miliar penduduk di seluruh dunia yang bekerja, sehingga beberapa penyakit akibat kerja (*occupational disease* – OD) dan cedera pun terjadi. Gangguan Muskuloskeletal (*Musculoskeletal Disorders* - MSDs) adalah salah satu dari banyak OD yang memiliki persentase tinggi di kalangan pekerja, dan nyeri punggung bawah (*Low Back Pain* - LBP) merupakan jenis MSD utama yang umum ditemukan. Penelitian ini bertujuan untuk mengetahui hubungan antara faktor risiko ergonomis dengan keluhan LBP pada penjahit rumah di Desa Tembok Kidul Kecamatan Adiwerna Kabupaten Tegal, salah satu tuan rumah basis penjahit rumah di Jawa Tengah. Penelitian deskriptif korelatif dengan pendekatan cross sectional ini menggunakan sampel sebanyak 139 penjahit rumah yang dipilih dengan teknik simple random sampling. Seperangkat kuesioner digunakan dan dikelompokkan menjadi 3 bagian yang utamanya mengukur karakteristik peserta, faktor risiko ergonomis, dan terakhir keluhan LBP. Hasil penelitian menunjukkan bahwa tidak ada hubungan yang signifikan antara faktor risiko ergonomi dengan keluhan LBP (p=1,000; α =0,05). Namun penelitian ini menekankan bahwa penjahit dengan faktor risiko ergonomi rendah lebih kecil kemungkinannya untuk mengalami keluhan LBP dibandingkan penjahit dengan faktor risiko ergonomi tinggi. Beberapa kemungkinan faktor ergonomis yang menyertai meningkatnya jumlah keluhan LBP adalah usia, jenis kelamin, dan durasi kerja. Studi ini menyarankan untuk fokus pada satu jenis faktor risiko ergonomis tertentu yang harus ditangani, sementara tindakan pencegahan pada lingkungan kerja yang ramah ergonomis dianjurkan untuk mengurangi risiko OD.

Kata Kunci: penjahit, ergonomis, faktor risiko, nyeri pinggang

Abstract

With 3.3 billion population worldwide is employed, several occupational disease (OD) and injuries ensued. Musculoskeletal Disorders (MSDs) is one among many ODs that hold high percentages among workers, and low back pain (LBP) raises as the main type of commonly found MSDs. This study aimed to investigates the relationship between the ergonomic risk factors and LBP complaints among home tailors at Desa Tembok Kidul Kecamatan Adiwerna Kabupaten Tegal, one of the host of home-tailors basis in Central Java. This descriptive correlative study using a cross sectional approach employed 139 home tailors as sample, selected with simple random sampling technique. A set of questionnaire was used and grouped into 3 part mainly measured the participants' characteristics, ergonomic risk factors, and lastly LBP complaints. his study showed that there is no significant association between ergonomic risk factors and LBP complaints (p=1,000; α =0,05). However, this study emphasized that tailors with low ergonomic risk factors were less likely to have complaints of LBP than tailors with high ergonomic risk factors. Some possible ergonomic factors that goes along the growing number of LBP complaints are age, gender, and working duration. This study suggests to focus on one specific type of ergonomic risk factors to work with, while preventive measure on ergonomic-friendly working environment is advocated to alleviate the risk of OD.

Keywords: *tailors, ergonomic, risk factor, low back pain*

Background

With around 3.3 billion people employed worldwide in 2019 (ILO, 2020), various inequalities prevail. The disparities of demographic traits (geographical location, sex, and age) become a challenge that affects work quality amongst the working ages. Workers are at high risk in having health problems even leads to death. International Labor Organization (ILO) recorded around 340 million occupational accidents and 160 million victims of work-related illness per year and they were expected to incline annually. ILO also estimates that every year 2.78 million workers die due to occupational injuries and occupational diseases and as many as 374 million workers suffer from non-fatal work diseases and accidents (ILO, 2019).

Even though European Union (EU) estimated that there were a declined of 25% occupational disease between the year of 2013-2020, the data denoted some major occupational disease (OD) that are commonly found amongst the workers (EUROSTAT, 2023). These notable ODs are pneumoconiosis, contact dermatitis, musculoskeletal disorders, and occupational cancers. Specifically, data from 1.8 million workers in Great Britain also emphasized that 27% of the workers are having musculoskeletal disorders (Health and Safety Executive, 2022). 2021 data from the Ministry of Manpower Republic of Indonesia recorded the number of work-related accidents as 234,270 cases, an increase of 5.65% from the previous year. In 2018 there were 114,148 cases of occupational accidents and in 2019 there were 77,295 cases recorded (Ministry of Manpower Republic of Indonesia, 2020).

