



HIGH HEEL SHOES; OUTCOME OF WEARING IN YOUNG GENERATION: A CROSS SECTIONAL STUDY.

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ABSTRACT... Object: Outcome of wearing high heel shoes in young generation: A Cross Sectional Study. **Introduction/ Background:** High heels increase the heel height, thus increasing the pressure under the metatarsal head in forefoot, they push the center of mass of the body forward taking the hips and spine out of alignment moreover the altered posture of walking in high heels places excessive forces on the inside of the knee joint¹⁻⁵. All these factors contribute in causing deleterious pathologic deformities. The studies carried out previously were more focused on the adult population furthermore there isn't much work done to investigate the effect of heels in Pakistan therefore, this was a non-invasive study the purpose of which was to evaluate these complications particularly targeting the medical students of medical colleges, Karachi. **Methods:** A total of 220 respondents aged between 15 to 25 years were selected as potential respondents meeting the criteria for selection. A convenience based randomized sampling method was adopted, where the participants were required to fill questionnaires and give their demographic details. They were inquired about the presence of any co morbidities which was an essential part of the exclusion criteria. They were also inquired about their usage of high heel shoes, their size, duration and frequency of usage, and if they had been causing any complications such as bunions, heel spur, callosities or pain in soles, calf or back. The data obtained was analyzed through SPSS and the graphs of frequency for all the complications were computed. **Results:** After analyzing the 220 participants it was found that 7.7% were males while 92.3% were females, and 61.8% were found to be within 21 to 23 years of age. After the analyses of data for the complications it was found that out of the total participants 18.8% experience foot swelling, 19.4% blisters, 16.4% foot numbness, 12.3% foot callosities, 2.8% heel spur, and 3.7% experience bunions. **Conclusions:** From this study conducted on the students of medical college it was found that wearing high heel shoes is not associated with any significant complications among most of the students.

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INTRODUCTION

Even though it causes considerable discomfort, in order to satisfy their fashion needs or to gain a height advantage most of the younger generation, majorly women don't refrain themselves from wearing high heel shoes¹⁻⁶. Historically, the first form of high heels started in the 14th century and since then it is widely known that wearing such footwear can often have deleterious and irreversible biomechanical effects⁷.

Many pathologies are associated with wearing high heel shoes mainly in the lower extremity including blisters, callosities, heel spur, bunions (hallux valgus) in the feet which is mainly due to the altered ankle joint axis and altered arch angle, pain in the calf muscle, knee and hip joint⁸⁻¹¹. Since the gastrocnemius and the soleus have both been reported to increase their tonic behavior in high-heeled gait¹². Similarly the spine is also adversely affected resulting in back pain which is mainly due to exaggerated spinal flexion¹¹⁻¹³. The postural

changes associated with wearing high heels are another major drawback. The postural changes caused by high heels is an overall increase in stiffness of the kinetic chain, which renders tissues more prone to injury from shock and aberrant force vectors over time¹⁴⁻¹⁷. All these factor also increasingly prone a person to trauma, fractures and other injuries¹⁸⁻¹⁹.

In a study conducted by Theresa H. M. Keegan and Jennifer L. Kelsey²⁷ it was found that high-heeled shoes and shoes with a narrow heel increased the risk of all fractures²⁰⁻²².

In another study done to analyze the altered EMG patterns conducted by Dr. Stephen J. Piazza²⁸, they compared those who wear flat heels to those who were high heel shoes and found out that in high heel gait and standing, many muscles located in the lower extremities and the back are overly worked due to the plantar flexion of the foot. Comparisons in EMG were calculated for the factor of each shoe condition heel versus flat, heel versus bare and bare versus flat, comparison showed the high-heeled condition to be different from both the bare and flat conditions with a significant difference of heel versus flat ($p = .0006$) and heel versus bare ($p = 0.028$) indicating that high heel causes over activity of the gastrocnemius muscle²²⁻²⁷.

Though most of the studies evaluated the effect of high heels in the adult population but they failed to assess the complications in the younger generation. The purpose of our study is to:

- Assess the complications caused by wearing high heels in the younger generation particularly targeting the medical students due to their daily strenuous physical activity as demanded by their hectic routine.
- To determine the extent of association of these complications with age and family history.

METHODOLOGY

The overall study was completed in 4 months from May 2012 to August 2013. The study was carried out among the medical students at different medical colleges of Karachi. A sample size of 220

was finalized after considering the previous studies.

