DOI: 10.30651/jqm.v9i02.23530

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Research Article

The Relationship Between Body Mass Index And Hand Grip Strength In Adolescents Aged 13-16 Years

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ARTICLE INFO

Submitted : *8th October 2024*
Accepted : *12th March 2025*
Published : *25th July 2025*

Keywords:
Body Mass Index, Hand Grip Strength, Adolescents

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ABSTRACT

Nutritional status is of particular concern in both developed and developing countries. The prevalence of overnutrition and obesity, especially in adolescents, continues to increase. Various parameters can be used to assess a person's physical fitness. Hand grip strength is one of the parameters used to evaluate nutritional status and physical fitness and predict various metabolic diseases. This study aims to determine the relationship between Body Mass Index (BMI) and hand grip strength in adolescents aged 13-16. The research design was analytic observation with a cross-sectional approach at SMP Negeri 7 Denpasar—sampling technique with simple random sampling of as many as 100 respondents based on inclusion and exclusion criteria. The nutritional status criteria are guided by the Indonesian Ministry of Health, namely underweight (-3SD to -2SD), normal (-2SD to +1SD), overweight (+1SD to +2SD), and obesity >+2SD. The classification of hand grip strength that we use includes Weak (< 26.6 kg), normal (26.6 kg), and strong (> 26.6 kg) for men, while for women, they are weak (< 27.1 kg), normal (27.1 kg), strong (> 27.1 kg). Data were analyzed using the Chi-Square Test. The results obtained in this study include the majority of 13-year-olds (55%), male gender (56%), weak hand grip strength (54%), and normal BMI (43%). The mean BMI was 20.49±4.24, and the mean hand grip strength was 26.74±9.33. Based on the Chi-Square test, there was a significant relationship ($p<0.001$) between BMI and hand grip strength. Thus, this study can conclude that a substantial relationship exists between BMI and hand grip strength in adolescents aged 13-16.

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INTRODUCTION

Intake and utilization of nutrients obtained from diet determine an individual's physical condition, which refers to their nutritional status (Budiman et al., 2021). Individuals' nutritional status can also impact dietary issues across all age demographics (Muchtar et al., 2022.). Experts consider nutritional status normal when the body acquires a well-proportioned supply of nutrients in adequate amounts. The body is in an inadequate dietary state when it lacks carbs, lipids, proteins, and vitamins (Sumadewi, 2017). When an individual's energy intake exceeds their energy expenditure, their nutritional condition is considered excessive, resulting in overweight and obesity (Rahmawati, 2017). Indicators can utilized to evaluate nutritional status, including assessing an individual's clinical manifestations and symptoms, biochemical markers, surveys on food consumption, and anthropometric measurements. Anthropometric measurements are frequently employed to evaluate an individual's nutritional and health condition because they offer comprehensive insights into body composition, particularly muscle and fat components. Body Mass Index (BMI) and Upper Arm Circumference commonly utilize anthropometric metrics (Bhattacharya et al., 2019). Variances in BMI can lead to alterations in body structure due to elevated body mass. This increase can also impact motor performance, encompassing postural balance and muscle strength. Body Mass Index (BMI) has the potential to affect the quality of muscles, which in turn can be used to predict the strength of the handgrip (Lubis and Pangaribuan, 2021).

The prevalence of underweight and obesity among adolescents in Indonesia, particularly in Bali, reflects significant nutritional challenges. According to Salsa *et al*. (2024), about 8% of adolescents in Indonesia are underweight, while the obesity rate among adolescents has increased substantially from 23.6% in 2013 to 31% in 2018 (Salsa et al., 2024). Specific findings in Bali show that 75.5% of adolescents classified as obese are classified as level II obesity, signaling a worrying trend in the region (Wiardani & Kusumajaya, 2023). Although the prevalence of underweight in Bali is not described in detail, national trends that show significant concern for the nutritional status of adolescents provide a broader picture of the challenges faced in efforts to meet the nutritional needs of adolescents in Indonesia (Arfines et al., 2020). The high prevalence of adolescent obesity in Bali shows adolescents' low physical fitness levels, so it is important to conduct research in adolescence.

