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The association of back pain and its functional limitation with wearing heels among working women and its therapeutic management

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Abstract
Background: Women have worn heels for centuries all over the world, and it is now an important part of women's fashion not only in the West, but also in Pakistan. According to recent research, women who wear heels on a daily basis face permanent problems such as bake pain as a result of the heels. A survey shows that women who wear heels more than 3 times a week are among 1/3 of them facing back pain on a permanent basis [1].
Objective: Moreover, the potential of back pain due to heel wearing on permanent bases is not clearly proven yet. The results of different literature very similar. Therefore, the current study was done to appraise this reason and outcome.
Methods: This study war questionaries based on research included those female participants who voluntarily participated in our study and who wear heels up to 3,4 times per week, with heels ranging in height from 2.5 to 5 inches. We distributed questionnaires to all of them and recorded their responses. Patients with severe back pain were treated separately and therapeutically, and their responses were monitored.
Results: There were 123 women's effects with very mild pain, 87 women's effects with moderate back pain, 53 women's effects with fairly severe pain, and women's effects with very severe pain among the 383 participants. After we gave both groups two different types of physiotherapy treatment, the patients in group two responded more positively than the patients in group one.
Conclusion: There was a high-quality correlation between length of wear and height of footwear in relation to both heels and back ache [2]. There is a great association between pain in the lower back and working hours.

Keywords: Low back aches, Heel pain, heels wearing, Statistical examination, Ladies, high heel shoes

Introduction
In this modern era, as women's fashion changes day by day, wearing high heels is considered as a sign of high-end fashion, but high heels also have major drawbacks. In spite of all the serious negative effects on health, women always wear high heels on almost every occasion. Studies reveal that these towering shoes exert unwanted bizarre effects on the human body. Heels have bad effects on our postures and gait. Aside from the glamour of high heels, one cannot deny their negative impact on the body [3]. We will study the physiological effects of high heels and also provide guidance and awareness of the positive and negative effects of heels on women [4].
Walking is the most common form of human mobility. Heeled shoes make walking extremely difficult and disrupt the natural position of the foot-ankle complex. Consequently, all these chain of reactions effects disturb the lumbar vertebrae. High heels are different from flat shoes. History shows high heels are considered as a symbol of class and gender. Sometimes, high heel women do not maintain their balance and fall down, which increases the chances of damaging the foot soft tissues [5].
High heels badly affect the lower back and cause back pain. This high-heel study is due to describe the relation between heeled footwear and heel and back pain. Walking is the most common form of human locomotion. The task of walking is tremendously complex due to human bipedalism. Many women face problems due to wearing heels and some women lose their feet 'natural position. Heels have a negative impact on the lumbar vertebrae [6]. Weight is shifted to the ball of the foot when the foot is ankle forward, which increases the likelihood of soft tissue that supports the foot being damaged.
When the foot is forward of the wearer, this puts pressure on the lower back and later causes back pain. This study included adolescents who wore heels and had back pain. After wearing high heels, women have back pain. Many doctors and therapists, research on causes of foot pain due to high heels. High heel shoes cause increased lumbar lordotic and lumbar lordosis [7].

Specifically mention physical therapists, but the study by Pila believe it is a nearly universal perception regardless of the practitioner's discipline. All of those ideas seem logical, but published research has cast doubt on the high-heeled shoe-lordosis relationship [8].

Lateur *et al* 2017 from the University of Oregon showed that heels accentuate lordosis is not new. Vida beuhler used a conformater, a framework of horizontal wooden slats that slide to place their ends against the surface of the spine. Vida Beuhler finding were mixed with various participants having increased, decreased or unchanged lumbar curves [9]. Beuhler mentioned in his writing that the segment or any segment of the body must compensate for the heel. The high heel has higher compensation. Such compensation is thought to take place in the lumbar region and therefore to increase forward and downward tilt of the pelvis… yet Miss Bennin rejected Beuhler's theory. Miss Bennion's said that compensation for the heels take place elsewhere. Then in the lumbor spine. This article presents statements from various sources as well as describes the benefits and drawbacks of high heels based on a review of the available research in this area. Low back pain and the wearing of high heels are both quite common. This study provides information and treatment for women with lower back pain. Bio mechanical effects of high heels and low heels on walking and they concluded there is decreased range of motion during stance phase with high heels and increased weight varying on lower limb [10]. Some women wear heels to follow the fashion, but it has a bad effect on their bodies. The objective of the research was to determine the frequency of back pain associated with wearing heels among working women and its therapeutic management [11].

