Original Research Article

Characteristics of Lower Back Pain in Patients at the General Hospital UKI, Jakarta, Indonesia

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ABSTRACT

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| **Aims:** To find out about the characteristics of lower back pain (LBP) in patients at the UKI General Hospital's Neurology Polyclinic from January 2021–Deadline 2022.  **Study design:** retrospective descriptive research with a cross-selective design  **Place and Duration of Study:** The research was carried out at the Neurology Polyclinic, Ulmulm Ulnivelrsitas Hospital, Kristeln Indonesia in March 2024.  **Methodology:** This research is a retrospective descriptive research using a cross-sector design. Data collection is carried out by collecting patient medical record data. This research uses a total sampling technique. The research sample consisted of 53 patients  **Results:** Analysis of the results is mostly based on age, gender, body mass index, type of work, type of pain, and LBP onset as well as treatment, namely: aged 56 - 65 years with a total of 19 patients (35.8%), a total of 41 patients. patients (77.4%), BMI 25 – 29.9 kg/m2 (the weight I) totaling 17 patients (32.1%), working as entrepreneurs totaling 21 patients (39.6%), radicular pain types totaling 28 patients (52.8%), acute LBP as many as 31 patients (58.5%), and co-infective management as many as 50 patients (94.3%)  **Conclusion:** LBP patients are dominated by women with an age range of 56-65 years. BMI 25 – 29.9 kg/m2 has the highest frequency and the type of work most frequently carried out by LBP patients is work in the private sector. Based on the type of pain and symptoms most frequently experienced are radicular pain and acute LBP. Based on the management that is most frequently obtained is conservative management. |

*Keywords: lower back pain, radicular pain, onset lower back pain, acute lower back pain*

1. INTRODUCTION

Low back pain (LBP) is a condition characterized by discomfort or acute pain in the fifth and first lumbar vertebrae (L5-S1).1 According to the Association of Indonesian Neurologist Specialist Doctors (PERDOSNI), low back pain (LBP) is pain felt in the lower back and can be local pain, radicular pain, or both. The pain can be a sensation such as burning, stabbing, or dull pain, pain that radiates towards the legs and feet, and muscles that feel tense. The pain will become increasingly worse with physical activity.2 LBP can be classified according to the onset of pain and the causes that trigger the pain. Based on the onset of pain, LBP can be classified into acute, subacute, and chronic LBP. Acute LBP lasts up to 6 weeks, subacute LBP lasts from 6 to 12 weeks while chronic LBP lasts for more than 12 weeks.3

Based on the cause, LBP can be classified into specific LBP and non-specific LBP. Specific LBP is a disease that can cause LBP complaints such as vertebral fractures, infections and tumors. 4 According to the National Institute for Health and Care Excellence, non-specific LBP is tension, pain, and/or stiffness of unknown etiology in the lower back area with involvement of joints, discs, and connective tissue that potentially contribute to the occurrence of LBP. 5 Approximately 85% of LBP patients are categorized as non-specific LBP. 4.. LBP is the main cause of disability in various high-income countries such as Central and Eastern Europe, North Africa, Middle East Africa, and America. LBP is the most common reason someone consults a doctor in the United States where as much as 1% of the United States population chronically experiences disability due to LBP. These conditions affect people's ability to do various types of work both inside and outside the home and affect mobility.4

LBP not only causes problems with work effectiveness but also has a significant impact on the quality of life in the form of increasing health care costs, reducing working hours, decreasing productivity, and increasing numbers. disability.6 According to the World Health Organization (WHO), working-age individuals with low back pain not only lose their productivity at work but can also spend an estimated $50 billion per year on LBP treatment.7 In Brazil, each worker is absent from their workplace on average 100 days per year due to LBP, while in the United States, 15.4% of the workforce reports an average of 10.5 days of work lost per year due to chronic LBP. Apart from the absence of workers from their workplace, LBP can cause workers to retire prematurely.8 According to the Global Burden of Disease Study, the incidence of LBP sufferers in 2020 was 619 million people and is estimated to increase by 36.4% to 843 million people in 2050, especially in Asia and Africa. 8 The incidence of LBP in Indonesia varies, it is estimated that around 7.6% to 37% of the Indonesian population experiences LBP complaints.2 LBP is a multifactorial problem. Factors that can trigger the occurrence of LBP include age, gender, body mass index, stress, long periods of sitting, and body posture when doing work.9 A study conducted at the Sanglah Denpasar Central General Hospital in the 2014–2015 period found that 20 people (58.8%) in the 41-60 year age group were the age group that experienced the most LBP.7 LBP occurs more frequently in women than men, the reason is that women's muscles are physiological. weaker, so the risk of musculoskeletal disorders increases.4 In 2021, research was conducted on students from the 2019 and 2020 classes of the Faculty of Medicine, Sam Ratulangi University, it was found that 89 female students (55%) had complaints of lower back pain and 25 female students (16%) did not complain of lower back pain, while the remaining 34 male students (21%) complained of lower back pain and 13 male students did not complain of lower back pain. (8%).9 Individuals with an excessive body mass index are twice as likely to experience LBP complaints as individuals with a normal body mass index.1