It was a cross sectional study. The data was collected through randomized sampling method.

People between 15 to 25 years of age both males and females who use shoes with heels of size 1 inch or greater than 1 inch, and who are not suffering previously from any other bone related deformity or disease not related to their usage of high heel shoes. People below 15 years and above 25 years excluded were excluded.

For the data collection randomized sampling method was adopted. The participants were required to be within the age limit of 15 to 25 years and without any bone deformity that is not associated with wearing high heel shoes. The potential respondents were given questionnaire in which they were required to give their demographic details including age, height and weight. They were also inquired whether they had been suffering from any previous bone deformity or disease. The participants were inquired about their daily exercise routine and if they had been wearing high heel shoes they were required to give the size of the heels and the duration and frequency of using them. The participants were also asked whether their usage of high heel shoes has led to complications including pain in the calf, backache, callosities, bunions, heel spur or any trauma and injury.

In order to avoid researcher based bias the participants were randomly selected and the researcher was completely blinded prior to the study about the fact that whether the participant was suffering from any of the complications or not.

The data obtained was analyzed through SPSS (Statistical package for the Social sciences). Frequencies were calculated for complications of pain in calf muscle, pain in back, pain in soles, callosities, bunions, and heel spur.

BUNIONS

A bunion is when your big toe points toward the

second toe. This causes a bump on the outside edge of your toe.

CALLOSITIES

A piece of skin that has become thickened as a result of repeated contact and friction.

HEEL SPUR

A heel spur is a bony projection on the sole (plantar) region of the heel bone may also accompany or result from severe cases of inflammation to the structure called plantar fascia.

BLISTER

A blister is a small pocket of fluid within the upper layers of the skin, typically caused by forceful rubbing (friction), burning, freezing chemical exposure or infection.

NUMBNESS

Partial or total lack of sensation in a part of the body; a symptom of nerve damage or dysfunction.

At all the stages of study due regard was given to the privacy of all the participants where the consent of each of the participant was an essential component of the criteria for their selection.

RESULTS

A total of 220 students from medical colleges of Karachi were included in the study. out of them 17(7.7%) were male and 203(92.3%) were females.2.0% of the study group was within the age group of 15-17 years 35.0% within 18-20 years and 63.0% were within 21-23 years.

Age group	Male 7.7% (17)	Female 92.3% (203)	Total (220)
15-17	-	2.5% (5)	2.3% (5)
18-20	-	38.9% (79)	35.9% (79)
21-23	100% (17)	58.6% (119)	61.8% (136)

COMPLICATIONS OF WEARING HIGH HEEL

DISCUSSION

According to the findings the data for the occurrence of pain in soles has been grafted (Fig 1), where it is found to exist always in 27 % (20) of

the respondents in age group 18 to 20 years while 39.2%(29) members of the same age group experienced it sometimes. The data collected from those between 21 to 23 years of age shows that here 17.7 % (22) of the female respondents experience it always while 31.5 %(39) experience it sometimes.

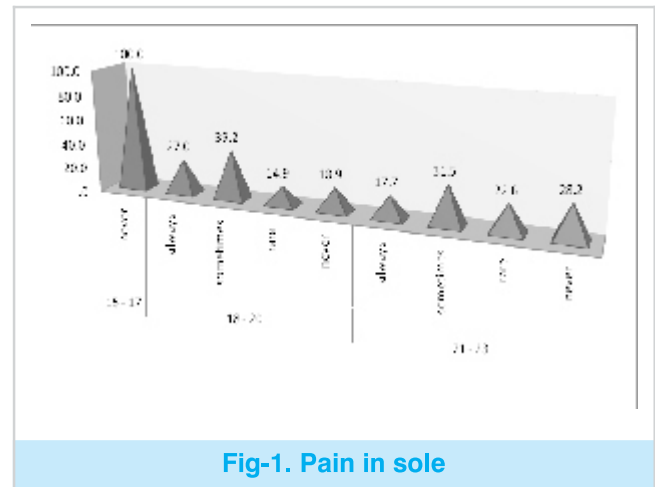


Fig-1. Pain in sole

In comparison to our study, the study conducted by Alyssa B. Dufour²³ found that nearly 64 percent of older women who reported hind-foot pain regularly wore high heels, pumpies or sandals at some point in their lives.