Muscular strength is a vital factor in assessing an individual's physical fitness. Assessing handgrip strength is highly valuable for evaluating an individual's overall physical condition and strength Heidy et al., 2019). Handgrip strength screening is a more sensitive tool for assessing nutritional status than other methods. Handgrip strength is a handy tool in daily practice for quickly and promptly assessing nutritional health. Research conducted in Brazil and Japan has found that handgrip strength is a more effective indicator of malnutrition, with a detection rate of 69.3%, compared to other anthropometric measures (Hardigaloeh et al., 2018).

The correlation between BMI and handgrip strength remains inconsistent. A study conducted by Khalid in 2017 in Saudi Arabia showed that age, BMI, hand length, and arm circumference exhibited a strong link with hand grip strength (Alahmari et al., 2017). Hand length, age, and arm circumference accounted for 44.2% of the differences in hand grip strength, as determined by anthropometric measurements. A study conducted in Iraq found

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a notable correlation between body mass index (BMI) and grip strength of the dominant hand. Specifically, as BMI grew, hand grip strength likewise increased, while a BMI reduction was associated with decreased hand grip strength (Al-Asadi, 2018). A study in Padang yielded varying outcomes, revealing no correlation between Body Mass Index (BMI) and the grip strength of both the right and left hands (Daniati et al., 2020). This study aims to establish the correlation between body mass index (BMI) and hand grip strength among adolescents in Denpasar.

METHODS

The study used analytic observational research with a cross-sectional approach. The research respondents were 100 students of the *SMP Negeri* 7 Denpasar who were selected based on the inclusion and exclusion criteria of the study using the simple random sampling method. The inclusion criteria of this study included students of *SMP Negeri* 7 Denpasar who were present during data collection and willing to participate in the study and signed an informed consent sheet by the parents of students. The exclusion criteria used are students with a history of injury to the upper limb area, deformities in the upper limb area, surgery on the upper limb area, and neuromuscular disorders in the upper limb area. The sample size formula used is:

$$n = \frac{Za^2 x\ P\ (1 - P)}{D^2}$$

The research data utilized original data that the researcher directly measured. The measurements were conducted thrice from the dominant hand grip side to minimize measurement errors, and they were performed on the same individual to eliminate mistakes arising from inter-individual variations.

A stepped weight scale analog clock manufactured by the OneMed brand is employed to assess the mean Body Mass Index. Additionally, this scale can measure height using a scaled pipe. To determine the height, measure the distance from the highest point of the head (vertex) to the heel while the body is upright (anatomical) (Sana et al., 2017). To determine the Body Mass Index (BMI), divide the body weight (in kilograms) by the square of the height (in meters) (Sumadewi & Udiyani, 2020). The nutritional status criteria are guided by the Indonesian Ministry of Health, namely underweight (-3SD to -2SD), normal (-2SD to +1SD), overweight (+1SD to +2SD), and obesity >+2SD (Agustin et al., 2024). The instrument used to measure hand grip strength is the Jamar Hydraulic Hand Dynamometer, a brand handgrip dynamometer. The strength of a hand grip with a handgrip dynamometer is measured by grasping and gripping the dynamometer as firmly as possible in a sitting upright position and then bending the hand position until it forms a 90-degree angle. The dynamometer can be held within a few seconds and then released. Measurements will be made thrice, and the average values will be used in the analysis (Sukania et al., 2022). The classification of hand grip strength that we use includes weak (< 26.6 kg), normal (26.6 kg), and strong (> 26.6 kg) for men, while for women, they are weak (<27.1 kg), normal (27.1 kg), strong (> 27.1 kg) (Al-Asadi, 2018). They examined the acquired data using univariate and bivariate analysis and conducted bivariate analysis utilizing the Chi-Square Test (Polnok et al., 2022). The study has obtained ethical approval under number 82/Unwar/FKIK/EC-KEPK/XII/203. Informed consent is given to the parents of students, considering the age of the respondents, who are still 13-16 years old.