Previous research about the musculoskeletal disorders explained that namely it happened 42% - 58% of all work-related diseases (Sekaaram & Ani, 2017). The scope of musculoskeletal disorders (MSDs) is very broad and can attack several parts of the body, such as low back pain (LBP) or low back pain (LBP), which are common complaints in relation to cases of MSDs. Data derived from 100.000 workers (HSE, 2022) mentioned that the most affected area of the MDs are back (42%), upper limbs (37%), and lower limbs (21%). Furthermore, the global prevalence of low back pain in 2017 reached 577 million people (Wu et al., 2020). A study conducted by Yang, Haldeman, Lu, and Baker (2016) on a sample of 13,924 workers stated that the prevalence of low back pain was 25.7%, of which men (24.5%), women (27.1%), workers aged 18-40 years (23.8%), and workers aged 41-64 years (27.7%).

Lower back pain (LBP) is common in workers who work with stiff and static body postures, thus tailors or those garment workers are prone to LBP. Tailors are very susceptible to LBP due to static work postures and these workers are rarely provided with a proper workplaces and weak social infrastructure, increasing the risk of discomfort and illness (Shah, Amjad, Shraf, Mushtaq, & Sheikh, 2016). This is supported by research by Jamro et al. (2018) about occupational MDs in tailors, that as many as 83% of tailors experience lower back pain. Meanwhile in Indonesia, research by Rahmat, Utomo, Sambada, and Andyarini (2019) on home tailors in Tasikmadu District, Karanganyar Regency, Central Java Province, showed that out of 39 respondents, 69.2% complained of LBP. Previous research by Susanti, Zulfadhli, and Mahdinursyah (2014) on 37 tailors in Kuta Malaka District, West Aceh Regency, also showed that 24 respondents (64.9%) experienced LBP. These studies strongly implied that more than half of the respondents experienced lower back pain.

Research by Habib (2015) identified ergonomic risk factors for sewing machine operators including awkward neck and back posture, repetitive hand and arm movements, unergonomic work stations, and long working hours without adequate rest. Low back pain is a common health problem in the world that causes activity restrictions and also work absenteeism (Arwinno, 2018). The high demands of being a tailor require them to do monotonous and repetitive work that involves sitting for long periods of time, and these cause them to experience MSDs that might lead to increasingly serious injuries (Ekta, Mehta, & Sharma, 2020). Even though it does not have a fatal impact, LBP can reduce work productivity, resulting in a large increase in the economic burden for the workers themselves, society and the government. Tailors who experience pain will feel uncomfortable when working, thus disrupting the work process which can have an impact on production targets.

Exposure to hazardous agents in the workplace include biological, chemical, physical, psychosocial and environmental agents can cause various occupational disease, one of which is the musculoskeletal disorders (Stanhope & Lancaster, 2016). MSDs are the most common complaints experienced by workers. However, workers and business owners often receive little attention because it is not directly related to fatal accidents or disease conditions.

Methods

This research is quantitative research with descriptive correlative of cross-sectional approach. The independent variable is data related to ergonomic risk factors) while the dependent variables are complaints of LBP, as well as worker characteristics were taken and observed at one time. This research employed 139 garment workers/tailors from Tembok Kidul Village, Adiwerna District, Tegal Regency. The sampling technique in this research used a simple random sampling technique.

This research used a set of questionnaire which consists of three parts. Part A of the questionnaire is a demographic data including initials, telephone number, age, gender, education level, length of work and duration of work. Part B is a questionnaire to measure ergonomic risk factors faced or carried out by respondents that uses a modified "Ergonomic Risk Factors" questionnaire by Widyasari (2014) and the "MSD Risk Assessment Checklist". This risk factors questionnaire was set into seven ergonomic risk factors based on references from the Occupational Health and Safety Council of Ontario (OHSCO) about the MSDs Risk Assessment Checklist. This questionnaire consists of 17 questions covering seven ergonomic risk factors, namely awkward posture, static working position, repetitive movements, use of excessive force, contact pressure, vibration and temperature. Last Part (Part C) is a questionnaire that measure complaints of lower back pain experienced by respondents. This part C questionnaire is a modification of the questionnaire developed by Marsiliana (2016) about LBP complaints from a questionnaire by Sya'bani in 2012 regarding back pain complaints.

