

## Original Article

# The bright side of high-heeled shoes

Paola Iana Fucks da Veiga<sup>1</sup>, Priscila Bárbara Zanini Rosa<sup>1</sup>, Luiza Horta Barbosa<sup>1</sup>, Marina Pires Veiga Sanhudo<sup>2</sup>, Mariana Motta Dias da Silva<sup>1</sup>, Kerolene Moraes de Souza<sup>1</sup>, Kellwin Nery Teixeira<sup>1</sup>, José Antônio Veiga Sanhudo<sup>1</sup>

1. Hospital Moinhos de Vento, Moinhos de Vento, Porto Alegre, RS, Brazil.

2. Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre, RS, Brazil.

## Abstract

**Objective:** Wearing high heels is a common practice, especially among urban women, and is part of the social and professional environment for many people. Research on the subject often focuses on the harmful health effects of high heels, including discomfort and pain, musculoskeletal disorders, and foot deformities. Since few studies have assessed the subjective effects of high heels, the objective of this study was to investigate why people wear them or not.

**Methods:** A cross-sectional, quantitative study was conducted using an online self-administered questionnaire that covered the participants' profiles and reasons they wear or do not wear high heels. The convenience sample consisted of skeletally mature cisgender and transgender women aged  $\geq 18$  years. Data were collected between November 2023 and March 2024.

**Results:** A total of 1100 responses were obtained, with a final sample of 801 participants. The variables significantly associated with wearing high heels were age, education, profession, approximate family income, and nutritional status. The reasons for wearing high heels included aesthetics (~80%), feeling more beautiful (63%), better professional appearance (54%), and improved self-esteem (47%).

**Conclusion:** Most participants wear high heels for aesthetic reasons, and more than half of those reported feeling more beautiful and feeling more professionally dressed. Although most participants who wear high heels experience pain (66%), there are still good subjective reasons to continue wearing them. Among those who reported not wearing high heels, the main reason was foot pain or discomfort.

**Level of evidence II; Cross-sectional, quantitative study.**

**Keywords:** Deformities, Foot; Pain; Motivation.

## Introduction

The act of wearing shoes has a long history and is widespread throughout the world. The use of high heels, mainly by women, is now commonplace in social and professional settings. It is estimated that approximately 59% of women wear high-heeled shoes for varying amounts of time (1 to 8 hours) daily<sup>(1)</sup>.

Studies have often associated high-heeled shoes with painful symptoms and lower limb problems. When walking in high heels, stride length, balance, and muscular efficiency are altered, which can lead to disorders in the feet, ankles, knees, and lumbar spine, and can cause pain and muscle fatigue<sup>(2,3)</sup>. A study evaluating ten years of medical records in hospital

emergency rooms in the United States found an overall high-heeled-related injury rate of 7.32 per 100,000 women, mainly involving foot or ankle sprains, with the highest rate among young adult women (20-29 years old)<sup>(4)</sup>.

However, other studies have found that wearing high heels benefits women, including improved posture, elegance due to a secondary increase in lumbar curvature, and, consequently, greater attractiveness<sup>(5-8)</sup>. Another study demonstrated that daily and prolonged use ( $\geq 8$  hours) has a protective effect on pelvic floor function<sup>(7)</sup>.

High heels are thus associated with both negative and positive health and well-being outcomes. No study, however, has evaluated the profile of women who wear high heels

Study performed at Hospital Moinhos de Vento, Porto Alegre, RS, Brazil.

**Correspondence:** José Antônio Veiga Sanhudo. Rua Ramiro Barcelos, 910, 90560-032, Porto Alegre, RS, Brazil. **Email:** [josesanhudo@yahoo.com.br](mailto:josesanhudo@yahoo.com.br).

**Conflicts of interest:** none. **Source of funding:** none. **Date received:** July 7, 2025. **Date accepted:** August 27, 2025.



or their reasons behind it, despite the plethora of disorders associated with this habit. Therefore, the objective of this study is to identify who uses this type of footwear and the reasons behind their use.

