

EFFECT OF BACKPACK WITH THE INCIDENCE OF LOW BACK PAIN AT 7-20 YEARS OF AGE

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ABSTRACT

Background: LBP (LBP) in children aged 8-20 years is becoming increasingly common, so it is necessary to know the causes. One of the factors that causes the emergence of LBP complaints in children is the use of a backpack. However, until now there are no load parameters, length, and how to use a backpack that can cause LBP. **Purpose:** To find out how the effect of the burden, duration, and how to use a backpack on LBP. **Methods:** Literature review by taking libraries from 30 journals. Journals were obtained from the PubMed search engine, Google Scholar, Lancet with the keywords Backpack and LBP in children which were selected with the criteria of accredited national journals indexed by Sinta 1, Sinta 2, Sinta 3 and international journals of good reputation and indexed by Scopus and non-Scopus Q1, and Q2 which were published no later than 2015. **Results:** Obtained journals with material that match the objectives of this study and passed the selection. The results of the analysis show that the LBP is influenced by the load, duration, and how to use the backpack **Conclusion:** There is an influence between LBP and load, duration, and how to use a backpack.

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1. INTRODUCTION

LBP, which is a symptom defined as back pain located in the back, in the area below the 12th rib, if the line is drawn axially, the dorsal parts included in this area are the lumbar vertebrae, sacral vertebrae, and caudal vertebrae. Or in other words, LBP is back pain that is located in the waist area that radiates to the buttocks. [1]

Most studies find the highest incidence of LBP occurs in the third decade of life and that overall prevalence increases up to 60 to 65 years of age. [2] But other researchers, found different results, [3] assumes that the age range under 20 years is the age range most at risk of experiencing LBP due to backpack use.

At 18 years of age, the lifetime prevalence rate of LBP was the same as that of adults, with an estimated annual prevalence of 20% and a lifetime prevalence of around 75%. [4] This means that if a person is exposed to LBP at a young age, the chance of getting LBP annually is 20% and the chance of getting LBP during his life is 75%. [5]

Why this happens, researchers then look for factors that are likely to contribute to development, Some researchers such as Legiran (2018), Mustafa (2018), MacCabe (2017) and Maher (2017), agree that LBP at the age of 7 to 18 years is mostly caused by excessive backpack load. [5-8] This article is linked to find out the factors involved in the development of LBP caused by backpacks.

2. METHOD

Literature review by taking libraries from 20 journals. Journals were obtained from the PubMed search engine, Google Scholar, Lancet with the keywords Backpack and LBP in children which were selected with the criteria of accredited national journals and international journals of good reputation and indexed by Scopus and non-Scopus which were published no later than 2015.

3. RESULTS AND DISCUSSION

Low back pain is the leading worldwide cause of years lost to disability and its burden is growing alongside the increasing and ageing population. [9] Because these increasing populations are more rapid in developing countries, where adequate resources to find out the problem might not exist, the effects will probably be more severe in these regions. [10]

One of the most influential factors on the development of LBP in children and adolescents is between the ages of 8 and 12 years, these parts will only become compact bones in adulthood. [4] Before fusion occurs, these areas are more susceptible to injury than those in the adult compact bone. [4] The second factor is the weight of the load and the length of time using the backpack. Research the use of a backpack that is too heavy. [11]

The American Occupational Therapy Association, and the American Academy of Orthopedic Surgeons recommends that the backpack load should be at the same rate, i.e. no more than 10% of body weight. [7] However, according to The American Physical Therapy Association, suggest a different figure, namely 15% of body weight. [11] According to Hartvigsen (2018), There are three factors that most influence the development of LBP in this age group, the first is biophysical factors, in this case the age of the backpack user. and the second is the load and duration of using the backpack, as well as how to use the backpack. The first most influential factor is a biophysical factor, more precisely age. [12] Each of these researchers described their research subject, namely the school age group as distinct age ranges. For example Legiran (2018) in his research using elementary school children with an age range of 10 to 12 years.. Research shows that the largest number of backpack users is the school age group. [5] Research that shows these various things is research, from Legiran (2018), MacDonald (2017), Spiteri (2017), Rodríguez (2018), MacCabe (2017).

In contrast to Legiran (2018), MacDonald (2017) uses a much wider age range, namely 7 to 18 years. Spiteri (2017) describes the subject, namely elementary school children in grades 4-6 years and middle school children grades 7,8, and 9, the age range of this school group ranges from ages 8 to 13 years. Rodríguez (2018) chose the research subject range from ages 12-16 years. And lastly, MacCabe (2017) chose the research subject range from ages 10-15 years. In general, the age range of research subjects who use backpacks is between 10 years old for the youngest age and 19 years for the oldest age. [3] The reasons or pathogenesis of LBP in this age group are as follows. Anatomical differences are the pathophysiological basis of this complaint, in children, the superior and inferior vertebrae of the vertebral bodies and the spinous process consist cartilages and secondary ossification centers occur conducted by Legiran (2018), Mustafa (2018), MacCabe (2017), Maher (2017), Hundekari (2017) and Pinem (2018).