The validity test results showed that 15 questions in part B of the questionnaire were valid (r count > r table). There were 2 questions that were eliminated because they were considered invalid. Furthermore, all questions in part C of the questionnaire were declared valid. The reliability test on the 15 questions of the part B questionnaire which were valid produced a Cronbach Alpha value of 0.838 and on the part C questionnaire the Cronbach Alpha value was 0.891, which means this questionnaire is reliable. Furthermore, the results of the validity test of both questionnaires showed that the calculated r value for each question ranges from 0.679 to 0.943. Data collection is carried

out offline and online. The results are presented as univariate analysis results and bivariate analysis results. Univariate analysis produces an overview of respondents' characteristics, ergonomic risk factors, and complaints of low back pain. The results of bivariate analysis using Chi-Square showed a relationship between ergonomic risk factors and complaints of low back pain among respondents.

Results and Discussion

Table 1 shows the description of participants characteristic.

Table 1. Distribution of Participants' Characteristic among home tailors in Tembok Kidul Village, Adiwerna District, Tegal Regency, 2021 (n=139)

Characteristics	Frequency (n)	Percentage (%)
Age		
Teenager (15-20 year)	23	16,5%
Young adults (21-40 year)	89	64%
Middle adulthood (41-54 year)	27	19.4%
Gender		
Female	90	64,7
Male	49	35,3
Education Level		
Elementary School (SD)	49	35,5
Junior High School (SMP)	41	29,5
Senior High School (SMA)	45	32,4
Higher Education (PT)	4	2,9
Length of Work		
≤5 years	64	46
6 – 10 years	28	20,1
>10 years	47	35,8
Work Duration		
≤8 hours/day	76	54,7
>8 hours/day	63	45,3

The results shows that the participants were dominated by the young adult group of 89 people (64%) that are, theoretically-wise, usually quite active (Potter, et al, 2013), and able to engage in productive work and take on civic responsibilities (DeLaune & Ladner, 2011). Most of them were female (64.7%), which explained by Rahayu (2015), many of them dream of working from home while not abandoning their status as housewives (Rahayu, 2015). The largest proportion had been to elementary school (35.3%) followed by high school graduates (32.4%). This only proves that educational levels does not really necessary in order to become home tailors, as the daily task consists of set of skills that can easily be trained along the time. This also supports the finding from ILO stated that 72% of all 677 million workers are under-educated (ILO, 2020).

The majority of respondents have worked as home tailors for 5 years or less (46%), that compliment a result from Aprilia, Solichin, & Puspitasari (2021) that reported 35 tailors (77.78%) had worked for less than 6 years. This can also be seen based on the results of previous analysis that the majority of respondents in this study were young adults even some of them are adolescent. Therefore, their average work experience as tailors is less than or equal to 5 years. 76 respondents (54.7%) worked a maximum of 8 hours a day. Even though the Law Number 13 of 2003 Article 77 Paragraph 2 stipulates provisions for working hours, in fact there is no fixed working hours in terms of home industry, included home tailors in our research area. Table 2 shows the description of respondents' ergonomic risk factors.

Table 2. Distribution of Ergonomic Risk Factors and LBP Complaints among Home Tailors in Tembok Kidul Village, Adiwerna District, Tegal Regency 2021 (n=139)

Variables	Frequency (n)	Percentage (%)
Ergonomic Risk Factors		
Low Risk	68	48,9
High Risk	71	51,1
LBP Complaints		
No complaints	32	23
Complaints	107	77

The results showed that more than half of the respondents had high ergonomic risk factors, namely 71 people (51.1%) with 77% had LBP complaints. Several similar studies use different measurement tools to investigate the ergonomic factors. One of them is a study by Ramadhan & Aisyah (2019) using the REBA method involving 95 tailors in Yogyakarta, that found 78.9% had medium risk and 13.7% had high risk. Regardless, our study also found that there were more tailors with high ergonomic risk than low ergonomic risk. Further analysis were perform to investigate the relation between LBP risk factors to LBP complaints among the home tailors. The results is shown in the Table 3. LBP complaints in this study was inline with other study that found the prevalence of LBP were higher amongst the workers (Ahmad & Budiman, 2014). Some risk factors that closely related to this finding were long-static position (Susanti, Hartiyah, & Kuntowanto, 2015), and inappropriate body alignment (Osni, 2012).

