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Body Image, Dietary Intake, and Nutrition Knowledge in Relation to Body Composition in Ballerinas

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ABSTRACT

Body composition in relation to body image, dietary intake, and nutrition knowledge among ballerinas were assessed in this study. This cross-sectional study collected data from ballet schools in Jakarta and Bekasi using anthropometric measurements and interviews. Among participants aged 8–39 years, more than 50% had normal range body composition, 65.4% had self-perceived negative body image, more than 71% had normal dietary intake; however, 67.3% had low nutrition knowledge score. Overweight ballerinas had significantly higher body fat, fat-free mass, fat-free mass index and muscle mass index, except for total-body-water ($p<0.05$). There is correlation between body composition and body image among ballerinas resided in Jakarta and Bekasi.

Keywords: adolescents, athletic art, body fat, fat-free mass index

INTRODUCTION

It has been challenging to assess the nutritional status of ballerinas in Indonesia, as there are few studies available. Since ballerinas practice an athletic art, they have unique nutritional requirements for their optimal performance (Wright & Collin 2020). Ballerinas are required to have an ideal body shape and their environment determines them to be "acceptable" or "competent", leading to body dissatisfaction. Stokic *et al.* (2005) elaborated that the body weight, height, and Body Mass Index (BMI) of ballerinas were notably lower than those of non-athletic girls. Meanwhile, Sousa *et al.* (2013) found that more than 70% of ballerinas had macronutrient and micronutrient intakes lower than recommended. A low level of knowledge about nutrition was also prevalent among ballerinas (Dotti *et al.* 2002). The purpose of this study was to assess body composition in relation to the body image, dietary intake, and nutrition knowledge in ballerinas.

METHODS

This cross-sectional study was conducted in Jakarta and Bekasi. Ballerinas were purposively recruited through ballet.id contact from 2019 to 2020. Inclusion criteria were females aged 8–40 years old, enrolled in ballet class ≥1 hour/week, and provided informed consent. Data on socio-demographics, previous month's dietary intake, nutrition knowledge and body image perceptions were collected using a questionnaire. Semi-quantitative food frequency questionnaires (SQ-FFQ) were used to measure previous month's dietary intake. Body image perception was based on Stunkard Figure Rating Scale. Anthropometric measurements were measured according to standardised procedures.

Body Mass Index (BMI), Body Fat (BF), Fat-Free Mass Index (FFMI), and Muscle-Mass Index (MMI) classification followed the participants' age standard, while Total Body Water (TBW) followed the general population standard. Dietary intake was calculated based on frequency of intake, portion size and number of food groups. Differences between groups were analysed using t-test or ANOVA, where appropriate. Statistical significance was set at $p<0.05$. Microsoft Excel 2016 and SPSS for Windows 20.0 were used for data analysis. Ethical clearance was obtained from Atmajaya University (reference number: 1445/III/LPPM-PM.10.05/07/2019).

RESULTS AND DISCUSSION

The subjects were 52 ballerinas aged 8–39 years, comprising of 8 children, 37 adolescents,

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and 7 adults with ballet training for 3.75±1.04, 8.30±2.55, and 14.9±8.84 years, respectively. The majority of the subjects had normal body composition. Yet adolescents had varied nutritional status; 5.4% were stunted, 23% were overweight, and 49% had BF above the normal range. Most of the mean body compositions of adults were higher than those of adolescents and children, except for FFMI and TBW. Table 1 shows that overweight adolescents had significantly higher body fat and fat and muscle mass but lower TBW than normal adolescents.

Overall, 65.4% of the subjects, particularly adults, desired a smaller body size than the present body size. Table 2 shows that the body composition indicators were significantly different across different body image perceptions. Dietary intake was satisfactory, as more than 71% subjects had a normal amount and variety of intake. The score for overall knowledge about nutrition was 62.2 (scale 1–100) with 67.3% of the subjects had a score less than 70, and there was no difference between groups.

The tendency to be more overweight with high body fat and fat mass in adolescents may be caused by hormonal, glucose metabolism and insulin resistance alterations, leading to physiological, behavioural, emotional, body composition, and eating and activity behavioral changes. The significant difference in dietary intake with most of body composition indicators among the adolescents ballerinas may explain the greater variety of foods they ate, thereby improving their body composition (Epstein *et al.* 2009).

Table 1. BMI status and body composition in adolescents ballerinas in Jakarta and Bekasi

Body image perception	Overweight (n=8)	Normal (n=29)
Body fat (%)	34.7±7.16	18.9±5.35**
Fat free-mass (kg)	37.8±6.46	32.6±4.73*
Fat free-mass index (kg/m^3)	15.8±1.05	14.0±0.74**
Muscle mass (kg)	35.5±5.96	30.6±4.60
Muscle mass index (kg/m^3)	14.8±0.94	13.1±0.85**
Total body water (%)	47.8±5.22	57.5±8.20**

*Significantly different at $p<0.05$; ** at $p<0.01$

BMI: Body Mass Index

Table 2. Body image perception and body composition of child and adolescent ballerinas in Jakarta and Bekasi

	n	BMI-z score	BF (%)	FFM (kg)	FFMI (kg/m^3)	MM (kg)	MMI (kg/m^3)	TBW (%)
Child ballerinas								
Desired a smaller body size	3	0.28±0.9^a	24.7±7.5^a	24.6±2.5	14.0±0.6^a	23.4±2.4	13.3±0.6^a	55.2±5.6^a
As it is	3	-1.29±0.2^b	19.57±1.4^b	21.7±2.2	12.5±0.4^b	20.6±2.0	11.9±0.3^b	66.4±1.0^b
Adolescent ballerinas								
Desired a smaller bidy size	25	0.33±1.0^a	23.5±9.0^a	34.4±5.2	14.6±1.1^a	32.2±5.0	13.7±1.7	53.8±9.4
As it is	8	-0.72±1.1^b	19.5±8.32	30.2±6.4	13.5±0.8^b	28.5±5.9	12.8±0.8^b	58.9±6.0
Desired a larger body size	3	-1.15±0.4	17.25±4.2	35.3±0.7	14.1±0.2	33.3±0.6	13.3±0.2	60.6±3.1

*a and b denote significant difference at $p<0.05$

BMI: Body Mass Index; BF: Body Fat; FFM; Fat Free-Mass; FFMI: Fat Free-Mass Index; MM: Muscle Mass; MMI: Muscle-Mass Index; TBW: Total Body Water

CONCLUSION

Ballerinas with a BMI in the overweight range had a significantly higher body composition than non-overweight ballerinas. Those who desired to have a smaller body size had higher body composition. A body size smaller than current body image is desired by the majority of ballerinas residing in Jakarta and Bekasi.

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DECLARATION OF CONFLICT OF INTERESTS

The authors have no conflicts of interest to declare.

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