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The relationship between long standing and hallux valgus degrees in market traders

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ABSTRACT

Background: Hallux valgus is a deformity in the foot or a disorder characterized by a change in shape in the first metatarsophalangeal joint deviating towards the medial and the first big toe deviating laterally with rotation, symptoms caused such as swelling, redness, and pain. Long standing is one of the risk factors for hallux valgus. The recommended duration of standing is around 2.5 hours per day, and the increase in the recommendation may have a greater risk of getting Hallux valgus. The purpose of this study was to determine the relationship between long-standing and the degree of hallux valgus in market traders in Sanur, Bali.

Methods: This study used cross-sectional analytical observation with a sample of market traders in Sanur totaling 31 people. The measuring instruments used to determine hallux valgus are the goniometer and Manchester scale. Data analysis in this study used the *Spearman rho test*.

Results: Based on data analysis in the study, a positive correlation number of 0.506 was obtained with a significance value of $p = 0.004$, which means that there was a significant positive correlation between long-standing variables and the degree of hallux valgus in market traders in Sanur.

Conclusion: There was a significant positive relationship between the long standing and the degree of Hallux valgus market traders in Sanur, Bali.

Keywords: deviating, hallux valgus, long standing, metatarsophalangeal, traders.
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INTRODUCTION

Standing is a basic activity that humans often do when working or doing an activity that uses the feet. Standing is a position that is alert to support the body, both physically and mentally, so that work can be completed more quickly.[1] Standing consists of 3 zones: the safe zone (standing for less than 1 hour and <4 hours in total), the recommendation zone (can stand for 1 hour to 4 hours/day), and the danger zone (standing for more than 4 hours) as done by some traders.[2] A good recommended standing time is 2.5 hours/day. If the standing time we do is more than 4 hours, then there could be problems or diseases, especially in the feet.[3]

Hallux valgus or bunion is a deformity that occurs in the valgus. This condition can occur when the first metatarsal deviates medially, the hallux deviates laterally and rotates, and there is an absence of dilation in the distal part of the first metatarsal towards the medial soft tissue.[4] The condition of hallux valgus is accompanied by a progressive musculoskeletal disorder where a lump appears at the base of the valgus. This lump appears because the muscles and ligaments around the first metatarsophalangeal joint are weakened, causing joint pain in the big toe. Apart from pain, what causes loss of balance is that the bone structure in the phalanges changes.[5]

The prevalence of hallux valgus is 23% in those aged 18-65 years and 35.7% in those older than 65 years, and is more common in women.[6] Hallux valgus can be caused by intrinsic factors and extrinsic factors. Intrinsic factors are genetics, age, gender, body mass index, and arcus type. Extrinsic factors include prolonged standing, faulty shoes or footwear, and trauma.[7]

A trader is a person who trades goods or products for profit. Market traders require the use of the body part of the foot to rest when standing. Most traders do more activities by standing and walking because the situation and conditions of the market tend to be crowded; thus, traders will stand more often than sitting. Long working positions cause fatigue and discomfort in the feet. This will cause several foot problems, including flat foot and hallux valgus.[8] Therefore, the purpose of this study is to determine whether long standing factors can affect the occurrence of hallux valgus in traders.

METHODS

The research method used was analytical observational with a cross-sectional approach. This study was conducted in the traditional market of Sanur, Bali, Indonesia, in May 2023. The sample was collected using the purposive sampling technique, where sample selection is based on predetermined characteristics.

The inclusion criteria for this study are market traders aged 30-65 years, in good health, willing to participate in the study voluntarily, have Hallux valgus based on measurements with a goniometer, and BMI (body mass index) categories of underweight, normal, and overweight. The exclusion criteria are subjects who are obese, are undergoing treatment or are on a diet, subjects who have post-traumatic hallux valgus, or who have previously had hallux valgus surgery.

The total sample obtained was 31 people. The independent variable was the long standing factor, and the dependent variable was the incidence of hallux valgus. The measuring instrument used to determine hallux valgus was a goniometer. The study began by measuring the duration of standing to the sample traders and then measuring hallux valgus using a goniometer.[9] Then, the research data was processed and analyzed using the help of the SPSS application. The relationship of long standing to the occurrence of hallux valgus can be determined by hypothesis testing using the *Spearman rho* method. This is because the results of the normality test conducted using the *Shapiro-wilk* technique show that the data is not normally distributed.[10]

RESULTS

The subjects in this study were market traders in the Sanur area, aged 35-65 years, who met the inclusion and exclusion criteria. The characteristics of respondents are shown in Table 1. It was found that there were more female respondents in this study compared to male respondents. The majority of respondents weighed 45-65 kg, with the majority of BMI obtained in the normal category with 27 people.

In Table 2, based on the duration of standing, the majority of respondents have a duration of standing between 1-4 hours per day. Based on the degree of hallux valgus obtained, the majority of respondents have a degree of hallux valgus 10^0-20^0.