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RESULTS

Characteristics of Respondents

Most 55% of responders were 13 years old based on the students' characteristics. Regarding gender, the male population constituted the majority of students, with 56%. A significant proportion of children, up to 54%, exhibit inadequate hand grip strength. Regarding the classification of BMI, most respondents fell into the normal BMI category, with 43% of students having a normal BMI (Table 1).

Mean BMI and Hand Grip Strength

Table 2 displays the average BMI and hand grip strength of the participants. The average BMI was 20.49 kg/m2, whereas the students' grip strength measured 26.74 kg.

Distribution of BMI and Hand Grip by Gender

Females comprised 51.5% of students with weak hand grips, while males comprised 48.5%. Of the students with a firm hand grip, 71.9% were male, and 28.1% were female. Regarding BMI, 58.8% of students classified as underweight were male, while 41.2% were female. Of the students with a normal BMI, 58.1% were male and 41.9% were female. Out of the students with an overweight BMI, 62.5% were female and 37.5% were male. In the BMI obesity class 1, 53.3% of students were male, and 46.7% were female.

Relationship between BMI and Hand Grip Strength

Among students with underweight BMI, 91.2% had a weak grasp, while 8.8% demonstrated a firm grip. Of all the pupils with a normal BMI, 60.5% had a weak grasp, whereas 39.5% had a firm grip. Half of the students with a high BMI had a weak grasp. Of the students with BMI obesity class 1, 53.3% had a good grip, and 46.7% had a poor grip. The Chi-Square test yielded a statistically significant connection, with a p-value of <0.001.

Table 1. Characteristics of Respondents

Characteristics of Respondents	Frequency (n)	Proportion (%)
Age (years old)		
13	55	55.0
14	39	39.0
15	4	4.0
16	2	2.0
Gender		
Male	56	56.0
Female	44	44.0
Hand Grip Strenght		
Weak	54	54.0
Strong	46	46.0
BMI		
Underweight	34	34.0
Normal	43	43.0
Overweight	8	8.0
Obesity	15	15.0

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Table 2. Mean BMI and Hand Grip Strength

Variable	Minimum	Maximum	Mean±SD
BMI	14	32.70	20.49±4.24
Hand Grip Strength	12.67	68.83	26.74±9.33

Table 3. The distribution of hand grip and BMI by gender

Variable	Gender		Total
	Male (n=56)	Female (n=44)	
Hand Grip Strenght			
Weak	33 (48.5%)	35 (51.5%)	68 (100%)
Strong	23 (71.9%)	9 (28.1%)	32 (100%)
BMI			
Underweight	20 (58.8%)	14 (41.2%)	34 (100%)
Normal	25 (58.1%)	18 (41.9%)	43 (100%)
Overweight	3 (37.5%)	5 (62.5%)	8 (100%)
Obesity	8 (53.3%)	7 (46.7%)	15 (100%)

Table 4. Relationship between BMI and Hand Grip Strength

BMI	Hand Grip Strenght		Frequency (%)	p-value
	Weak (n=68)	Strong (n=32)		
Underweight	31 (91.2%)	3 (8.8%)	34 (100%)	<0.001
Normal	26 (60.5%)	17 (39.5%)	43 (100%)	
Overweight	4 (500%)	4 (50.0%)	8 (100%)	
Obesity	7 (46.7%)	8 (53.3%)	15 (100%)	

DISCUSSION

The findings indicated that 54 students, accounting for 54% of the total, had weak hand grip strength, whereas 46 students, representing 46% of the total, demonstrated good hand grip strength. The mean grip strength of the students is 26.74 kg. Wang et al. (2018) conducted a study and found that junior high school students' hand grip strength averaged 25.27 kg, categorizing it as weak (Wang et al., 2018). Several factors, including weariness, time of collection, diet, the presence or absence of discomfort, and the cooperation of responders, can affect hand grip strength (Heidy et al., 2019). Data collection in this study was conducted during the day following the completion of learning activities, hence contributing to the acquired results. Aside from adipose-related parameters, the specific kind of muscle fiber and the extent of muscle cross-sectional area utilized during the evaluated movement also impact muscular strength (Heidy et al., 2019).

