

Prevalence flatfoot in primary school

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Abstract. Flatfoot or often called pes planus or fallen arches is a flat or flat pedal arcus state, all parts of the foot attached or almost stick to the ground. A Flat foot can occur in children, adolescents, and adults. Many factors contribute to the occurrence flat foot include overweight, obesity, type of shoes used by children, standing and sleeping positions, rupture ligament or tendon on the feet, congenital disorder, post-trauma, genetic, neurological disorder, collagen disease. Flatfoot can cause long-term effects such as pain in the soles of the feet, knees, and ankles, balance disorders, bunions, hammer-toe, can lead to repeated acute trauma to cause deformity in the foot. This research used a cross-sectional method with sample clustering technique with double cluster random sampling method. A total of 123 primary school students as a sample of this study. It was found that more male subjects suffered from flat foot and there is no relationship between obesity and the incidence of flatfoot in elementary school-aged children in the city of Denpasar, Bali.

1. Introduction

The Foot is part of the body that plays a role as a supporter of the upper body, pressure and weight containers. Foot arch is one of the parts that play a role in the biomechanics of the foot to keep the feet more stable as it stands, treads, distributes the weight evenly over a wider area, increases speed and agility during walking and provides stability and flexibility. The pedis arch is formed by the tarsal, metatarsal, ligament and tendon bones. [1] Based on the structure of the pedis arch the shape of the sole of the human foot is divided into three categories normal foot, flatfoot and cavus foot [2].

Flatfoot or often called pes planus or fallen arches is a flat of arcus state, all parts of the foot attached or almost stick to the ground. Flatfoot normally occurs in infants because the pedis arch is not yet fully developed. But after the child began to stand then the longitudinal arch develop to help balance when standing and walking. [3,4] The Flatfoot can occur in children, adolescents, and adults. A study conducted in India in 2014 reported that 11.25% of the population aged 18-25 years have a bilateral flatfoot. In Taiwan also reported the prevalence of flatfoot in children aged 6-12 years of 13.88%. Study flatfoot in Indonesia found that 24.14% of boys aged 8-12 years suffered flat foot while 17.24% of girls also experienced flatfoot [3-6].

The Flatfoot can be categorized into two that is flexible and rigid. Flexible flatfoot marked with the discovery of the arch on the body while holding the weight (such as standing), but if not to bear the weight of the foot arch body can be seen. While the rigid flatfoot marked with the invention of the arch of the foot either at the time of holding the body load and not withstand the burden of the body. [7,8] Many factors play a role in flatfoot such as overweight, obesity, type of shoes used by children,



standing and sleeping positions, rupture ligament or tendon in the legs, congenital disorders, post-trauma, genetic, neurological lesions, collagen disease [1,3,9].

The Flatfoot can cause long-term effects such as pain in the soles of the feet, knees and ankles, balance disorders, bunions, hammer-toe, can lead to repeated acute trauma to cause deformity in the foot. [10,11] Although Flexible flatfoot is rarely symptomatic in patients, early detection and early handling are necessary in patients with flatfoot to prevent more severe deformity at a later age. So early detection and early intervention is needed to reduce the deformity that occurs in the lower extremity due to flatfoot. The prevalence data of flatfoot prevalence in children aged 6-12 years in Bali is still very limited. This study aims to determine the prevalence of flatfoot in primary school-age children.

2. Methods

The research design was a cross-sectional study and was conducted from August until December 2017 at five elementary schools in Denpasar, the sample was obtained by using double cluster random sampling. First sampling to determine the school to be studied and the second sampling to determine the students to be studied. In accordance with the formula of Lemeshow, 1997 sample size required in this study was 123 samples and of all participants had agreed to sign the informed consent. The study protocol was approved by the Medical Research Etic Committee of Udayana University/Sanglah General Hospital, Bali.

Exclusion criteria from this study were absent at the time of study having postural defects or limb defects, known by examining differences in right and left leg lengths when standing upright and the presence of spinal abnormalities. Check the Wet Footprint Test to find out the flat foot on the subject by looking at the footprint of the longitudinal arch and the medial boundary of the foot. [7] Footprint inspection using ink or plain water media. To find out the axis of the foot by pulling the line from the mid heel back to the middle of the second finger past the most convex part of the heel.[6] Characteristic of a subject is presented by a table of demography and table of flat foot frequency.

3. Results

At enrolment, 25 cases compared with 25 controls had complete information on 25(OH)D status and relevant covariates. Demographic and characteristics of the patients are summarized in table 1.

Table 1. Demography factor

Characteristics	Frequency (%)
Mean age, years (\pm SD)	8.41 \pm 1.52
Gender	
- male	57 (46.3%)
- female	66 (53.7%)
Nutritional status	
- thin	8 (6.5%)
- normal	64 (52%)
- overweight	23 (18.7%)
- obese	28 (22.8%)

Table 1 shows that from 123 subjects, most of the subjects were female (66.7%), the calculation of nutritional status in subjects using the Z Score method found subjects with Obesity as many as 28 people (22.8%) and subjects with a normal nutritional status of 64 people (52.0%). Flat foot examination using the wet print test method and flat foot category using the Denis classification. Flat foot examination results are summarized in table 2 and result wet print test in figure 1.

Table 2. Flat foot distribution

Gender	Flat foot				Total	
	Normal		flat foot			
	N	%	N	%	N	%
Male	29	50.9	28	49.1	57	100
Female	41	62.1	25	37.9	66	100
Total	70		53		123	

**Figure 1.** Result wet print test

4. Discussion

Flexible flatfoot is the condition of the foot arch in a weight-bearing position but becomes flat when standing or weight bearing. Flexible flatfoot is generally physiological, does not cause symptoms, does not require treatment and appears early in the decade of life. [9,12] Rigid flatfoot is a pathological flat foot that usually causes pain, limitations, and requires treatment. In this condition, a person does not have a curvature of the foot, either in a weight-bearing position or weight-bearing [13].

In this study, flatfoot is mostly found in men. This results same with Umar in Nigeria he reported that 13% flat foot occurred in men. In addition, it is different from the research conducted by Pfeiffer which found that boys have a greater risk of flat foot than women with a prevalence of 52% in men and 36% in women. From the literature obtained, differences in flat foot events in men and women due to differences in foot anatomy. In men flatfoot angle is greater than that of women and the lateral and medial arc angle in women is greater than in men [7].

There are differences study of flat foot events in children. In accordance with the development of the child's age, the development of the arch pedis or plantar arch at the age of 6 years. So that if the examination is carried out before the age of 6 years, there will be an overestimation of the incidence of flatfoot [3,14].

Daneshmandi, reported that there was no relationship between obesity and flat foot. This is because there is a temporary increase in body weight in puberty children so that it does not significantly affect the structure of the legs. But Dowling, found that long-term weight gain associated with obesity at 12-15 years of age showed a significant relationship with the incidence of flat in the medial longitudinal arch or flat foot [15,16].

5. Conclusion

The study shows that hypovitaminosis D was a risk factor of TB-HIV co-infection. The results provide an importance of vitamin D sufficiency in HIV infected persons and provide new insight into approaches to prevent and treat TB-HIV co- infection.

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