Lower back injuries that lead to LBP are associated with occupational risk factors, with 11% to 80% of them caused by ergonomic factors such as prolonged sitting, lifting, bending, and twisting.10 Medical personnel are a type of work that is prone to experiencing lower back pain, especially due to repetitive activities (moving patients and medical equipment), unergonomic working positions, relatively heavy workloads, and changing work schedules. Research conducted on medical personnel at Siloam Hospitals Lippo Village in the period October - December 2017 found that 80 nurses (70.8%) complained about LBP, the remaining 33 nurses (29.2%) did not complain about LBP. Apart from that, there were also 29 non-nurse medical personnel (50%) who complained about LBP. Activities that interact with loads such as pulling, lifting, pushing, bending, and rotation influence the incidence of LBP in medical personnel, especially nurses. This activity causes repetitive trauma, especially in the lumbar area, which can ultimately lead to LBP.6 Based on the background described above, more in-depth knowledge is needed about the characteristics of low back pain patients at the Neurology Polyclinic at UKI General Hospital in the January 2021-December 2022 period.

2. material and methods

**2.1. Types of Research**

The research carried out was a retrospective descriptive study with a cross-sectional design. This research was carried out by collecting and analyzing medical record data of LBP patients who came to the Neurology Polyclinic RSU UKI for the period January 2021–December 2022 Tables should be explanatory enough to be understandable without any text reference.

**2.2. Location and Time of Research**

The research was carried out at the Neurology Polyclinic at the General Hospital of the Indonesian Christian University in March 2024.

**2.3.Research Subjects**

**2.3.1. Population**

The population in this study were all patients who experienced Lower Back Pain at the Neurology Polyclinic at UKI General Hospital for the period January 2021–December 2022.

**2.3.2.Sample Size**

The sample size in this study uses a total sampling technique, that is, the entire population that meets the inclusion criteria will be the research subject.

**2.3.3.Inclusion Criteria**

1. Patients at the Neurology Polyclinic at RSU UKI who had the main complaint of lower back pain.
2. Patients who have complete medical record data.

**2.3.4. Exclusion Criteria**

1. Patients from the Neurology Polyclinic at the Indonesian Christian University RSU who do not have complaints of lower back pain.
2. Patients with incomplete medical record data
   1. **Research Instruments**

The research instrument used in this study was medical records of LBP patients at the Neurology Polyclinic at the Indonesian Christian University General Hospital for the period January 2021–December 2022.

* 1. **Data Collection Methods**

Data collection was carried out using a cross-sectional design, namely analyzing variable data collected at a certain point in time across the sample population. The data used is secondary data, namely medical records of patients at the Neurology Polyclinic at the RSU Christian University of Indonesia. The data that will be collected are: age, gender, body mass index, type of work, type and onset of LBP, as well as the treatment obtained

* 1. **Data Analysis Methods**

All data obtained will then go through a series of data management processes including data input, grouping, editing, and storage on a computer as well as using a data processing application instrument, namely SPSS (Statistical Package for The Social Science) v.24. After that, univariate analysis will be carried out to produce the frequency and percentage distribution of each variable. Univariate analysis in this study is age, gender, body mass index, type of work, type, and onset of LBP as well as the treatment obtained which will be presented in the form of number (n) and percentage (%).

3. results and discussion

**3.1. Research Results**

Based on the results of retrospective research regarding the characteristics of low back pain patients in the neurology clinic at the Indonesian Christian University Hospital for the period January 2021–December 2022, a total of 92 LBP patients were found, but only 53 patients met the research criteria. Research data regarding the characteristics of LBP patients at the Neurology Polyclinic at the Indonesian Christian University General Hospital are presented in tabular form..