Operational Definitions

Back pain

Back pain, also known as backache, is a back pain. Depending on the affected area, the back is classified as neck pain (cervical spine), thoracic back pain, lumbar pain, or coccydynia (tailbone or sacral pain). The head area is the most pretentious area; lower back pain is also the most common.

Frequency

The rate at which to some degree happens at a precise time or in a prearranged model.

Working women's

It may refer to roles related to professions such as salesgirls, teachers, office workers,

Heel of shoe

An impact point is defined as the area beneath the lower leg inverse to the toe of the foot, or the aspect of the shoe that supports the impact point. A case of an impact point is the rear of the foot.

Materials and Methods

Study Design

It was a Cross sectional study.

Data Collection

Data was collected from different mall salesgirls, office workers, teachers, university students.

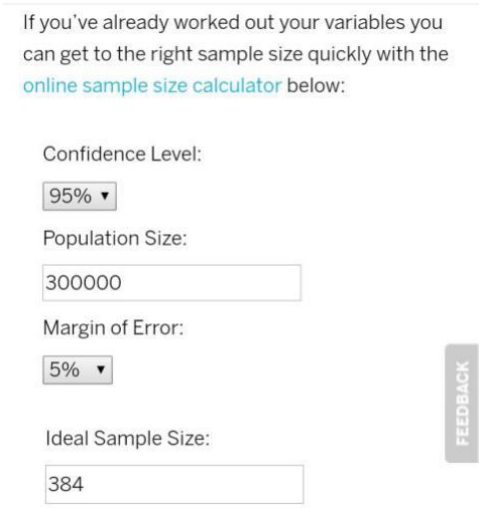
Sample Technique

In this study, a nonprobability convenient sampling technique was used.

Sample size

Our studies the sample size was 384 that was calculated by utilizing the online sample size calculator EPITOOL by taking Margin of error: 0.05,

Confidence interval: 95%
Population: 300000



Sample size is calculated by the formula: n = Z21-a/s P (1-P) D 2
1-a =level of confidence
P = population Anticipated proportion
D = Absolute required precision
N = size of Sample

Data collection Tool:

Data was collected by using The Oswestry Disability Index (also known as the Oswestry Low Back Pain Disability Questionnaire) is an excellent and very vital tool used by researchers and appraisers of disability and used to evaluate low back pain and chronic illness or disability. This is a gold standard test for evaluating low back pain effect performance.

Sample selection criteria

Inclusion criteria

- The inclusive criteria for the study are.
- Participants were volunteers to participate in study.
- Women wearing heels.
- Women wear heels above the age of 15-20 years.
- Women wear heels for at least 5-6 hours a day.
- Women wear heels ranging from 2 to 5 inches in height.

Exclusion criteria

- The exclusive criteria for the study are.
- Patients who have any foot deformities by birth.
- The patient has a recent history of ankle sprain and strain.
- Patient with any fracture of the foot or lower limb.
- Previous heel surgery.
- Signs and symptoms of local arthritis.

- Infection in foot

Data Anylysis

After taking an informed written consent form. Data was collected by using the Oswestry Disability Index (also identified as Oswestry questionnaire for low back pain). SPSS 22.1 was used in this study for data analysis, frequency, flow charts and suitable data computing methods.

Methodology

We collected data from 384 women who were wearing high heels and experiencing back pain as a result of high heel wear via questionnaire 384, and we collected data from ladies who volunteered to participate in our research study. We divided women or ladies into three groups based on the height of their heels, which ranged between 2.5, 3 > 3.5, and 4-5 inches in a cross-sectional study. We collected information from the women by using a questionary, and their responses were observed or noted. Data was entered in SPSS version 21. and graphs will be formulated afterwards to find out the frequency of back pain and its associated functional limitations with high heel wear were checked. Patients with severe back pain were separated and divided into two groups. Patients in group one was treated by educating them about self-management and some kind of manual exercise, while patients in group two were treated with mechanical devices in the physiotherapy department of City Hospital Lahore.