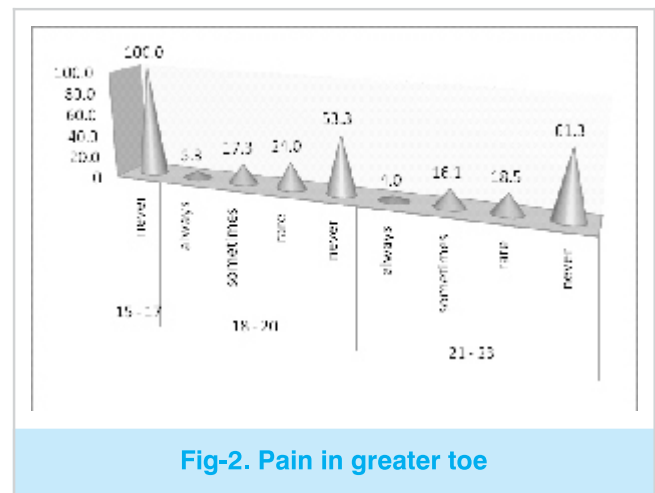


Fig-2. Pain in greater toe

The study found no connection between foot pain in men and the shoes they wore, largely because they don't typically wear high heels and spend less time in sandals, the researchers concluded.

The occurrence of pain in great toe was found (Fig-

2) to exist always in 5.3%(4) of those in age group 18 to 20 years and 17.3%(13) females of the same age group experience it sometimes. While those between age 21 to 23 years 4.0% (5) experience it always and 16.1%(19) experience it sometimes.

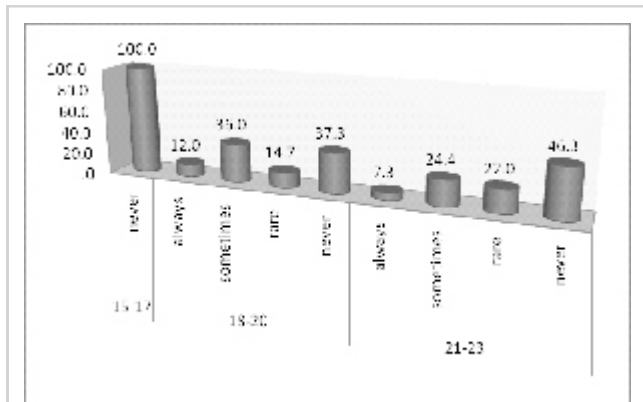


Fig-3. Pain in calf muscle

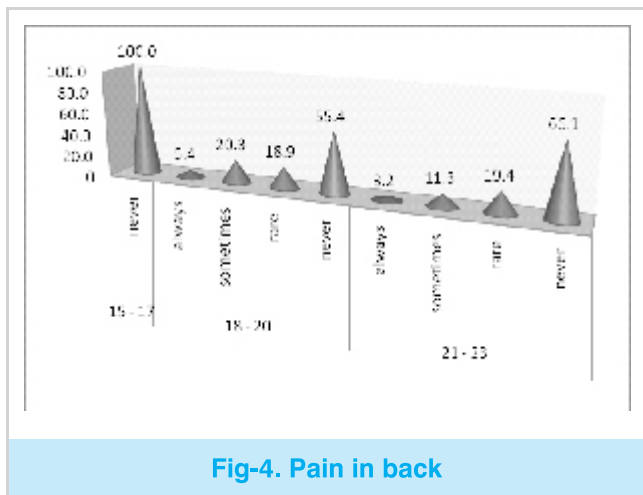


Fig-4. Pain in back

The complain of pain in the calf muscle was found to be always present in 12%(9) of those in age group 18 to 20 years as shown in (Fig-3) while 36%(27) respondents of the same age group experienced it sometimes. While in the age group of those between 21 to 23 years it was always present in 7.3% (9) of the female participants and 24.4%(30) experienced it sometimes.

In contrast to our study, the study conducted by Robert Csapo²⁴, found from the scans of the calf muscles in a group of frequent heel wearers that muscle fibers were, on average, 13% shorter than

in those who avoided high heels concluding that they cause over activity of these muscles.

