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**Inter-professional Collaboration in Health
Program: Promotive, Preventive, and
Rehabilitative on Non-communicable Diseases**

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THE EFFECT OF WEIGHT OF BACKPACK TOWARD MUSCULOSCELETAL DISRUPTIONS AMONG STUDENT OF MADRASAH TSANAWIAH (MTSN) NEGERI 2 PONTIANAK CITY

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Abstract

Background: Mostly, the habit of students is putting various kinds of stuff on their backpack, and that causes the weight of backpack was 15 % of their body weight. If this happened continuously, will interfere musculoskeletal development and also disrupt the vertebrae structure along with nerve system. The occurrence of musculoskeletal disruption is begun from a pain in some areas of the body.

Objective: This study aimed to analyze the effect of weight of backpack toward musculoskeletal disruptions among students of Madrasah Tanawiah (MTsN) Negeri 2 Pontianak City.

Method: This study used *Cross Sectional* on 240 students MTsN 2 Pontianak City.

Result: Of 240 students, female was greater than male (50.83 %). The respondents who experienced neck pain was 85.41% and shoulder pain was 75%.

Conclusion: There was significant effect between the weight of backpack toward back pain. *P* value was 0.001 or lower than 0.005.

Keyword: Backpack, Back Pain, Musculoskeletal disruptions

INTRODUCTION

Students never be loose or identical with their school bags, they put all of the stuffs on their bags. Mostly, the kinds of their bag school is backpack, because the wrap is plentiful and easier to carry. The backpack is a bag model with plenty of parts to keep various of school equipments such as books, pencil boxes, food supplies and drinking water. Most of students sometimes include everything which fit into the bag. Consequently, their backpack exceed 15% of their own weight. If this happens continuously, it will interfere the musculoskeletal development and disrupt the vertebrae structure along with its nerve system. In addition, junior high school age period is the age of growth and development where the average student age 14 to 15 years. A Using of backpack

inappropriately will affect various of musculoskeletal problems. Based on the name, the backpack should be used on the back side, but some students use it not on that side. Periodically, the students often combine the two pouches of the backpack and put them on one shoulder (Hardjono, 2014).

A pain usually occurs along with disease process. It is a common reason for a individual seeking a healthcare provider, diagnostic examination, and medication. At levels of elementary school, junior high school, and senior high school are often experiencing of musculoskeletal problem such as muscle and pain. Those are caused of inappropriately in carrying of the backpack.

The results of a study conducted by physician Eric Wall, a child orthopedic surgeon at Cincinnati Children's

Hospital Medical Center, USA, showed that generally students complain about headaches, neck pain, muscle stiffness, tingling hands, or lower back pain. Additionally, from the same institution, the doctor Mark Goddard explained that the complaints were caused by the use of backpacks with excessive loads put into a backpack (Anonimus, 2006).

In Italy, a study on grade VI elementary showed that typically students carrying loads of up to 10 kg in backpacks, there were 46% complaining of pain in the back, while 66% of them admitted to fatigue (Anonimus, 2006).

METHOD

This was cross Sectional Study. The respondents were selected by random. There were 240 students from MTsN 2 Pontianak involved in this study. This study was conducted on June 2017.

RESULTS

Tabel 1. Characteristic of Respondents based on Sex, Body Weight, and Backpack Weight

No	Characteristic	Categories	n=240	%
1	Sex	Male	118	49,16
		Female	122	50,83
2	Weight of backpack	< 15 %	80	33,33
		>15%	160	66,66

Source: Primary Data

Tabel 1 showed that the frequency of female (50.80%) was greater than male. The weight of backpack exceeded 15% than body weight was greater (66.66%) than the backpack which less 15% than body weight.