Table 1: The results/outcome of a questioner-based survey among heel wearing working women

What is your age?	Frequency	Percent	Cumulative Percent
15-25	203	53	53
26-35	118	30.8	83.5
36-45	30	7.8	91.5
46-55	30	7.8	99.5
56-65	2	0.5	100
What is your height?			
4ft 10 inch	41	10.7	10.7
5ft 2 inch	119	31.1	41.8
5ft 4 inch	130	33.9	75.7
5ft 6 inch	72	18.8	94.5
5ft 8 inch	21	5.5	100
What is your weight?			
40kg to 50kg	121	31.6	31.6
51kg to 60kg	127	33.2	64.8
61kg to 70kg	97	25.3	90.1
71kg to 80kg	25	6.5	96
81kg to 90kg	13	3.4	100
Do you wearing heels?			
No	36	9.4	9.4
Yes	171	44.4	54
some time	134	35	89
not ever	12	3.1	92
dialy basis	18	4.7	96
once in a week	12	3.1	100
Does your back is hurt after you wear heels?			
No	74	19.3	19.3
Yes	171	44.6	64
some times	118	30.8	94
not ever	6	1.6	96
dialy basis	10	2.6	99
once in a week	4	1.6	100
What is your heel height?			
1-2 Inches	81	21.1	21.1
2to3 Inches	128	33.4	54.6
3-4 Inches	120	31.3	85.9
4-5Inches	39	10.2	96.1
More than 5 Inches	50	3.9	100
How long you in a day wear heels ?			
3-4 Hours	184	48	48
4-5 Hours	145	37	85
6-8 Hours	54	14	100
How Long You wear Heels before heels hurting your feet?			
1/2 Hour	77	21	20.1
up to 1 Hour	119	31	51.2
up to 2 Hour	103	26	78.1
Up to 3 Hours	51	13	91.4
4 to 6 Hours	25	7	97.9
More Than 6 Hours	18	2	100
Pain Intensity?			

No Pain	88	23	23
very Mild Pain	123	32	51
Moderate Pain	87	22	77
Fairly Severe Pain	53	13	91
Very Severe Pain	25	7	98
Worst Imaginable Pain	7	2	100
Personal Care(Washing, Dressing, extra)			
Look After without Extra Pain	186	48	48.6
Look After with Extra Pain	103	26	75.5
It is pain full to look after my self	50	13	88.5
I need Some Help	32	8.4	96
I am not able to Get dressed, I am facing difficulty in washing etc.	12	3.1	100
Lifting?			
Lift Heavy Weight without Extra Pain	94	24	24
Lift Heavy Weight with Extra Pain	149	38	63
Pain prevent me for lifting heavy weight	45	12	75
I can manage light to medium weight	39	10	86
i can lift very light weight	42	11	96
I cannot lift or carry anything at all	15	4	100
Walking?			
Pain does not prevent me walking any distance	122	31.9	31.9
pain prevent me from walking more than 20 miles	96	25.1	56.9
pain prevent me from walking more than 10 miles	74	19.3	76.2
pain prevent me from walking more than 5 miles	70	18.3	94.5
I can only walk using a stickor curtches	9	2.3	96.9
I am in Bed Most of the time?	12	3.1	100
Sitting?			
I can sit on any chair	184	48	4
I can only sit in my Favorite chair as long as i like	66	17.2	63.5
Pain prevents me from sitting more than 1 hour	66	17.2	82.5
Pain prevent me from sitting more than 30 minutes	38	9.9	92.5
Pain prevents me from sitting more than 10 minutes	23	6	98.4
Pain prevents me from sitting at all	6	1.6	100
Standing?			
I can stand as long as i want without extra pain	115	30	30
I can stand as long as i want but it gives me extra pain	162	43.3	72.3
Pain prevents me from standing for more than 1 hour	48	12.5	84.9
Pain prevents me from standing for more than 30 Minutes	37	9.7	94.5
Pain prevents me from standing for more than 10 Minutes	13	3.4	97.9
Pain prevents me from standing at all	8	2.1	100
Sleeping?			
The sleep is never disturb by pain	160	41.8	41.8
My sleep is occasionally disturb by pain	125	32.6	74.4
because of pain i have less than 6 hours sleep	42	11	85.4
Because of pain I have less than 4 hours sleep	32	8.4	93.7
because of pain i have less than 2 hours sleep	18	4.7	98.4
Pain prevents me from sleeping at all	6	1.6	100
Social Life?			
My social life is normal	199	52	52
My social life is normal but increase the degree of pain	82	21.4	73.4
pain has no significant effect in my social life apart from limiting my more energetic interest e sports	47	12.3	85.6
Pain has restricted my social life and don't go out as often	33	2.3	94.3
I have no social life because of pain	9	3.4	96.6
Travelling?			
I can travel anywhere without pain	145	37.9	36.9
i can travel anywhere but it gives me extra pain	103	26.9	64.7
pain is bad but i manage journey over 2 hours	70	18.3	83
pain restricted me to journey of less than 1 hour	43	11.2	94
pain restricted me to short necessary journey under 30 minutes	15	3.9	98.2
pain prevent me from travelling excepts to receive treatment	7	1.8	100