**3.1.1. LBP Characteristics Based on Age**

LBP patients are grouped based on age with distribution as in the following Table 1:

**Table 1. Distribution of LBP Patient Based on Age**

|  |  |  |
| --- | --- | --- |
| **Age (year)** | **Frequency (n)** | **Percentage (%)** |
| 17–25 | 4 | 7.5 |
| 26–35 | 3 | 5.7 |
| 36–45 | 1 | 1.9 |
| 46–55 | 10 | 18.9 |
| 56–65 | 19 | 35.8 |
| >65 | 16 | 30.2 |
| **Total** | **53** | **100.0** |

The results of the study showed that the largest age group in the 56-65 year range was 19 patients (35.8%), followed by the >65 year age group totaling 16 patients (30.2%), the 46-55 year age group totaling 10 patients (18.9%), the 17-25 year age group totaling 4 patients (7.5%), the 26-35 year age group totaling 3 patients (5.7%), the 36-45 year age group totaling 1 patient. (1.9%)

**3.1.2. Characteristics of LBP Based on Gender**

LBP patients are grouped by gender with the following distribution as in Table 2:

**Table 2. Distribution of Patient Based on Gender**

|  |  |  |
| --- | --- | --- |
| **Gender** | **Frequency (n)** | **Percentage (%)** |
| Male | 12 | 22.6 |
| Female | 41 | 77.4 |
| **Total** | **53** | **100.0** |

This research shows that women experience LBP more often, namely 41 patients (77.4%) compared to men, namely 12 patients (22.6%).

**3.1.3 Characteristics of LBP Based on Body Mass Index (BMI)**

LBP patients are grouped based on BMI with the distribution as in Table 3 below:

**Table 3. Distribution of Patient LBP Based on Body Mass Index (BMI)**

|  |  |  |
| --- | --- | --- |
| **BMI** | **Frequency (n)** | **Percentage (%)** |
| <18,5 | 3 | 5.7 |
| 18,5–22,9 | 9 | 17.0 |
| 23–24,9 | 11 | 20.8 |
| 25-29,9 | 17 | 32.1 |
| ≥ 30 | 13 | 24.5 |
| **Total** | **53** | **100.0** |

In this study, it was found that most LBP patients were in the BMI 25–29.9 kg/m2 (obesity I) category totaling 17 patients (32.1%), followed by the BMI ≥ 30 kg/m2 (obesity II) category totaling 13 patients (24.5%), the BMI 23–24.9 kg/m2 category (overweight/overweight with risk) totaling 11 patients (20.8%), the BMI category. 18.5–22.9 kg/m2 (normal) amounted to 9 patients (17.0%), and the BMI category <18.5 kg/m2 (underweight) amounted to 3 patients (5.7%).

**3.1.4 Characteristics of LBP Patient Based on Type of Job**

LBP patients are grouped based on type of work with the following distribution:

**Table 4. Distribution of LBP Patient Based on Type of Job**

|  |  |  |
| --- | --- | --- |
| **Type of Job** | **Frequency (n)** | **Percentage (%)** |
| Student/Students | 3 | 5.7 |
| Housewife | 17 | 32.1 |
| Self-employed | 21 | 39.6 |
| Retired | 4 | 7.5 |
| Teacher | 1 | 1.9 |
| Civil servants | 3 | 5.7 |
| Architect | 1 | 1.9 |
| Doesn't work | 1 | 1.9 |
| Etc | 2 | 3.8 |
| **Total** | **53** | **100.0** |

The research results showed that the type of work most frequently carried out by LBP patients was working as an entrepreneur, amounting to 21 patients (39.6%).

**3.1.5 Characteristics of LBP patients based on Pain Type**

LBP patients are grouped based on Pain type with the following distribution:

**Table 5. Distribution of LBP Patient Based on Pain Type**

|  |  |  |
| --- | --- | --- |
| **Pain Type** | **Frequency (n)** | **Percentage (%)** |
| Local Pain | 24 | 45.3 |
| Radicular Pain | 28 | 52.8 |
| Referred Pain | 1 | 1.9 |
| **Total** | **53** | **100.0** |

This research shows that the type of pain most frequently experienced by LBP patients is radicular pain, 28 patients (52.8%), followed by local pain, 24 patients (45.3%), and the type of pain least experienced by LBP patients is referred pain, 1 patient (1.9%).