Table 2. Characteristic of Pain

Variable	f	%
Neck	205	85,41
Pain	35	14,58
Shoulder Pain	180	75
Not Pain	60	25
Arm	132	55
Pain	108	45
Low Back Pain	110	45,83
Not Pain	130	54,16

Source: Primary Data

Table 2 showed that the frequency student who experienced neck pain was the greatest (85.41%). It followed by the second greatest was the student who experienced shoulder pain (75%), and the last was the student who experienced low back pain (45.83%)

Table 3 : Relationship between the weight backpack and pain (n = 240)

Cate gory	pain				P	
	yes		no		Total	n
	f	%	f	%	n	
< 15	85	35,41	155	64,59	240	100
>15	125	52,08	115	47,92	240	100

Source: Primary Data

Table 3 showed that weight backpack more than 15 % body weight had musculoskeletal pain was 52,08 %. However, weight backpack less than 15% body weight had musculoskeletal pain was 35,41%. There were relationship between the weight backpack and pain (P = 0.001).

DISCUSSION

Complaining about the pain on musculoskeletal problem is come from the student who used the backpack which the weight of it 15% over than their body weight. there were 52.08% the students who experienced those problems. It showed that there is influence the weight of backpack toward back pain that happened among student of Tsanawiyah 2 Pontianak City ($P < 0.001$). According to Nordin and Melot (2002), the high number of backpain complaints in grade 5 students in Kelurahan Tegal Panjang can be caused by many factors that increase the sensitivity of students to pain due to the use of backpack. Other factors such as the level of activity and how to sit in the classroom. The activities of students grade five is relatively high, especially play activities. Mostly the students grade five spend their time outside, such as play foot ball or sports. Along the increasing of age, the activities of students are also increasing. The previous study found that 52,08 % the weight of backpack students exceed 15 % their body weight. Besides they are carrying a textbook which is consisting of 5 subjects and each subject consists of 3-4 books (1 kg), then the average day a student bring 15 books (5 kg), plus a bottle of drinks, food supplies, etc. In addition, students carry a bag with one shoulder or with a selection of bags that are less precise, like a small and hard strap bag. In muscle areas, the experience neckpain was 85.41%, shoulder pain was 75%, arm pain 55%, and low back pain was 45.83%. The results of a study which conducted by physician Eric Wall, a children's orthopedic surgeon at Cincinnati Children's Hospital Medical Center, USA, generally complain of headaches, neck pain, muscle stiffness, tingling hands, or lower back pain. From the

same institution, the doctor Mark Goddard explained that the complaints were caused by the use of backpacks with excessive loads put into backpack (Anonimus, 2006). Research in Italy towards grade VI elementary students typically carries a load of up to 10 kg in the backpack. Acquired 46% complained of pain in the back, while 66% of them admitted fatigue (Anonimus, 2006). Alaa'O (2012), a study conducted on 800 students in Turkey, said that the long use of a 5-30 minute bag from home to school every day with an average bag weight of 5.267 kg or 12.3% of body weight causes shoulder pain (47.8%), lower backpain (21.6%), and neckpain (18.2%). Based on the sex, the female students more than male students was 50.83%. The weight of the student bag that exceeds its weight is 66.66%, larger than the student carrying the weight of bag under 15% of weight. Mahendrayani's (2015), said that male sex has more back pain than females in children aged 11-12 years and statistically different results from previous studies are also due to other factors affecting outcomes. There is a difference in the level of activity by gender on the respondents. The level of male activity is higher and higher than women. Men are also more often do more challenging and heavy sport types. This is supported by the opinions of Adam, McGrath, Pickett, and Van Den Kerkhof (2006). According to the previous researchers, at the time of observation, that female students carry more luggage outside of school books such as small umbrellas, food boxes, *mukenah* etc., so female students are more likely to weigh bags more than 15% of their body weight compared to male students.

CONCLUSION

This study aimed to determine the effect of backpack on musculoskeletal pain complaints in Tsanawiah Negeri 2 Pontianak City. The research was conducted by using Cross Sectional Design research design from 240 students, selected by purposive sampling technique. This research shows that there is a significant influence between the weight of student backpack with musculoskeletal pain, with P value equal to 0.001, or less than 0.005. The weight of the bag of female students is heavier than the weight of the bag of male students. It is caused of many female students carry items outside of school books, such as mukenah, lunch box, umbrella and others.

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