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Laporan Kes /*Case Report*

A Case Report on Combined Overweight and Stunting in Adolescent with Underlying Dyslipidaemia

Laporan Kes: Kombinasi Berat Badan Berlebihan dan Bantut dalam Kalangan Remaja dengan Dislipidemia

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ABSTRACT

The complex combination of stunting and overweight have been overlooked as a significant form of malnutrition. Childhood stunting not only impairs growth and development but also increases the risk of overweight and obesity later in adulthood (Keino. et al. 2014). This case study discusses the nutritional management of a 12-year-old boy with dyslipidaemia, overweight, and stunted growth. Interventions included reducing sugary drinks, optimising protein intake, and increasing physical activity. This case emphasizes the importance of a balanced approach that combines tailored dietary strategies, growth-promoting activities, and regular monitoring. This case also highlighted the inclusive approach between healthcare provider and parents. Early, targeted interventions are critical not only for improving immediate health outcomes but also for preventing long-term complications such as metabolic syndrome, cardiovascular diseases, and reduced adult height. Continued efforts in addressing stunting alongside overweight are vital to combat this dual burden form of malnutrition effectively.

Keywords: overweight, stunting, dyslipidaemia, childhood

ABSTRAK

Gabungan masalah bantut dan berat badan berlebihan sering dipandang remeh sebagai satu isu malpemakanan yang serius. Bantut sejak kecil bukan sahaja menjejaskan pertumbuhan dan perkembangan kanak-kanak, tetapi juga boleh meningkatkan risiko menjadi berlebihan berat badan dan obes semasa dewasa (Keinoet al. 2014). Kajian kes ini membincangkan pengurusan pemakanan seorang kanak-kanak lelaki berusia 12 tahun dengan bacaan kolesterol tinggi, berat badan berlebihan, dan pertumbuhan terbantut. Antara langkah yang diambil termasuk mengurangkan minuman manis, memastikan pengambilan protein mencukupi, dan meningkatkan aktiviti fizikal. Kes ini menunjukkan betapa pentingnya pendekatan seimbang yang menggabungkan pemakanan yang sesuai, aktiviti untuk merangsang pertumbuhan, serta pemantauan berkala. Selain itu, ia juga menekankan kepentingan kerjasama antara doktor, pakar pemakanan, dan ibu bapa dalam memastikan kanak-kanak mendapat penjagaan yang terbaik. Intervensi awal bukan sahaja membantu memperbaiki kesihatan kanak-kanak dalam jangka masa pendek, tetapi juga dapat mengurangkan risiko masalah kesihatan jangka panjang seperti masalah metabolik, penyakit jantung, dan masalah bantut. Oleh itu, usaha berterusan untuk menangani masalah bantut dan berat badan berlebihan perlu diperkukuhkan bagi mengatasi masalah malpemakanan dengan lebih berkesan.

Kata kunci : berat badan berlebihan, bantut, dislipidemia, kanak-kanak

INTRODUCTION

The coexistence of overweight and stunting in adolescent represents a critical aspect of the global

"dual burden" of malnutrition, often overlooked as malnutrition is perceived as a condition that impacted only the underweight. This dual burden, which overnutrition and undernutrition happens within an individual or populations has rose as a health concerns particularly in developing country with rapid nutrition transitions. Globally, the prevalence of stunting and overweight among children and adolescents aged 5 to 19 years reveals important health trends. As of 2023, around 14.3% of children in this age group were stunted, while 18% were overweight. However, the exact overlap between stunting and overweight in this age group remains less frequently quantified in global data, though it has been noted as a rising concern in regions undergoing rapid nutrition transitions, such as Southeast Asia and parts of Africa (UNICEF, 2023; WHO, 2023). Findings from the National Health and Morbidity Survey (NHMS) 2019 also reported that 15% of Malaysian children aged 5 to 17 years old were overweight while 14.8% were obese. These indicate nearly one in three children in Malaysia have excess weight.

Childhood overweight is defined as excess body weight relative to height or body mass index (BMI) falls at or above 95th percentile for children of same age and gender (Dietz & Robinson 2005). It is a result from an imbalance between energy intake and expenditure (Hill et al. 2013). In contrast, stunting reflects chronic undernutrition during critical growth periods which may indicate child being too short for their age (WHO 2014). These conditions, though contradictory to each other, might coexist due to shared underlying factors such as poor-quality diets, food insecurity, and inadequate maternal and child healthcare.