**3.1.6 Characteristics of LBP Patients Based on LBP Onset**

LBP patients are grouped based on the onset of NPB with the following distribution:

Table 6. Distribution of LBP Patient Based on LBP Onset

|  |  |  |
| --- | --- | --- |
| **LBP ONset** | **Frequency (n)** | **Percentage (%)** |
| Acute | 31 | 58.5 |
| Subacute | 8 | 15.1 |
| Chronic | 14 | 26.4 |
| **Total** | **53** | **100.0** |

The results of the study showed that the length of time patients experienced complaints of LBP, it was found that most LBP patients experienced complaints of acute LBP (pain for <6 weeks) as many as 31 patients (58.5%), followed by chronic LBP (pain for >12 weeks) as many as 14 patients (26.4%), and subacute LBP (pain for 6-12 weeks) as many as 8 patients (15.1%).

**3.1.7 Characteristics of LBP Based on Management**

LBP patients are grouped based on the treatment received by LBP patients with the following distribution:

**Table 7. Distribution of LBP Patient Based on Management**

|  |  |  |
| --- | --- | --- |
| **Governance** | **Frequency (n)** | **Percentage (%)** |
| Conservative | 50 | 94.3 |
| Operative | 3 | 5.7 |
| **Total** | **53** | **100.0** |

This research shows that as many as 50 patients (94.3%) received conservative treatment, namely medical treatment and physiotherapy and as many as 3 patients (5.7%) received treatment in the form of surgery.

**3.2. Discussion**

From 53 research samples, it was found that the largest group of elderly people who experienced LBP were in the age range of 56-65 years, namely 19 patients (35.8%). The results of this research are in line with research conducted at Sangah General Hospital Denpasar in 2014-2015 where LBP patients were mostly found in the age range 41-60 years, namely 20 of the 34 patients studied (58.8%). The age range was 61-70 years as many as 14 patients (41.2%).11

This happens because as we age, degeneration of the intervertebral discs occurs and there is thickening and shifting of the intervertebral disc structure which causes the flexibility of the vertebrae to decrease. Long-term compression of the intervertebral discs causes the intervertebral discs to become thinner. This condition causes protrusion of the nucleus pulposus and tearing of the relatively weak posterior ligament which in turn can put pressure on the spinal nerves, causing complaints of LBP.12,13 In addition, along with increasing age, degenerative processes occur which have the risk of causing diseases in the vertebral area such as spinal stenosis, facet hypertrophy, spondylosis, and spondylolisthesis which can cause complaints of LBP.14

In this study, it was found that the female gender, 41 patients (77.4%) more often experienced LBP compared to the male gender, which was only 12 patients (22.6%). This research is in line with research conducted at the Bandung City Hospital Neurology Clinic for the period January–December 2018 where the number of male patients was only 27 people (35.5%) while there were 49 female patients (64.5%).15 Women have a higher risk of developing LBP due to hormonal imbalance. The hormonal imbalance that occurs during pregnancy causes the spinal ligaments to relax, thereby reducing the strength of the lower back muscles and increasing the risk of LBP. Women tend to have a lower pain threshold than men, therefore they report LBP symptoms more often than men. Apart from that, menopausal osteoporosis also causes LBP in women.16

Based on BMI, it was found that 17 LBP patients (32.1%) had a BMI in obesity category I or MBI 25–29.9 kg/m2. This is in line with research conducted at the Bandung City Hospital Neurology Clinic for the January–December 2018 period where the highest number of LBP patients were in the BMI ≥ 25.0 or overweight category (56.6%).15 The mechanism of the relationship between obesity and LBP is two-way. Obesity can cause LBP or vice versa LBP can cause obesity.17

The first mechanism, when someone experiences weight gain, the part of the body that first experiences an increase in volume is the abdomen, then the femur, gluteus, and other parts of the body. Fat in obese people will be distributed to the abdominal area and accumulation can occur which causes the lumbar work to increase to support the load. In addition, increasing the load on the spine will cause an increase in compression pressure which increases the risk of tears in the spinal structure.15,17 The second mechanism, obesity can cause LBP through a chronic systemic inflammatory process. When a person is obese, the number of adipocyte cells increases. Adipocyte cells are cells that function as storage of energy reserves in the form of fat. The increase in cell number is associated with increased production of adipokines (leptin, resistin, TNF α, and IL-6). Sensitization of free nerve endings, matrix degradation, and chondrocyte apoptosis can occur due to the release of compounds such as IL-8, matrix metalloproteinase (MMP), and NO by chondrocytes due to stimulation of these adipokines. A third mechanism, metabolic syndrome may be involved in the pathology of low back pain, especially abdominal obesity involving hypertension and dyspidemia. The fourth mechanism, obesity is closely related to the degenerative process of the intervertebral disc and to changes in the spinal endoplatel. In addition, as body weight increases, spinal mobility decreases.17