## Methods

### Study design and population

This cross-sectional study collected data through an online self-report questionnaire. Participants accessed the questionnaire through a public link disseminated in the involved institution's internal network and the social network of each author. Data were collected between November 2023 and March 2024. Participants were included only after providing written informed consent. This study was approved by the Institutional Review Board.

Skeletally mature ( $\geq 18$  years of age) cisgender and transgender women who wear high heels or not were included. Individuals identifying as male, those who did not complete the questionnaire, and those under 18 years of age were excluded.

### Variables

The study outcome was the use or non-use of high heels. The exposure variables were frequency of use, heel type, and reasons for use. The covariates, also used to outline the population demographics including sex (cisgender/transgender women), age (categorized into quartiles: 18-33, 34-41, 42-50, > 50 years), race (self-reported and categorized as: White/Asian, Black, Mixed/indigenous), education (categorized as  $\leq$  high school, incomplete university, complete university, or graduate school), nutritional status according to body mass index (weight/height<sup>2</sup>): underweight ( $< 18.5$  kg/m<sup>2</sup>), normal weight (18.5 to 25 kg/m<sup>2</sup>), overweight (25 to  $< 30$  kg/m<sup>2</sup>); obese ( $\geq 30$  kg/m<sup>2</sup>) and height (short:  $< 1.60$  m; medium: 1.60 to 1.70 m; tall:  $> 1.70$  m)<sup>(9)</sup>.

The REDCap-HMV platform was used for data collection, storage, and management<sup>(10,11)</sup>.

### Statistical analysis

Categorical data were presented as absolute and relative frequency, while continuous variables were described using the mean (Standard deviation (SD)) or the median and interquartile range, depending on the data distribution. The chi-square test was used to determine the association between the variables of interest. When an association between the variables was identified, analysis of standardized residuals was performed. The significance level was set at 5%. All analyses were performed in RStudio 4.3.11.

## Results

The final sample consisted of 801 participants. The majority were cisgender women (95.93%), primarily between 18 and 33 years old (27.58%), White (88.18%), and with a graduate

degree (57.64%) (Table 1). The mean age at which they began wearing high heels was 14.7 years (SD, 2.77).

Overall, 583 participants (73%) reported wearing high heels, and the characteristics associated with their use were: age 34-41 years ( $p < 0.001$ ), income levels ( $p < 0.001$ ), higher education level ( $p < 0.001$ ), and normal weight ( $p < 0.001$ ). However, age  $> 50$  years ( $p < 0.001$ ), lower education level ( $p = 0.0031$ ), retirement ( $p = 0.0289$ ), and overweight ( $p < 0.001$ ) were associated with not wearing high heels (Table 2). Regarding height, it was observed that 75% of short women have the habit of wearing high heels, compared to 73.8% of women of average height and 67.9% of women of tall height.

Table 2 presents the user profile and their reasons for wearing high heels. Most participants wear high heels at least once a week (52.58%), alternate between low and high heels (40.76%), and prefer square heels (43.92%). Most participants wear high heels for aesthetic reasons (79.76%) and 21% to look taller. A significant percentage (63.46%) reported feeling more beautiful, 54.20% reported feeling more professionally dressed, and 16% felt happier with this item of clothing. Improved self-esteem and attractiveness were reported by 47% and 41.6% of the participants, respectively. Only 1.5% responded that they use high heels to protect their feet. An interesting fact is that 19.5% of the participants work or have worked in a company that recommended the use of high heels. Among the total, 37% responded that they have felt embarrassed at a social event for not wearing high heels. There was no difference in the habit of wearing high heels between cis women (551/755) and trans women (23/32) ( $p > 0.999$ ). However, 66.67% reported that wearing high heels causes pain, while 63% continue wearing them nonetheless. Among those who reported not wearing high heels, the main reason was foot pain or discomfort (69.72%), and 18.8% reported fear of ankle sprains (Table 3).