Dyslipidaemia, characterized by abnormal lipid profiles, including elevated levels of total cholesterol, low-density lipoprotein (LDL), or triglycerides, and reduced high-density lipoprotein (HDL), is increasingly recognized in paediatric populations. In children with overweight, dyslipidaemia is a significant concern, as it increases the long-term risk of cardiovascular diseases such as coronary artery disease and stroke (Kopin & Lowenstein, 2017). Managing dyslipidaemia in children requires early intervention to modify dietary habits and lifestyle factors, preventing the progression of metabolic syndrome.

In cases of combined overweight and stunting, dietary management must carefully balance calorie restriction to address excess weight while ensuring adequate nutrient intake to support linear growth. The presence of dyslipidaemia also weighs up and need further dietary modification to improve lipid profiles, emphasizing the types and quantity of fats and carbohydrates consumed.

This case study emphasizes the dual burden of malnutrition by exploring the application of medical nutrition therapy (MNT) in managing an adolescent presented with the rare combination of overweight, stunting, and underlying dyslipidaemia. By addressing the multifaceted nutritional needs and integrating evidence-based strategies, this report aimed to provide insights into optimizing growth and metabolic health in similar cases

CASE STUDY

PATIENT PROFILE

A 12-year-old Malay boy, accompanied by his father, presented at the dietetic clinic after being referred by paediatricians for obesity and dietary management. He was diagnosed with dyslipidaemia in early 2024 and has a body mass index (BMI) of 25 kg/m². Additionally, he has well-controlled bronchiolitis asthma and partially controlled allergic rhinitis, both managed with medication. He lives with his family as the eldest of four siblings. His father works as a prison warden, and his mother is an office worker. His maternal family has a history of hypertension. The patient started attending boarding school in April 2024. His lifestyle has changed significantly since the dyslipidaemia diagnosis, influenced by his parents' supervision and his transition to boarding school. His father appeared motivated to support his son's condition.

NUTRITION ASSESSMENT

During the appointment, patient weighed 48.2 kg. According to the CDC weight-for-age chart, this places him between 50th and 75th percentiles, indicating a normal weight for his age. He has been experiencing significant weight gain with a gain of 2.2 kg over the past two months and 1.1 kg per month. The patient's height was 138.5 cm, charted between 5th and 10th percentiles on the CDC height-for-age chart, indicating patient was stunted.

Although his weight was within the normal range, his short stature contributes to a BMI of 25.12 kg/m², which is above the 95th percentile on the CDC BMI-for-age chart, classifying him as overweight. His waist circumference was 84.4 cm, slightly above the 90th percentile, according to Poh et al. (2011) this suggests risk of abdominal obesity for 12 years old. The ideal body weight at 50th percentile for his age was 45 kg, while ideal height for his age is 148 cm. Ideal CDC BMI for age was suggested as 21 kg/m² at 50th percentile.

The patient appeared cheerful and communicated well throughout the session. He was reported to be in the pre-pubertal Tanner stage. He claimed to have consistent appetite even though he has experienced weight gain since starting school.

Available biochemical data included fasting blood sugar (FBS), fasting serum lipids (FSL), and liver function tests (LFT). The patient's triglycerides (TG) and high-density lipoprotein cholesterol

(HDL-C) levels were within normal ranges. However, total cholesterol (TC) and low-density lipoprotein cholesterol (LDL-C) levels were elevated, reflecting current condition of dyslipidaemia. Additionally, the alkaline phosphatase (ALP) level was high, raising concerns about potential fatty liver. Table 1 summarizes the laboratory results.

The estimated daily calorie intake of the patient was 2000–2400 kcal/day (40–50 kcal/kg body weight), while the estimated protein intake was 50–60 g/day (1–1.2 g/kg body weight). The patient is allergic to seafood and avoids prawns and squid, as these trigger rashes and worsen his asthma. Since attending boarding school, he receives five meals daily at the dining hall, including breakfast, morning tea, lunch, afternoon tea, and dinner. He usually only skipped breakfast or supper. Additionally, he purchases food from the school canteen.