In this study, the type of work most frequently carried out by LBP patients was as self-employed, totaling 21 patients (39.6%), however, it could not be explained in detail the type of self-employment carried out due to the limitations of recording medical records. This is in line with research conducted at Sangah General Hospital Denpasar in 2014-2015 which found that the occupation with the largest proportion was self-employment with 11 patients with a percentage of 32.4%. LBP is a condition closely related to occupation, which can be caused or triggered by certain jobs. Physical work, operating manual machines, repetitive body rotation, vibrations that expose the entire body, or sitting for long periods can increase the incidence of lower back pain.7

Based on the type of LBP pain, it was found that the most frequently experienced type of pain was radicular pain in 28 patients (52.8%). Radicular pain is closely related to the distribution of spinal nerve roots, and is exacerbated in positions that cause tension, such as bending; and decreases with rest. Pain that radiates to the legs indicates nerve root involvement.18 One of the causes of radicular pain is a spinal cord tumor which is characterized by pain that does not subside after rest or gets worse, especially at night. Other features that may be observed are neurological changes such as paresthesia and numbness which may be accompanied by motor weakness.19

The results of the study showed that the length of time patients experienced LBP complaints was that most LBP patients experienced acute LBP complaints (pain for <6 weeks) as many as 31 patients (58.5%). Acute LBP is the most common form. Acute LBP can generally heal on its own. However, many also later become chronic and cause disability.18 The recurrence of acute LBP can be prevented by avoiding excessive muscle use.20

Based on the treatment carried out by LBP patients, 50 patients (94.3%) received conservative treatment in the form of education, medical therapy and physiotherapy and 3 patients (5.7%) received treatment in the form of surgery. The results of research conducted at the medical rehabilitation installation of RSUP Dr. Mohammad Hoesin Palembang regarding the relationship between SWD and TENS therapy on the incidence of kinesiophobia and pain catastrophizing in 25 low back pain patients, it was found that there was an influence from short-wave diathermy (SWD) and transcutaneous electrical nerve stimulation (TENS) therapy undergone by low back pain patients, which means there was an improvement in the level of function or an improvement in pain scores in these patients. Physiotherapy can help relieve pain, overcome functional disorders and activity limitations, and enable patients to return to their activities. There are several physical therapy modalities most commonly used to reduce pain, including Short Wave Diathermy (SWD) and Transcutaneous Electrical Nerve Stimulation (TENS).21

4. Conclusion

Based on the results of research regarding the characteristics of lower back pain in Neurology Polyclinic Patients at UKI General Hospital for the period January 2021–December 2022, it can be concluded: )Based on age, the age group that experienced the most LBP was in the 56-65 year age group, amounting to 19 patients (35.8%) and the age group that experienced the least LBP was the 36-45 year age group, amounting to 1 patient (1.9%); 2) Based on gender, women experienced more LBP, 41 patients (77.4%) compared to men, namely 12 patients (22.6%); 3) Based on body mass index, most LBP patients were in the BMI category 25 – 29.9 kg/m2 (obesity I) totaling 17 patients (32.1%); Based on the type of work, the type of work most frequently carried out by LBP patients is working in the private sector, amounting to 21 patients (39.6%); 5) Based on the type of pain most frequently experienced by LBP patients, radicular pain was 28 patients (52.8%); 6) Based on the onset or duration of the patient experiencing LBP complaints, the most LBP patients experiencing acute LBP complaints were 31 patients (58.5%).; 7) Based on management, most LBP patients received conservative therapy, amounting to 50 patients (94.3%).