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The gripping process involves the relaxation and coordinated contraction of the flexor and extensor muscles in the forearm. The primary muscles involved in grasping are the Flexor Digitorum Profundus muscle, the Flexor Digitorum Superficialis muscle, the Flexor carpi muscle, and the Extensor carpi muscle. Four primary joints are involved in the grasping mechanism: the carpometacarpal joint, intermetacarpal joint, metacarpophalangeal joint, and interphalangeal joint. During the gripping process, the flexor muscles of the hand and forearm generate force, while the extensor muscles help stabilize the wrist. An injury or irregularity in a joint or contracting muscle might impact the hand grip strength (Budoff, 2004).

According to the BMI categorization study findings, the category with the highest number of individuals is normal BMI, with 43 people accounting for 43% of the sample. These findings align with the research conducted by Daniati et al. (2020), which indicates that most junior high school students in the BMI category fall within the normal BMI range, specifically 189 individuals (45.4%). Adequate nutritional intake is necessary to maintain a normal BMI (Daniati et al., 2020). Physical activity is an element that influences (Astuti & Bayu, 2022). Junior high school students receive weekly instruction on sports and extracurricular activities outside of regular class hours. This condition promotes the maintenance of an equilibrium between physical activity and food, resulting in an essentially normal BMI among junior high school students. The research conducted by Mahali and Indahsari (2019) also provides evidence of a correlation between physical activity and Body Mass Index (Hubungan Antara Kebiasaan Aktivitas Fisik Dengan Indeks Massa Tubuh (Imt) Pada Mahasiswa Fk-Uwks, 2016).

The findings of this study demonstrate a notable correlation between BMI and hand grip strength. A study conducted in Taiwan revealed considerable variations in hand grip strength across individuals with underweight, average weight, and overweight body mass index (BMI) categories. A correlation exists between hand grip strength, body weight, and height (Liao, 2016). Oseloka et al. (2014) conducted a study in Nigeria that found a positive correlation between BMI and hand grip strength (Oseloka et al., 2014). Muscular strength is a crucial factor when assessing and appraising physical fitness. Various factors, including nerve stimulation, recruitment size, stretching, muscle tissue type, muscle contraction type, muscle fiber type, energy stores and blood supply, contraction speed, muscle diameter, individual motivation, and nutritional status, determine muscle strength. The nutritional state of the human body is affected by various factors, including the percentage of body fat (Setiawan & Setiowati, 2014). Individuals with a BMI classified as overweight or obese typically exhibit a grip muscular strength that is 2.771 or 2.8 times greater than those with a normal BMI. Individuals with an average body mass index (BMI) but moderate physical activity levels typically exhibit weak grip strength. Conversely, individuals with a normal BMI but high levels of physical exercise generally have average to good hand grip strength.

Recognize muscular strength as a potent safeguard against metabolic syndrome. The protective effect is associated with mechanisms linked to insulin resistance and the quantity of ectopic fat. Plasma glucose uptake primarily occurs in striated muscle under the influence of insulin. The study by Atlantis E et al. (2009) highlights the significant significance of striated muscle in regulating glucose levels (Atlantis et al., 2009). Hand grip strength measurement can evaluate muscle strength. A randomized control

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trial study showed notable impacts of strength training on muscle mass, strength, and insulin resistance. This result could be attributed to decreased ectopic fat levels (since muscular strength is inversely correlated with fat buildup in the muscle) and improved muscle insulin sensitivity due to enhanced glucose absorption (Holten et al., 2004). Therefore, brief strength training programs enhance insulin resistance, indirectly impacting other aspects of metabolic syndrome.

This study still needs to improve in some aspects due to limited human resources and time constraints during its execution. Future studies will likely improve by considering other aspects influencing hand grip strength.