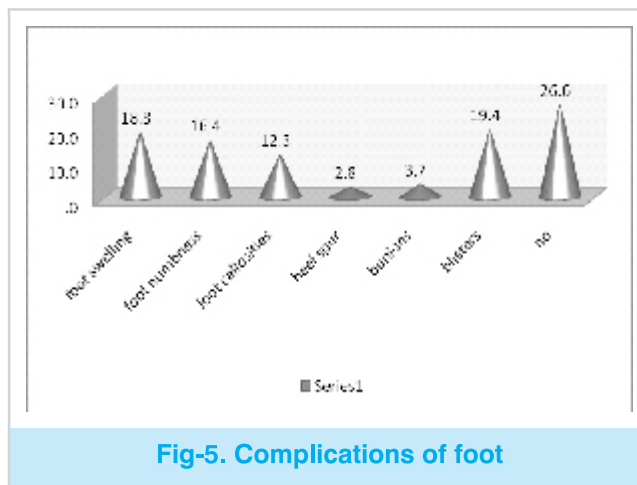


Fig-5. Complications of foot

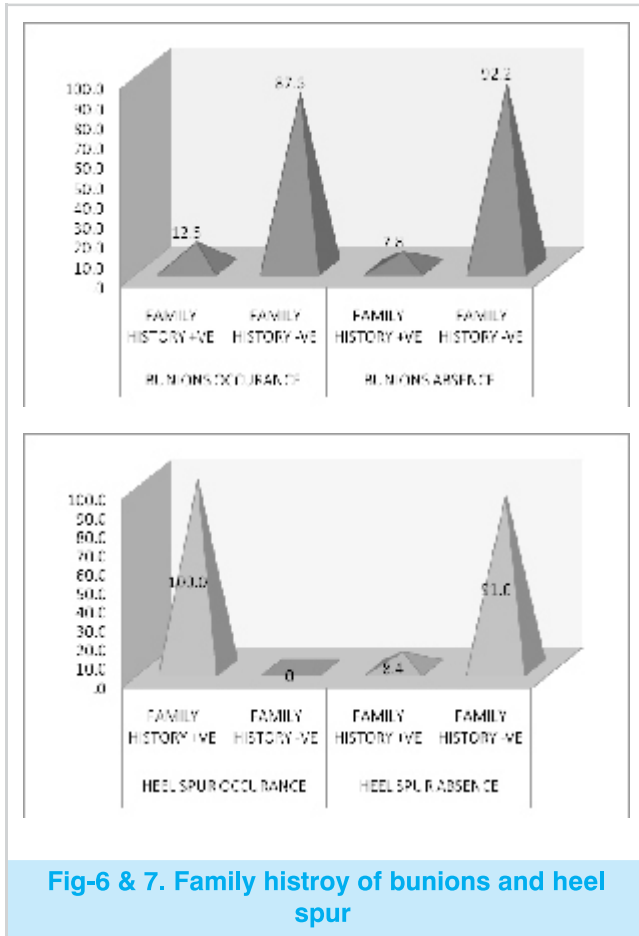
The data found regarding backache associated with wearing high heel shoes as shown in Fig-4, shows that 5.4%(4) females of age group 18 to 20 years experience it always while 20.3%(15) experience it sometimes, while the data obtained from those between 21 to 23 years of age shows that 3.2%(4) of the females experience it always while 11.3%(14) experience it sometimes.

The data found regarding (Fig-5) complications of foot associated with wearing high heel shoes shows that age group from 15 to 25 years experience 18.8% foot swelling while 16.4% experience foot numbness 12.3% experience foot callouses and 2.8% heel spur and 3.7% bunions and 19.4% blisters.

In contrast to our study, the study conducted by Robert A Schwart²⁵, he found that, "Poorly fitted shoes are the main cause of foot blisters with heat; sweating and maceration of the skin are the predisposing factor. His study comprised of 11 groups out of which 6 groups are of the positive findings.

FAMILY HISTORY OF BUNIONS AND HEEL SPUR

According to the data found (Fig-6) the occurrence of family history of bunions in bunions positive students is 12.5% and those with negative family history were found to be 87.5%. Also the



occurrence of family history of heel spur in heel spur positive students is 100%.

In contrast to our study, the study conducted by Coughlin²⁶ concluded that, "Magnitude of bunions (hallus valgus) was not associated with Achilles tightness or with increasing age. A family history, female gender and constricting shoes were implicated by 35% of the population sample as the cause of bunion.

CONCLUSIONS

A study on 220 students of Medical Colleges, Karachi was carried out in which 72.1% were found not to be suffered from any complication regarding wearing high heels and this rate was found to be higher than the studies conducted in china.

While the finding of complications in students is 27.9%, of which mostly complications occur rarely. So it could be concluded on the basis of these

results that high heels are not the main cause of complications of foot.

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