The patient has several notable dietary patterns. Firstly, he does not finish protein-rich foods such as chicken, meat, or fish during main meals. His father mentioned that this habit began before he started school. The patient explained that he feels bored and sick of eating these foods. However, he enjoys vegetables and often finishes an entire tray, as other children tend to leave them.

Secondly, before his diagnosis, the patient frequently consumed heavy meals before bedtime, such as fried rice, nasi lemak, or other fried foods as the school canteen operates even after their night class. However, he claimed that he has stopped buying supper meals and only eats biscuits. His parents have also reduced his pocket money and controlled his spending using the school's cashless card system. This system has aid them in monitoring his purchases.

Thirdly, the patient consumes excessive sugary snacks and beverages. He drinks sugary beverages 4–5 times daily, either from the dining hall or purchased at the canteen or vending machine. For snacks, he usually eats biscuits provided by his parents. His father also reported that the patient often joins his peers for "hangout sessions" at a table filled with snacks, making it difficult to accurately quantify his snacking habits.

The patient was physically active, as indicated by his HDL-C levels and his participation in activities like badminton and jogging. However, he only occasionally plays badminton on the court, often playing indoors or in his dormitory with friends.

NUTRITION DIAGNOSIS

Excessive calorie intake related to food preferences as evidenced by high intake of carbohydrates and fibers than protein and reported frequent consumption of sugary drink and sweet biscuits snacking.

NUTRITION INTERVENTION

The primary goals for the patient was to lower his BMI to within the normal range (24.9 kg/m²) by the next appointment and to optimize his protein intake. According to the RNI 2017, the estimated nutritional needs for boys aged 13–15 years is 1900–2300 kcal/day for calories and approximately 45 g/day for protein.

The importance of protein in growth and development was explained to the patient, including sources of high biological value (HBV) and low biological value (LBV) protein (RNI 2017). He was encouraged to finish the protein portion of his meals. Other essential nutrients that could promote growth and height includes a combination of vitamins and minerals. Thus, daily intake of milk that is high in calcium was recommended. Milk also contains protein that work synergistically to support healthy growth patterns. Zinc and magnesium also support one growth and development, with zinc being particularly important for cell growth and division. High sources of magnesium and zinc food are often found in oysters, red meat, poultry, fish, bananas and leafy greens.

Although it is good that he consumes a high amount of fibre, this preference for vegetables may lead to satiety (Hakim et al. 2018), reducing his protein intake. Therefore, proper portioning of fibre was recommended around 3 servings of vegetables (MDG for Children and Adolescents 2023).

As he is still in the pre-pubertal phase, he has the potential for height growth. Exercises that promote growth, such as stretching, badminton, skipping, and pull-ups, were recommended to help increase his height.

The patient was advised to limit sugary snacks and beverages to no more than twice daily. Sugary snacks like biscuits and beverages are often low in nutrients but high in calorie which also affect weight gain (Olsen &Heitmann 2009).

NUTRITION MONITORING AND EVALUATION

Parameters to monitor include weight, height, lipid profile, waist circumference, and compliance with dietary recommendations. Monthly weight and height measurements were recommended, but the lack of measurement tools at school may pose a challenge. Waist circumference was suggested as an alternative, with the 90th percentile cutoff for a 12-year-old being 75 cm, based on study done by Poh et al. (2011) on cut-off points for adolescent's waist circumference.

The patient's next appointment was in five months, during which a repeat blood test will be conducted by the paediatrician. The lipid profile will be reassessed, and the goal was for the LDL-C level to be within the normal range (<3.33 mmol/L) or

TABLE 1 shows the full laboratory results

	Day 1	Unit	Reference range
FBS	4.6	mmol/L	3.3-5.6
FST			
Total	6.9*	mmol/L	<5.2
Cholesterol			
Triglyceride	0.78	mmol/L	<1.70
HDL-C	1.80	mmol/L	>1.55
LDL-C	4.7*	mmol/L	<3.33
LFT			
Total	80.4	(g/L)	57-80
Protein			
Albumin	45.3	(g/L)	35-52
ALP	252.8*	(U/L)	43-115
AST	48.62	(U/L)	3-50
Bilirubin	35.22	(U/L)	<50
total			

*Higher than normal range

show a reducing trend. Further assessment and management will be based on the results of the next blood test.

