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PREVALENCE OF FOOT, SKIN AND NAIL DISORDERS AMONG WOMEN WEARING HIGH-HEELED SHOES: THE FRAMINGHAM FOOT STUDY

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SUMMARY

High-heeled shoes (HHS) cause increased weight-bearing plantar normal and shear stresses by up to 119% and could contribute to foot disorders. The aims of this study are to investigate whether the prevalence of at least one foot, skin and nail disorder differs among older women who wear HHS currently or who have worn HHS for differing amounts of time over their lifespan. A cross-sectional study was conducted among participants from the Framingham Foot Study to investigate the prevalence of foot, nail and skin disorders among women wearing HHS. Crude and age-adjusted logistic regression models were used to calculate odds ratios (OR) and 95% confidence intervals (CI) for the relation between the use of HHS (current and past) and the prevalence of at least one foot, skin and nail disorder. compared with those who have never worn HHS up until the age of 64 years, those who have always worn HHS were at increased odds for foot (OR 2.33, 95% CI 1.70, 3.21), nail (1.84, 95% CI 1.42, 2.39), and skin (OR 1.66, 95% CI 1.07, 2.54) disorders. Skin disorder remained significant, even after adjustment for age (OR 1.66, 95% CI 1.04, 2.63). Older women who have worn HHS in the past have increased odds of having at least one foot, skin and nail disorder. Even when the use of HHS is abandoned after the age of 64, the higher prevalence of foot, skin and nail disorders persists.

INTRODUCTION

Foot, skin and nail disorders are common in older women and could be associated with poor footwear [1]. High-heeled shoes (HHS) are reported to increase weight-bearing plantar normal and shear stresses by up to 119% [2] and could contribute to foot disorders. However, few studies have examined the relationship between the use of HHS and foot, skin and nail disorders. The aims of this study are to investigate whether the prevalence of at least one foot, skin and nail disorder differs among older women who wear HHS currently or who have worn HHS for differing amounts of time over their lifespan.

METHODS

A cross-sectional study was conducted among participants from the Framingham Foot Study to investigate the

prevalence of foot, nail and skin disorders among women wearing HHS. the Framingham Foot Study cohort, was derived from 2 large, population-based samples of residents of Framingham, Massachusetts.

Trained clinical examiners performed examinations for foot, nail and skin disorders. foot disorders included hallux valgus, hallux rigidus, hammer toes, claw toes, overlapping toes, plantar fasciitis, Morton's Neuroma, and plantar forefoot atrophy on either or both feet. Skin disorders included calluses, corns, pressure points, dry skin, warts, ulcerations and trauma on either or both feet. Nail disorders included thickened nails, ingrown nails, nail discoloration, and nail trauma on either or both feet.

Current HHS use was defined by the participant choosing HHS from a list as the shoe currently worn most often. Past HHS use between the ages of 20 and 64 years was categorized into three groups: always, sometimes, and never.

Female participants who did not have a lower extremity amputation were included in this study. Crude and age-adjusted logistic regression models were used to calculate odds ratios (OR) and 95% confidence intervals (CI) for the relation between the use of HHS (current and past) and the prevalence of at least one foot, skin and nail disorder.

RESULTS AND DISCUSSION

This study included 1,916 participants aged 66.46 (± 10.97) years. 71% had at least one foot disorder, 88% had at least one skin disorder and 34% had at least one nail disorder. 5% wore HHS at the time of the study. Between the ages of 20 and 64, 18% of participants had always worn HHS, 40% had sometimes worn HHS, and 43% had never worn HHS.

The prevalence of foot, skin and nail disorders among participants who were wearing HHS at the time of the study were not significantly different compared to those who were not wearing HHS. However, compared with those who have never worn HHS up until the age of 64 years, those who have always worn HHS were at increased odds for foot (OR 2.33, 95% CI 1.70, 3.21), nail (1.84, 95% CI 1.42, 2.39), and

skin (OR 1.66, 95% CI 1.07, 2.54) disorders. Skin disorder remained significant, even after adjustment for age (OR 1.66, 95% CI 1.04, 2.63) (Table 1).

Further analyses show that the higher odds of developing foot disorders were contributed by plantar forefoot atrophy (OR 2.72, 95% CI 2.09, 3.55), hallux rigidus (OR 2.11, 95% CI 1.22, 3.65), hammer toes (OR 1.88, 95% CI 1.40, 2.33), overlapping toes (OR 1.82, 95% CI 1.26, 2.63) and hallux valgus (OR 1.81, 95% CI 1.40, 2.33). Hallux valgus remained significant, even after adjustment for age (OR 1.42, 95% CI 1.08, 1.87).

Higher odds of developing nail disorders were contributed by discoloration (OR 2.08, 95% CI 1.59, 2.72), nail dystrophic (OR 1.63, 95% CI 1.18, 2.25), and thickened nails (OR 2.05, 95% CI 1.56, 2.68), although these results were not significant after adjustment for age.

Higher odds of developing skin disorders among those who always wore HHS up until the age of 64, were contributed by dry skin (OR 1.59, 95% CI 1.03, 2.45), toes corn (OR 2.12, 95% CI 1.59, 2.83), and pressure points (OR 2.09, 95% CI 1.58, 2.75); pressure points were still significant after adjustment for age (OR 1.79, 95%CI 1.33, 2.40). Skin disorders, in particular pressure points, were significantly higher for those who sometimes wore high heel shoes compared to those who never wore high heel shoes.

CONCLUSIONS

Older women who have worn HHS in the past have increased odds of having at least one foot, skin and nail disorder. Even when the use of HHS is abandoned after the age of 64, the higher prevalence of foot, skin and nail disorders persists.

Table 1: Results from unadjusted and adjusted logistic regression models assessing the odds of foot, skin or nail disorder. The Framingham Foot Study, 2002-2008

	n	Foot Disorder (n=1363)	Skin Disorder (n=1689)	Nail Disorder (n=642)
Prevalence (%)	1916	71.1 %	88.15%	33.51%
Currently wear HHS	92	68.5 %	92.4 %	20.7 %
Do not wear HHS	1824	71.3 %	87.9 %	34.2 %
Independent Variable		OR (95%CI)	OR (95%CI)	OR (95%CI)
Do not wear HHS	1824	Referent	Referent	Referent
Currently wear HHS	92	0.9(0.6, 1.4)	1.7(0.8,3.7)	0.5 (0.3,0.8)
Adjusted for age		1.1(0.7,1.8)	1.7(0.8,3.7)	0.6 (0.4,1.0)
Have never worn HHS*	818	Referent	Referent	Referent
Have always worn HHS*	336	2.3(1.7,3.2)	1.7(1.1,2.5)	1.8.(1.4.,2.4)
Adjusted for age		1.3 (0.9,1.9)	1.7(1.0,2.6)	1.0(0.8,1.4)
Have sometimes worn HHS*	762	1.2(0.9,1.4)	1.1(0.8,1.5)	0.8.(0.7,1.0)
Adjusted for age		1.1(0.9,1.4)	1.1 (0.8,1.5)	0.8(0.6,1.0)

'HHS' = high-heeled shoes. '*' = up until the age of 64.

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