Table 3. Relationship between Ergonomic Risk Factors and Complaints of LBP among Home Tailors in Tembok Kidul Village, Adiwerna District, Tegal Regency, 2021 (n=139)

Ergonomic risk factors	LBP Complaints		Total	OR (95% CI)	p
	No Complaints	Complaints			
Low Risk	16 (11,5%)	52 (37,4%)	68 (48,9%)	1,058 (0,48 – 2,33)	1,00
High Risk	16 (11,5%)	55 (39,6%)	71 (51,1%)		
Total	32 (23%)	107 (77%)	139 (100%)		

Bivariate analysis shows p value of 1.000, which means p value > α, with α = 0.05. Therefore, it can be concluded that there is no significant relationship between ergonomic risk factors and LBP complaints amongst home tailors in Tembok Kidul Village, Adiwerna District, Tegal Regency. Then an OR value of 1.058 (95% CI = 0.48-2.33) was obtained, which means that tailors with low ergonomic risk factors were 1.058 times less likely to have complaints of LBP than tailors with high ergonomic risk factors. Despite from the results, additional crosstab analysis showed some supporting data about our study as shown in the Table 4.

Table 4. Crosstab analysis of Ergonomic Risk Factors and LBP Complaints among Home Tailors in Tembok Kidul Village, Adiwerna District, Tegal Regency 2021 (n=139)

Variables	LBP Complaints		Total
	No Complaints (n)	Complaints (n)	
Age			
Teenager (15-20 year)	3	20	23
Young adults (21-40 year)	26	63	89
Middle adulthood (41-54 year)	3	24	27
Gender			
Female	18	72	90
Male	14	35	49
Education Level			
Elementary School (SD)	4	45	49
Junior High School (SMP)	10	31	41
Senior High School (SMA)	17	28	45
Higher Education (PT)	1	3	4
Length of Work			
≤5 years	18	46	64
7 – 10 years	4	24	28
>10 years	10	37	47
Work Duration			
≤8 hours/day	22	54	76
>8 hours/day	10	53	63

Although the results showed that the is no significant relationship between ergonomic risk factors with the LBP complaints, there's a trend we can describe to narrow down the most possible factors related to it. Crosstab analysis from Table 4 shows that, as the age progress there's seemingly inclination on LBP complaints. Meaning that, once people grow older, they are more susceptible in having LBP complaints. Other than that, male worker also less likely to have LBP complaints, thus female workers are more prone to it. And lastly, workers who spend more than eight hours per day will more vulnerable in developing LBP complaints.

This study assessed all general ergonomic risk factors, including inappropriate postures, static working positions, repetitive movements, excessive use of force, contact pressure, vibration and temperature. Researchers assume that not all ergonomic risk factors contribute significantly to the occurrence of LBP complaints in home tailors. This can be seen from research by Widyasari, Ahmad, & Budiman (2014) showing that there is no significant relationship between excessive use of force (accuracy) and complaints of lower back pain ($p=0.699 > 0.05$). Apart from that, Mait, Pinontoan, & Kawatu (2017) conducted research which resulted in no relationship between environmental temperature and musculoskeletal complaints in workers ($p=0.193>0.05$). One of the ergonomic risk factors that has quite an influence on complaints of lower back pain is static working positions. Most of the respondents in this study worked in 9 sitting positions for a long time and did not change positions while working. This is reviewed based on the questions in this research questionnaire, namely that the majority of respondents answered that they often or always work in a sitting position for 6 hours or more. This finding is assumingly can be caused by the static sitting position for more than 6 hours is one of the triggers for complaints of lower back pain in respondents. This opinion is supported by research by Wijayanti, Oktafany, Ramadhian, Saftarina, & Cania (2020) showing that there is a significant relationship between sitting time and complaints of lower back pain ($p=0.045>0.05$).