FOLLOW-UP

A recent follow-up via phone call indicated that the patient has been adhering well to the recommended dietary and lifestyle changes. He reported successfully limiting his sugary drink intake to three times daily and making a great effort to finish his protein sources during meals. Additionally, he has joined his school's cricket team, further supporting his physical activity levels.

During a recent medical check-up, the patient was measured at 47 kg and 138 cm in height. This reflects a 1 kg weight loss over the past month, which was a notable progress toward his weight management goals. However, there has been no significant change in his height during this period. The patient's adherence to the previous recommendation of milk consumption was not clearly documented. Thus, it is uncertain whether this influenced the lack of height change. This outcome shows the importance of ongoing monitoring and sustained interventions to support both weight and height improvements.

DISCUSSION

The patient was presented with dyslipidaemia where the probable cause was most likely due to his excessive intake of sugary beverages and snacks, concurrent with his imbalance in macronutrient intake. Despite his weight being in the normal range for age, his short stature placed him in the overweight BMI category. These shows the connection between dietary intake, growth and metabolic condition.

Self-monitoring of weight and height monthly might be a challenge for this patient due to the limited access of measurement tools at school. His parents were also unable to evaluate his adherence to the dietary advice given. Additionally, the school environment, which facilitates access to sugary snacks and beverages, and peer influence encouraging snacking habits might further complicates patient's adherence to the dietary advice.

Because the patient is still in the pre-pubertal stage, there is still room for significant growth if appropriate nutritional habits and interventions are implemented. The pre-pubertal stage is critical for height gain as it sets the foundation for growth spurts that occur during puberty. During this phase, factors such as nutrition, physical activity, and hormonal regulation play a pivotal role in maximizing growth potential (Soliman et al. 2014, Chen 2022). Thus, by achieving height gain it will indirectly improve his BMI classification as his current stunted stature disproportionately raises his BMI despite a normal weight-for-age percentile.

Adequate protein intake is vital for bone growth and height, especially during critical growth periods like pre-puberty. Protein provides essential amino acids necessary for bone matrix development and muscle growth (Antonio et al. 2020). Studies indicate that dietary protein, particularly high-quality sources, can significantly impact linear growth by supporting both skeletal and muscle development, especially when combined with

adequate calcium, vitamin D, and other nutrients critical for bone health (Xiong et al. 2023).

Exercise that involves stretching and resistance, such as badminton, skipping, and pull-ups, has been shown to promote growth potential. Physical activity stimulates growth hormone secretion and strengthens the musculoskeletal system, enhancing the potential for linear growth during pre-pubertal and pubertal stages (Antonio et al. 2020).

In the long term, if dyslipidaemia and overweight status remain untreated, the patient may face an increased risk of metabolic diseases during the transition to adulthood. Atherosclerotic cardiovascular disease (ASCVD), a leading cause of death globally, often emerges in children presented with overweight and dyslipidaemia (Schefelker & Peterson 2022). Additionally, Mainieri (2023), highlights that childhood obesity frequently correlates with a higher prevalence of dyslipidaemia, emphasizing the need for early management. Early dietary and lifestyle modifications can significantly lower these risks and improve overall health outcomes.

CONCLUSION

This case highlights the critical importance of early intervention in managing paediatric dyslipidaemia, overweight and stunted growth. The patient's pre-pubertal phase presents a window of opportunity for targeted nutritional and physical activity strategies to optimize growth and metabolic health. Key challenges, such as the school environment and monitoring limitations, highlight the need for a collaborative approach involving the family, school, and dietitians or also other healthcare providers. Addressing these issues can not only improve the patient's immediate health but also reduce the risk of long-term complications like cardiovascular disease and obesity. By fostering a supportive environment and empowering the patient and his family with knowledge and tools, this case demonstrates the potential for meaningful improvements in growth and overall well-being.

CONSENT

Verbal consent has been obtained from the patient.

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DECLARATION OF CONFLICT OF INTERESTS

The authors declared no potential conflicts of interest concerning the preparation and publication of this article.

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