## Discussion

Our study examined the shoe-wearing habits of women who wear high-heeled shoes and those who do not, as well as their reasons for doing it. The main sociodemographic variables associated with wearing high heels were age 34-41 years, a high education level, and a normal body mass index. The main reasons for wearing high heels were aesthetic and professional requirements, while the main reasons for not wearing them were foot pain or discomfort.

The fact that retired women do not wear heels may be due to their distance from the professional world and its dress standards. Overweight women may have greater difficulty wearing high heels, possibly due to greater discomfort from overloading the forefoot.

We also found that the mean age of first high-heeled shoe use was in adolescence (14.7 years), before reaching skeletal maturity, possibly due to improved self-esteem, and feeling happier, more beautiful, and attractive. However, early initiation of high-heel use can be harmful to health, as it can

**Table 1.** Overall participants' characteristics.

Variables	Total (N = 801)	Wear high heels (N = 583)	Does not wear high heels (N = 218)	p-value
<b>Sex</b>				
Woman - cisgender	755/787 (95.93)	551/574 (95.99)	204/213 (95.77)	> 0.999
Woman - transgender	32/787 (4.07)	23/574 (4.01)	9/213 (4.23)	
<b>Age category</b>				
18-33 years	214/776 (27.58)	163/569 (28.65)	51/207 (24.64)	< 0.001
34-41 years	181/776 (23.32)	147/569 (25.83)*	34/207 (16.43)	
42-50 years	192/776 (24.74)	146/569 (25.66)	46/207 (22.22)	
> 50 years	189/776 (24.36)	113/569 (19.86)	76/207 (36.71)*	
<b>Race</b>				
White	701/795 (88.18)	508/578 (87.89)	193/217 (88.94)	0.871
Black	26/795 (3.27)	20/578 (3.46)	6/217 (2.76)	
Mixed	68/795 (8.55)	50/578 (8.65)	18/217 (8.29)	
<b>Education level</b>				
≥ High School	59/798 (7.39)	31/582 (5.33)	28/216 (12.96)*	0.0031
University - incomplete	86/798 (10.78)	66/582 (11.34)	20/216 (9.26)	
University - complete	193/798 (24.19)	141/582 (24.23)	52/216 (24.07)	
Graduate degree	460/798 (57.64)	344/582 (59.11)	116/216 (53.70)	
<b>Profession</b>				
Retired	22/627 (3.51)	11/464 (2.37)	11/163 (6.75)*	0.0289
Exact and Earth Sciences	38/627 (6.06)	30/464 (6.47)	8/163 (4.91)	
Health Sciences	271/627 (43.22)	202/464 (43.53)	69/163 (42.33)	
Applied Social Sciences	214/627 (34.13)	162/464 (34.91)	52/163 (31.90)	
Linguistics, Literature, and Arts	27/627 (4.31)	16/464 (3.45)	11/163 (6.75)	
Civil service	22/627 (3.51)	20/464 (4.31)*	2/163 (1.23)	
Other	33/627 (5.26)	23/464 (4.96)	10/163 (6.13)	
<b>Nutritional status</b>				
Underweight	10/776 (1.29)	5/565 (0.88)	5/211 (2.37)	< 0.001
Normal weight	416/776 (53.61)	330/565 (58.41)*	86/211 (40.76)	
Overweight	227/776 (29.25)	158/565 (27.96)	69/211 (32.70)*	
Obese	123/776 (15.85)	72/565 (12.74)	51/211 (24.17)	
<b>Height</b>				
Short	205/779 (26.32)	154/570 (27.02)	51/209 (24.40)	0.3021
Medium	440/779 (56.48)	325/570 (57.02)	115/209 (55.02)	
Tall	134/779 (17.20)	91/570 (15.96)	43/209 (20.57)	

\*Group with an association.

lead to postural disorders, including forward head posture, lumbar hyperlordosis, pelvic anteversion, and valgus knee<sup>(6)</sup>.