The relationship between prolonged standing and the occurrence of Hallux valgus can be determined by hypothesis testing using the *Spearman rho* method. This is because the results of the normality test conducted with the *Shapiro-wilk* technique show that the data is not normally distributed, which can be seen in Table 3.

In Table 4, the results of the Spearman Rho test between the relationship between long standing and the occurrence of the degree of hallux valgus obtained the results of a positive correlation number of r= 0.506 with a significance value of p= 0.004, which means that there was a significant positive correlation between the long standing and the degree of hallux valgus in market traders in Sanur. The correlation coefficient value also shows that the variables long standing with hallux valgus have a relationship strength that is classified as sufficient.

Table 1. Characteristics of respondents (n=31)

Characteristics	Frequency (n)	Percentage (%)
Gender		
Male	5	16.1
Female	26	83.9
Age		
35-50 years old	18	58.0
51-65 years old	13	41.9
Body weight		
45-65 kg	27	87.1
66-73 kg	4	12.9
Body height		
150-165 cm	19	61.3
166-179 cm	12	38.7
BMI		
Underweight	1	3.2
Normal	27	87.1
Overweight	3	9.7

Table 2. Descriptive data overview

Characteristics	Frequency (n)	Percentage (%)
Long Standing		
1-4 hours	15	48.9
4.5-12 hours	16	51.6
Hallux Valgus		
10^o-20^o	19	61.3
24^o-45^o	12	38.7

Table 3. Normality test

Variable	*P*-value	Distribution
Long standing	0.003	Not normal
Hallux valgus	0.005	Not normal

Table 4. *Spearman rho* correlation test

Variable Correlation	Correlation Coefficient (*r*)	*P*-value
Long Standing with Hallux valgus degree	0.506	0.004

DISCUSSION

There were 31 respondents involved in this study, whose average age was above 35 years. The age characteristics chosen are based on the understanding that the older a person is, the higher the risk of experiencing a degree of hallux valgus.[11] Thus, the age above 35 years is considered as a group that is vulnerable to Hallux valgus degree due to long standing activities while trading in the market.

Market traders were chosen as the study population due to their involvement in specialized work activities that necessitate standing for prolonged periods of time, leading to leg fatigue and discomfort. Static weight-bearing muscle work poses a greater risk than dynamic muscle work,

with one such example being when the body's weight is supported by a single fulcrum or a load is carried. Technical terms will be explained upon the first usage. Static weight-bearing muscle work poses a greater risk than dynamic muscle work, with one such example being when the body's weight is supported by a single fulcrum or a load is carried. An elevation in muscular internal pressure may lead to compromised blood flow and oxygen delivery to tissues, potentially damaging it if there are repetitive instances in the same organ.[12]

Standing for prolonged periods is considered a risk factor for hallux valgus. The suggested duration for standing is 2.5 hours per day. Standing for over 4 hours per day correlates with the onset of hallux valgus.[13]

Hallux valgus can lead to cosmetic concerns, pain, and discomfort while wearing shoes due to the medial protrusion of the metatarsals.[14] It also has a profound impact on gait, increasing the risk of imbalance and falling while walking.[15] Research indicates that individuals with moderate to severe hallux valgus exhibit shorter walking strides, decreased walking speed, and non-rhythmic gait, highlighting the potentially debilitating effects of this condition.[16] Thus, the study suggests that prolonged standing during trading may increase the risk of hallux valgus.

The analysis revealed a positive correlation between the duration of standing and the severity of hallux valgus among market traders in Sanur. Therefore, the study provides evidence that extended periods of standing among market traders could contribute to the development of hallux valgus in their feet.[17] The duration of standing by market traders is directly proportional to the severity of hallux valgus, while reduced standing mitigates it.[18]

These findings align with those of Pratiwi et al. (2018), whose study explored the correlation between prolonged standing and the incidence of hallux valgus among saleswomen at Mall X. Their results likewise demonstrate a connection between extended standing and the prevalence of hallux valgus amongst saleswomen.[19] According to research, long-term use of narrow, pointed shoes such as high heels may lead to hallux valgus. Moreover, Coughlin and Jones identified footwear, standing for prolonged periods, and excessive weight as factors in the etiology of this condition.[20]

The study included 31 participants. This study's limited number of participants may limit the representativeness and generalizability of the findings to the overall population of traders. Other factors, such as footwear, trauma, or uncontrollable conditions, may also contribute to hallux valgus to some degree, which cannot be fully accounted for in this study.[21]

CONCLUSION

Based on the results of the study, a positive correlation rate of 0.385 was obtained with a significance value of p= 0.033, which means that there is a significant correlation between the variable of long standing and the degree of hallux valgus in market traders in Sanur.

ETHICAL CLEARANCE

The Research Ethics Commission, Faculty of Medicine, Universitas Udayana, stated that this research is ethically feasible with number 1778/UN14.2.2.VII.14/LT/2023.

CONFLICT OF INTEREST

This study has no conflict of interest.

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AUTHOR CONTRIBUTIONS

NNJSM is preparing study designs, collecting data, processing data, and writing manuscripts. IPYPP, NWT, and MHSN are directing data collection and revising the manuscript.

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