However, other than working duration that can affect the development of LBP, there might some condition we need to take account to such as gender and progressing age. Our crosstab analysis found that as the ages progress, the worker will most likely have the LBP complaints. This in conjunction with the worsening bodily function in aging theories. Some studies confirmed this findings, as some reported that LBP was associated with age (Arma et al., 2019; Uehara et al., 2021; Rachmawati et al., 2021, Wang et al., 2022). Along with it, our study also suggest that female worker are more susceptible in developing LBP complaints. This finding was emphasized by some previous study (Wang et al., 2016; Bento et al., 2016). However, in this study we recognized that the assessment of ergonomic risk factors was not measured objectively and was only seen from the respondents' perceptions and subjectivity. Likewise, complaints of lower back pain were assessed through a questionnaire which is subjective in nature and does not include the severity of the complaint or pain felt.

Conclusion

There is no significant relationship between ergonomic risk factors and complaints of LBP in home tailors. However, this study emphasized that tailors with low ergonomic risk factors were less likely to have complaints of LBP than tailors with high ergonomic risk factors. Focusing on several possible aspects such as age, gender, and working duration also suggested as they contributes in LBP complaints development. Further rigorous analysis must be conveyed to address which ergonomic risk factors are most associated with the occurrence of LBP with wider sample size and various objective measurements. From this findings, occupational health nurses can provide health education about the principles of ergonomics and preventing lower back pain for home tailors especially with the consideration of age, gender, and working duration as main focus. Home tailors' owners can provide ergonomic sewing equipment to create more proper working environment for the workers and provide adjustable break time for the home tailors.

References

Aprilia, L., Solichin, Puspitasari, S. T. 2021. Gambaran keluhan low back pain (LBP) pada pekerja menjahit dengan pengukuran analog scale (VAS). *Sport science and health, 3*(3), 117-124.

Arma, M., Septadina, I.S., Legiran. 2019. Factors affecting low back pain (LBP) among public transportation drivers. *Majalah Kedokteran Sriwijaya, 51(4),* 206-2015. Retrieved from: https://ejournal.unsri.ac.id/index.php/mks/article/download/10240/5047

Arwinno, L. D. 2018. Keluhan nyeri punggung bawah pada penjahit garmen. *Higeia journal of public health research and development, 2*(3), 406-416. DOI: 10.15294/higeia/v2i3/23520

Bento, T. P. F., Genebra, C. V. D. S., Maciel, N. M., Cornelio, G. P., Simeão, S. F. A. P., & Vitta, A. (2020). Low back pain and some associated factors: is there any difference between genders?. *Brazilian journal of physical therapy*, *24*(1), 79–87. https://doi.org/10.1016/j.bjpt.2019.01.012

DeLaune, S. C. & Ladner, P. K. 2010. *Fundamental of nursing: Standards & practice* (4th Ed.). Delmar: Cengage Learning.

Ekta, Mehta, M., & Sharma, P. K. (2020). A study on work-related musculoskeletal disorders among sewing machine operators. *Indian Journal of Health and Wellbeing*, *11*(1-3), 8-12. DOI: 10.15614/IJHW.v11i01.3

EUROSTAT. 2023. *Occupational disease statistics.* Accessed from: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Occupational_diseases_statistics

International Labour Organization (ILO). 2019. *Safety and health at the heart of the future of work: Building on 100 years of experience.* Switzerland: International Labour Organization.

International Labour Organization (ILO) – ILOSTAT. 2020. *258 million workers in the world are over-educated for their jobs.* Retrieved from: https://ilostat.ilo.org/258-million-workers-in-the-world-are-over-educated-for-their-jobs/

International Labour Organization (ILO). 2020. *World Employment and Social Outlook: Trends 2020.* Retrieved from: https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_734479.pdf

Jamro, S.A., Sheikh, M.A., Rajput, H.I., Chughtai, M.J.B., Amanullah, & Jamroo, A.A. 2018.Work-related musculoskeletal disorders among tailors. *International Journal of Pharmaceutical Science and Health, 2*(8), ISSN 2249-5738

Kementerian Kesehatan RI. 2015. *Situasi kesehatan kerja.* InfoDATIN. Pusat Data dan Informasi Kementerian Kesehatan RI. Diakses dari: www.kemkes.go.id.

Mait, N.N M., Pinontoan, O., & Paul, K. 2017. Hubungan antara masa kerja, suhu lingkungan dan sikap kerja terhadap keluhan muskuloskeletal pada pekerja pengupas kelapa di kecamatan kauditan. *Media Kesehatan, 9*(3). Diakses pada 20 Juli 2021 dari http://www.ejournalhealth.com/index.php/in dex/login?source=%2Findex.php%2Fmedkes %2Farticle%2Fview%2F340

Marsiliana. 2016. *Hubungan tingkat pengetahuan ergonomi pekerja pengguna komputer terhadap keluhan nyeri punggung di PT X,* Skripsi. Depok: FIK UI.