Research conducted by Legiran (2018), which involves backpack load and length of use of backpacks, in his research, the results of statistical tests obtained p value = 0.000 ($p < \alpha$), this means that there is a significant relationship between bag weight and musculoskeletal complaints . The distribution of respondents based on backpack weight can be seen that quite a lot of school students carry a backpack weight that exceeds a percentage of their body weight. [5] About 50% of students carry 10-15% of the backpack's load, around 38% carry a backpack load of > 15% of their body weight, and only 12% of students carry a load <10% of their body weight. [5]

Research conducted by Mustafa (2018) found that 50% of students complained about backpack weight, 64.9% of students complained of musculoskeletal pain, the remaining 35.1% of students did not feel it. Based on the characteristics of pain, about 6.1% of students said that they felt very, very painful, and 15% felt continuous pain, even though school time was over. [6]

The pathogenesis of how the burden and duration of use of the backpack can affect the development of LBP are as follows, a body that carries a backpack that is too heavy tends to cause the body to be pulled back by the load. To compensate for this condition the body will perform anterior flexion to balance the posture. Increased anterior flexion, especially over a long period of time, will cause an increase in intervertebral. [7] The third factor is how to use the backpack also contributed to explaining the relationship with LBP. Research conducted by Mosaad (2018), Mustafa (2018), Rodríguez (2018), and Alami (2018).

Research from Iraq Mosaad (2018) shows that how to carry a backpack also affects the balance of the body and cervical angle (CA). Researchers compared the way to carry a traditional backpack with a backpack that is worn on both shoulders. The result is that the use of a backpack that is worn on both shoulders tends to

improve body balance, reduce HF (head flexion), this is because the load is more distributed on both sides of the backpack.[13]

How to carry a backpack in a variety of ways also spurred the curiosity of one of the researchers in the province of Koya, Iraq. The researcher named Mustafa (2018) examined the position of carrying a backpack and its relationship with the LBP incidence. The first is how to carry a backpack using one side of the shoulder. [6] From the results, about 40% of backpack users who use it on one side of the shoulder admit to having LBP. The second position to carry a backpack is to carry it with both shoulders, with a complaint of 22% LBP. [6] A researcher from Spain, Rodríguez (2018), also included how to carry a backpack along with his relationship with LBP in his research. He divides how to carry the backpack in two positions, the first position is two shoulder straps and the second position is another type strap. [14] After doing the research, it was found that 23.6% of the two shoulder strap backpack users were LBP and 18.8% of the other backpack type strap. [14] Why this happens, the pathogenesis of how to carry a backpack and can cause LBP are as follows. The wrong position of the backpack can lead to changes in posture for example, carrying the backpack on one side or on one shoulder can cause a lateral inclination of the spine and depression on the side of the shoulder carrying the backpack. [13] This causes an increase in the intervertebral pressure on that side, if this continues it may result in compression on the intervertebral disk which can cause pain. [7] Over time, this will lead to postural change followed by LBP. [15]

In general, the age range of research subjects who use backpacks is between 10 years old for the youngest age and 19 years for the oldest age. Anatomical differences are the basis of the differences in LBP in this age group. In children aged 7- 20 years, secondary ossification still occurs in their spine, this causes their spine to become more fragile than in the age group over 20 years. Bag weight exceeding 15% of the carrier body weight will lead to an increase in the prevalence of LBP. Carrying a backpack for more than half an hour a day for more than 4 years can also increase the prevalence of LBP

4. CONCLUSION

There is an influence between LBP and load, duration, and how to use a backpack. Use of the bag exceeds 30 minutes, if the bag load exceeds 10% of body weight. in one day, for over 4 years. increasing the prevalence of LBP. The recommended backpack load ranges from 5-10% of body weight.

The recommended way of using the backpack, using the backpack should not exceed 30 minutes in one day, using a two strap backpack, attaching the backpack to the back, and distributing the backpack load evenly on the carrier.

The prevalence of LBP from school-age children is 1% in children aged 7 years, 6% in children aged 10 years, and 18% in children aged 14 to 16 years. Ages 18-20 the prevalence of LBP increases to 20%.

To avoid LBP, you should follow a good backpack usage method according to the directions from American Orthopaedic Surgeon. However this conclusion needs more study to be proven

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