The reasons for wearing high heels included aesthetic, professional, self-esteem, and attractiveness issues, which align with a study of Brazilian students who also described positive feelings from wearing high-heeled shoes, such as increased sensuality, power, elegance, and femininity<sup>(12)</sup>. The positive feelings associated with the use of high heels may explain why most women continue wearing them despite the pain<sup>(8,12)</sup>.

In contrast, 27.21% of our respondents did not wear heels, either due to foot pain or discomfort, or due to fear of ankle sprains. It is not surprising, given that the association between high heels and foot deformities has been described<sup>(13,14)</sup>.

This study has notable strengths, including the significant number of participants and the pioneering nature of the research in identifying the subjective benefits of wearing high heels as a non-drug therapy that can cause happiness and improve self-esteem. As with many other habits, moderation seems to be the best recommendation regarding high-heeled

**Table 2.** Characteristics of participants who wear high heels.

Variable	Total (N = 583)
<b>Frequency of high heel use</b>	
Rarely/ Only special events	171/582 (29.38)
≥ 1 a month	105/582 (18.04)
1-3 times a week	148/582 (25.43)
> 3 times a week	158/582 (27.15)
<b>Heel height</b>	
≤ 4 cm	173/579 (29.88)
> 5 cm	170/579 (29.36)
Both	236/579 (40.76)
<b>Heel type</b>	
Stiletto	78/576 (13.54)
Square	253/576 (43.92)
Platform	31/576 (5.38)
> 1 of the above	214/576 (37.15)
<b>Reasons for using high heels</b>	
To be taller	122/583 (20.93)
For aesthetic reasons	465/583 (79.76)
For comfort	35/583 (6.00)
Professional requirement	160/583 (27.44)
For foot protection	9/583 (1.54)
<b>Feeling when wearing high heels</b>	
Prettier	370/583 (63.46)
Happier	93/583 (15.95)
More attractive	243/583 (41.68)
Higher self-esteem	275/583 (47.17)
Feel more professional	316/583 (54.20)
No influence other than height	28/583 (4.80)

shoes. Our results contribute to understanding the reasons for the continued use of high-heeled shoes, despite their potential to cause discomfort or pain.


**Table 3.** Characteristics of participants who do not wear high heels.

Variable	Total (N = 801)
<b>Reasons for not wearing high heels</b>	
I don't think they're pretty	8/801 (1.00)
They are uncomfortable	152/801 (18.98)
I'm afraid of twisting my ankle	41/801 (5.12)
My spouse is my height or shorter	12/801 (1.50)
Other	60/801 (33.33)
<b>Wearing high heels is painful</b>	
Yes	386/579 (66.67)
No	193/579 (33.33)
<b>I wear high heels despite the pain</b>	
Yes	242/384 (63.02)
No	142/384 (36.98)

However, some study limitations must be acknowledged, including the use of a self-selection sampling technique and the online-only dissemination and completion of the questionnaire, which may have led to selection bias and prevented the generalization of the results to the general population.

### Conclusion

Women who wear high heels are mainly young, have higher education and income levels, and most wear them for aesthetic reasons, because they feel prettier, more attractive, more professionally dressed, and with increased self-esteem. Although high-heel-related pain is quite prevalent, it is insufficient to outweigh the subjective benefits. Among those who reported not wearing high heels, the main reason was foot pain or discomfort.