Osni, M. 2012. *Gambaran faktor risiko ergonomi dan keluhan subjektif terhadap keluhan muskuloskeletal disorder (MSDs) pada penjahit sektor informal di Kawasan Home Industry RW 6, Kelurahan Cipadu, Kecamatan Larangan, Kota Tangerang pada tahun 2012,* Skripsi. Depok: FKM UI.

Potter, P.A. & Perry, A.G., Stockert, P.A., & Hall, A.M. 2013. *Fundamentals of nursing (8th ed.).* St. Louis: Mosby-Elsevier.

Rahayu, A. W. 2015. *Perempuan dan Belenggu Peran Kultural*. Diakses pada 14 Juli 2021 dari https://www.jurnalperempuan.org/wacana- feminis/perempuan-dan-belenggu-peran- kultural

Rahmat, N., Utomo, P. C., Sambada, E. R., & Andyarini, E. N. 2019. Hubungan lama duduk dan sikap duduk terhadap keluhan nyeri punggung bawah pada penjahit rumahan di kecamatan tasikmadu. *Journal of health science and prevention,* Vol. 3 (2), 79-85

Ramadhan, H. & Aisyah, U. 2019. *Hubungan sikap kerja terhadap nyeri punggung bawah pada penjahit di PT. Mataram Tunggal Garment Yogyakarta*, Naskah Publikasi. Yogyakarta, Universitas 'Aisyiyah.

Sekaaram, V. & Ani, L. S. 2017. Prevalensi musculoskeletal disorders (MSDs) pada pengemudi angkutan umum di terminal mengwi, kabupaten bandung-bali. *Intisari sains medis, 8*(2), 118-124. DOI: 10.1556/ism.v8i2. 125

Shah, Z. A., Amjad, A., Ashraf, M.,Mushtaq, F., & Sheikh, I. A. 2016. *Ergonomic risk factors for workers in garments manufacturing – a case study from pakistan*. Kuala lumpur: Proceedings – International Conference on Industrial Engineering and Operations Management.

Susanti, N., Hartiyah, H., & Kuntowanto, D. 2015. *Hubungan Berdiri Lama dengan Keluhan Nyeri Punggung Bawah Miogenik pada Pekerja Kasir*. Surakarta: Pena Medika.

Susanti, Zulfadhli, & Mahdinursyah. 2014. Analisis Keluhan Nyeri Punggung Bawah Pada Penjahit Di Kecamatan Kuta Malaka Kabupaten Aceh Besar. *Jurnal kesehatan ilmiah nasuwakes,* Vol. 7 (1), 104-111

Wang, J., et al. 2022. Correlations between Age, Pain Intensity, Disability, and Tactile Acuity in Patients with Chronic Low Back Pain. *Pain Research and Management*, vol. 2022, Article ID 2907009, 9 pages, 2022. https://doi.org/10.1155/2022/2907009

Wáng, Y., Wáng, J., & Káplár, Z. 2016. Increased low back pain prevalence in females than in males after menopause age: evidences based on synthetic literature review. *Quantitative Imaging In Medicine And Surgery, 6*(2), 199-206. doi:10.21037/qims.2016.04.06

Widyasari, B. K. 2014. *Hubungan faktor individu dan faktor risiko ergonomi dengan keluhan low bank pain (LBP) pada penjahit sektor usaha informal CV. Wahyu Langgeng Jakarta Tahun 2014,* Skripsi. Jakarta: Universitas Esa Unggul.

Wijayanti, F., Oktafany, Ramadhian, M. R., Saftarina, F., & Cania, E. 2019. Kejadian *low back pain* (LBP) pada penjahit konveksi di kelurahan way halim kota bandar lampung. *Medula,* Vol. 8 (2), 82–88

Yang, H., Haldeman, S., Lu, M. L., & Baker, D. 2016. Low Back Pain Prevalence and Related Workplace Psychosocial Risk Factors: A Study Using Data From the 2010 National Health Interview Survey. *Journal of manipulative and physiological therapeutics*, *39*(7), 459