CONCLUSION

Based on the characteristics of the respondents, the majority of respondents were 13 years old with a male gender. Most respondents had weak muscle grip strength and a normal BMI in both men and women. The average grip strength of the hand is 26.74 kg. The average BMI of respondents was 20.49 kg/m2. This study found a significant relationship between BMI and hand grip strength in adolescents aged 13-16 ($p<0.001$). The limitation of this study is that it has not examined other factors that can affect hand grip strength, such as physical exercise, sleep patterns, body fat percentage, and grip endurance. Future research may include variables that may affect hand grip strength in adolescents. In addition, it may also explore physical exercise-based interventions or dietary modifications to improve muscle strength in the adolescent population.

ACKNOWLEDGEMENTS

The researcher expresses gratitude to SMPN 7 Denpasar for their participation in this study. The Faculty of Medicine and Health Sciences at Warmadewa University deserves appreciation for offering scholars a platform to complete their research successfully within the designated timeframe.

REFERENCES

Agustin AL, Wismaningsih ER, Oktaviasari DI, et al. (2024). Gambaran Status Gizi Remaja Di Wilayah Kerja UPTD Puskesmas Pare Description of the Nutritional Status of Adolescents in Pare Community Health Center Working Area. *Jenggala, 3*(1), 48–53.

Alahmari KA, Silvian SP, Reddy RS, et al. (2017). Hand grip strength determination for healthy males in Saudi Arabia: A study of the relationship with age, body mass index, hand length and forearm circumference using a hand-held dynamometer. *Journal of International Medical Research*, *45(2), 540–548*.

Al-Asadi JN. (2018). Handgrip strength in medical students: Correlation with body mass index and hand dimensions. *Asian Journal of Medical Sciences*, *9(1), 21–26.*

Arfines, P. P., Luglio, H. F., & Kusumawardani, N. (2020). Prevalence and Lifestyle Risk Factors of Overweight and Obesity Among Indonesian Adolescents: An Analysis of Global School-Based Health Survey 2007 and 2015. *Proceedings of the 4th International Symposium on Health Research (ISHR 2019)*. https://doi.org/10.2991/ahsr.k.200215.098

Astuti PT, Bayu IW. (2022). Indeks massa tubuh, pola makan, dan aktivitas fisik: apakah saling berhubungan?. *Jurnal Olahraga Pendidikan Indonesia (JOPI), 1(2), 154-167.*

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http://journal.um-surabaya.ac.id/index.php/qanunmedika

Atlantis E, Martin SA, Haren MT, et al. (2009). Inverse associations between muscle mass, strength, and the metabolic syndrome. *Metabolism: Clinical and Experimental*, *58(7), 1013–1022*.

Bhattacharya A, Pal B, Mukherjee S, et al. (2019). Assessment of nutritional status using anthropometric variables by multivariate analysis. *BMC Public Health*, *19(1), 1049.*

Budiman AL, Rosiyana R, Sari A, et al. (2021). Analisis Status Gizi Menggunakan Pengukuran Indeks Massa Tubuh dan Beban Kerja dengan Metode 10 Denyut pada Tenaga Kesehatan. *Nutrizione: Nutrition Research And Development Journal*, *1(1)*, *6-15.*

Budoff JE. (2004). The prevalence of rotator cuff weakness in patients with injured hands. *Journal of Hand Surgery*, *29(6), 1154–1159*.

Daniati L, Afriwardi, Ilmiawati. (2020). Penelitian Hubungan Aktivitas Fisik dengan Indeks Massa Tubuh (IMT) pada Siswa SMP Negeri 1 Padang. *Jurnal Ilmu Kesehatan Indonesia, 1(2), 193-198.*

Hardigaloeh AT, Gani R, Hasan, I, et al. (2018). Kekuatan genggam tangan, skor Child Pugh, dan massa otot pada pasien dengan sirosis hati. *Jurnal Gizi Klinik Indonesia, 14(3), 122-129.*

Holten MK, Zacho M, Gaster M, et al. (2004). *Strength Training Increases Insulin-Mediated Glucose Uptake, GLUT4 Content, and Insulin Signaling in Skeletal Muscle in Patients With Type 2 Diabetes. Diabetes, 53, 294-305.*