References

1. Wahab A. Factors associated with complaints of low back pain in fishermen in Batu Karas village, Cijulang Pangandaran subdistrict. Biomedicine. 2019;11(1):35–40.
2. Astuti I, Septriana D, Romadhona N, Achmad S, Kusmiati M. Lower back pain and smoking habits, body mass index, years of work, and workload among waste collectors. JKS [Internet]. 2019;1(1):74–8. Available from: http://ejournal.unisba.ac.id/index.php/jiks
3. Kahere M, Ginindza T. The prevalence and risk factors of chronic low back pain among adults in kwazulu-natal, south africa: an observational cross-sectional hospital-based study. BMC Musculoskelet Disord [Internet]. 2021;22(955):1–10. Available from: https://doi.org/10.1186/s12891-021-04790-9
4. Nugraha RF, Respati T, Rachmi A. Risk factors for low back pain in housewives. JKS. 2020;2(1):35–8.
5. Morris P, Ali K, Merritt M, Pelletier J, Macedo LG. A systematic review of the role of inflammatory biomarkers in acute, subacute and chronic non-specific low back pain. BMC Musculoskelet Disord [Internet]. 2020 Mar 3 [cited 2023 Jun 29];21(142):1–12. Available from: https://link.springer.com/articles/10.1186/s12891-020-3154-3
6. Suryawijaya EE, Siahaan YMT, Purba PF, Hartoyo V. Factors influencing the incidence of lower back pain in medical personnel at Siloam Hospitals Lippo Village Karawaci. Neurona. 2021;38(4):286–91.
7. H Cahya IPI, Yulda AAG. Prevalence of lower back pain in 2014-2015 at Sanglah General Hospital, Denpasar. JMU [Internet]. 2020;9(6):35–9. Available from: <https://ojs.unud.ac.id/index.php/eum>
8. GBD 2021 Low Back Pain Colabolators. Global, regional, and national burden of low back pain, 1990 – 2020, its attribute risk factors, and projections to 2050: a systematic analysis of the global burden of low back pain 2021. Lancet Rheumato. 2023;5(6):el 316–29.
9. Hutasuhut RO, Lintong F, Rumampuk JF. The relationship between long periods of sitting and complaints of lower back pain. eBiomedicine. 2021;9(2):160–5.
10. Dialo SYK, Mweu MM, Mbuya SO, Mwanthi MA. Prevalence and risk factors for low back pain among university teaching staff in Nairobi, Kenya: a cross-sectional study. F1000 Research. 2019;8(808):1–19.
11. Goin ZZ, Pontoh LM, Umasangadji H. Characteristics of patients with low back pain in medical rehabilitation polyclinic of regional hospital Tidore Islands in January-June 2019. Kieraha Med J. 2019;1(1):44–53.
12. Knezevic NN, Mandalia S, Raasch J, Knezevic I, Candido KD. Treatment of chronic low back pain - new approaches on the horizon. J Pain Res. 2017;10:1111–23.
13. Alegri M, Montella S, Salici F, Valente A, Marchesini M, Compagnone C, et al. Mechanisms of low back pain: a guide for diagnosis and therapy. F1000 Research. 2016;5:1–11.
14. S AC, Santoso WM, Husna M, Munir B, Kurniawan SN. Low back pain. JPHV. 2021;1:13–7.
15. Islami NANN, Akbar B, Hakim FA. Description of risk factors for patients with lower back pain in Bandung City Hospital for the period January-December 2018. In: Medical Proceedings. 2020. p. 465–8.
16. Makkiyah FA, Sinaga TA, Khairunnisa N. A study from a highly populated country: risk factors associated with lower back pain in middle-aged adults. J Korean Neurosurg Soc. 2023;66(2):190–8.
17. Patrianingrum M, Oktaliansah E, Sulrahman E. Prevalence and risk factors for low back pain in the anesthesiology work environment at Dr. Hospital. hasan sadikin bandung. JAP. 2015;3(1):47–56.
18. Winata Elementary School. Diagnosis and management of low back pain from an occupational perspective. J Kedokt Meditek. 2014;20(54):20–7.
19. Wullandari A. Chiropractic therapy (spinal manipulation) for low back pain. JMH. 2020;02(01):369–75.
20. Tanderi ElA, Kusuma TA, Hendrianingtyas M. The relationship between functional ability and pain level in mechanical low back pain patients at the medical rehabilitation installation at Dr. Hospital. Kariadi Semarang. JKD. 2017;6(1):63–72.
21. Wardana Y, Jalalin J, Zulliseltiana ElF. The effect of short wave diathermy (swd) and transcutaneous electrical nerve stimulation (swd) on the incidence of kinesiophobia and pain catastrophizing in low back pain patients. JKK. 2018;5(1):10–9