**Authors' contributions:** Each author contributed individually and significantly to the development of this article: PIFV \*(<https://orcid.org/0009-0008-7949-2402>), and PBZR \*(<https://orcid.org/0000-0002-1774-073X>), and LHB \*(<https://orcid.org/0000-0002-2299-8452>), and MMDS \*(<https://orcid.org/0000-0002-4291-1684>), and JAVS \*(<https://orcid.org/0000-0002-6321-9566>) Conceived and planned the activities that led to the study, interpreted the results of the study, participated in the review process, data collection, bibliographic review, formatting of the article; MPVS \*(<https://orcid.org/0000-0002-0177-8338>) Conceived and planned the activities that led to the study, data collection, bibliographic review; KMS \*(<https://orcid.org/0000-0003-1697-1584>) Conceived and planned the activities that led to the study, interpreted the results of the study, data collection, statistical analysis, formatting of the article; KNT \*(<https://orcid.org/0009-0005-6884-6832>) Conceived and planned the activities that led to the study, bibliographic review. All authors read and approved the final manuscript. \*ORCID (Open Researcher and Contributor ID) .

## References

1. Di Sipio E, Piccinini G, Pecchioli C, Germanotta M, Iacovelli C, Simbolotti C, et al. Walking variations in healthy women wearing high-heeled shoes: Shoe size and heel height effects. *Gait Posture*. 2018;63:195-201.
2. Wiedemeijer MM, Otten E. Effects of high heeled shoes on gait. A review. *Gait Posture*. 2018;61:423-30.
3. Cronin NJ, Barrett RS, Carty CP. Long-term use of high-heeled shoes alters the neuromechanics of human walking. *J Appl Physiol*. 2012;112(6):1054-8.
4. Moore JX, Lambert B, Jenkins GP. Epidemiology of high-heel shoes injuries in U.S. Women: 2002 to 2012. *J Foot Ankle Surg*. 2015;54(4):615-19.
5. Meskó N, Öry F, Csányi E, Juhász L, Szilágyi G, Lubics O, et al. Women walk in high heels: Lumbar curvature, dynamic motion stimuli and attractiveness. *Int J Environ Res Public Health*. 2021;18(1):299.
6. Silva AM, de Siqueira GR, da Silva GA. Implications of high-heeled shoes on body posture of adolescents. *Rev Paul Pediatr*. 2013;31(2):265-71.
7. Wang Y, Shi C, Jiao W, Yu W, Shi G, Zheng J. Wearing high heels with an appropriate height is protective for pelvic floor function. *Transl Androl Urol*. 2021;10(6):2493-9.
8. Lewis DMG, Russell EM, Al-Shawaf L, Ta V, Senveli Z, Ickes W, et al. Why women wear high heels: Evolution, lumbar curvature, and attractiveness. *Front Psychol*. 2017;8:1875.
9. Instituto Brasileiro de Geografia e Estatística (IBGE) [Internet]. Rio de Janeiro: Características Étnico-raciais da População Classificações e Identidades; 2013. [atualizado 2013; citado 2024 Set 13]. Disponível em: <https://biblioteca.ibge.gov.br/visualizacao/livros/liv63405.pdf>
10. Harris PA, Taylor R, Minor BL, Elliott V, Fernandez M, O'Neal L, et al. The REDCap consortium: Building an international community of software platform partners. *J Biomed Inform*. 2019;95:103208.
11. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)--a metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform*. 2009;42(2):377-81.
12. Brito, GA. Uma análise acerca da Hegemonia dos sapatos de saltos altos ao longo da História. In: 9º colóquio de Moda-Fortaleza (CE); 2013; Fortaleza. Fortaleza: Silo.Tips; 2017. [citado 2025 May 29] Disponível em: <https://silo.tips/download/uma-analise-acerca-da-hegemonia-dos-sapatos-de-saltos-altos-ao-longo-da-historia>
13. Barnish MS, Barnish J. High-heeled shoes and musculoskeletal injuries: a narrative systematic review. *BMJ Open*. 2016;6(1):e010053.
14. Cronin, NJ. The effects of high heeled shoes on female gait: a review. *J Electromyogr Kinesiol*. 2014;24(2):258-63.