Mahali MI, Indahsari NK. (2019). Hubungan Antara Kebiasaan Aktivitas Fisik dengan Indeks Massa Tubuh (Imt) pada Mahasiswa Fk-UWKS. *Hang Tuah Medical Journal, 17(1), 84-93.*

Heidy, Djuartina, T, Irawan, R. (2019). The Correlation Of Hand Grip Strenght With Forearm And Hand Anthropometry And Body Mass Index. *Damianus Journal of Medicine, 18(1), 1-7*.

Liao KH. (2016). Hand Grip Strength in Low, Medium, and High Body Mass Index Males and Females. *Middle East Journal of Rehabilitation and Health*, *3*(1), e-33860.

Lubis ID, Pangaribuan DM. (2021). Hubungan Antara Kekuatan Genggaman Tangan Dengan Indeks Massa Tubuh Pada Mahasiswa Fakultas Kedokteran Universitas Muhammadiyah Sumatera Utara. *Anatomica Medical Journal, 4(2), 1-14.*

Muchtar F, Savitri ED, Lestari H, et al. (2022). Pengukuran status gizi remaja putri sebagai upaya pencegahan masalah gizi di. *Abdi Masyarakat*, *4(1)*, *43-48*.

Oseloka IA, Bello BM, Oliver HW, et al. (2014). Association Of Handgrip Strength With Body Mass Index Among Nigerian Students. *IOSR Journal of Pharmacy and Biological Sciences*, *9(1), 01–07.*

Polnok S, Titus T, Santoso WNH, et al. (2022). Statistics Kingdom: A Very Helpful Basic Statistical Analysis Tool for Health Students. *Health Notions*, *6(9), 413-420*

Rahmawati T. (2017). The Correlation Of Nutrient Intake With Nutritional Status Of Students In Nutritional Program 3rd Semester Of Stikes PKU Muhammadiyah Surakarta. *PROFESI, 14(2), 47-57*.

Salsa, D. Y., Dinengsih, S., & Syamsiah, S. (2024). Analysis Of Factors Associated With The Incidence Of Obesity In

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http://journal.um-surabaya.ac.id/index.php/qanunmedika

Adolescents. *JKM (Jurnal Kebidanan Malahayati)*, *10*(4), *305–314.*

Sana, IGNP, Astini DAAAS, Widarsa IKT, et al. (2017). Perkiraan Tinggi Badan Berdasarkan Tulang Panjang Usia 17-22 Tahun. *WMJ (Warmadewa Medical Journal)*, *1(2), 66-70*.

Setiawan DA, & Setiowati A. (2014). Hubungan Indeks Massa Tubuh (IMT) Terhadap Kekuatan Otot Pada Lansia Di Panti Wredha Rindang Asih III Kecamatan Boja. *JSSF*, *30(3), 30-35.*

Sumadewi KT. (2017). Korelasi Antara Kadar Leptin dengan IMT, Lingkar Pinggang dan RLPP pada Orang Dewasa Obesitas Usia 19-25 Tahun di Universitas Warmadewa. *WMJ (Warmadewa Medical Journal)*, *1(2), 71-82.*

Sumadewi KT, Udiyani DPC. (2020). The association between Body Mass Index (BMI) and knee pain on flexible flat foot among students at Universitas Warmadewa, Bali, Indonesia. *Indonesia Journal of Biomedical Science*, *14(2), 73–77.*

Wang YC, Bohannon RW, Li X, et al. (2018). Handgrip strength: Normative reference values and equations for individuals 18 to 85 years of age residing in the United States. *Journal of Orthopaedic and Sports Physical Therapy*, *48(9), 685–693.*

Wiardani NK, Kusumajaya AAN. (2023). Perilaku Makan, Aktivitas Fisik, Dan Penggunaan Internet Pada Remaja Sekolah Yang Mengalami Obesitas Di Provinsi Bali. *Gizi Indonesia*, *46*(2), *207–220.*