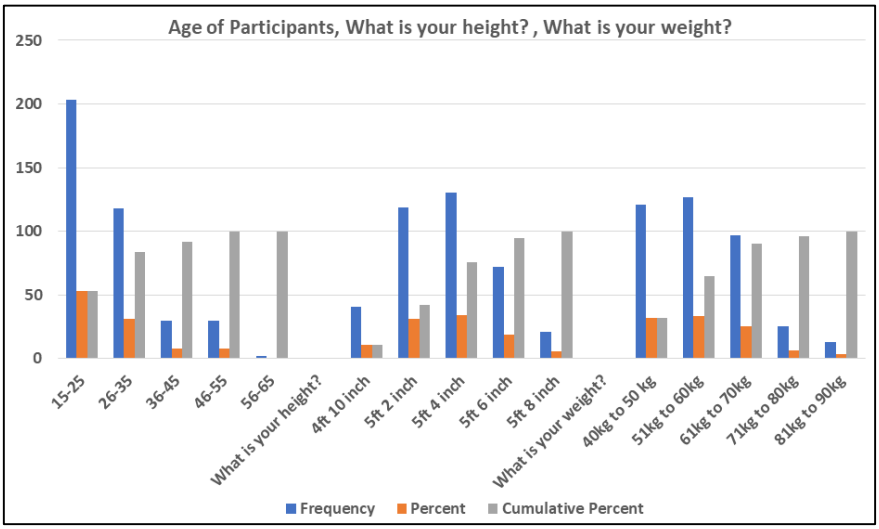


Fig 1: Out of 383 participants, 203 women's ages ranged from 15 to 25, 118 women's ages ranged from 26 to 35, 30 women's ages ranged from 36 to 45, 30 women's ages ranged from 46 to 55-, and 2-women's ages ranged from 56 to 65.130 women were 5ft 4inches tall, while 21 women were 5ft 8inches tall. The women's weight ranged from 40kg to 50kg, the women's weight ranged from 50kg to 60kg, and the 13 women's weight ranged from 81kg to 90kg

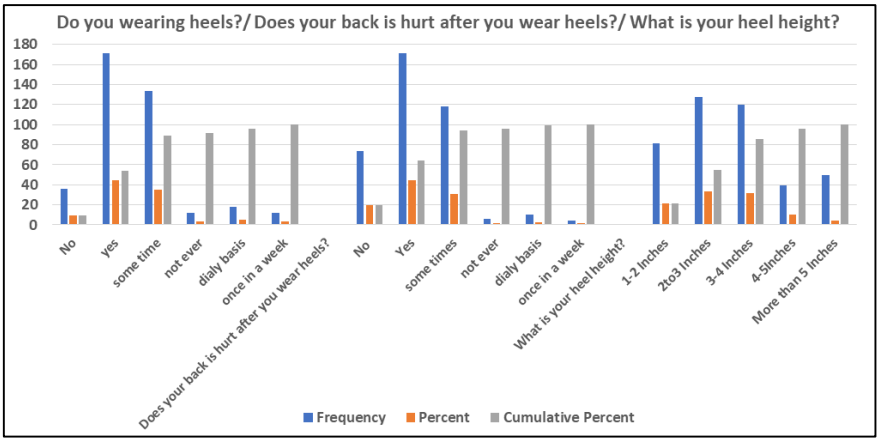


Fig 2: Out of 383 participants, 171 women wore heels on a daily basis during their working hours, 134 women wearing heels for some time. Only 12 women were wear heels once a week. Out of 383 participants, 171 women's backs hurt as a result of wearing heels, and 118 women's backs hurt for a short period of time as a result of wearing heels. Only 4 women's backs were not hurting due to wearing heels. Out of 383 participants, 128 had heel heights of 2-3 inches, 120 had heel heights of 3-4 inches, and only 15 had heel heights of more than 5 inches

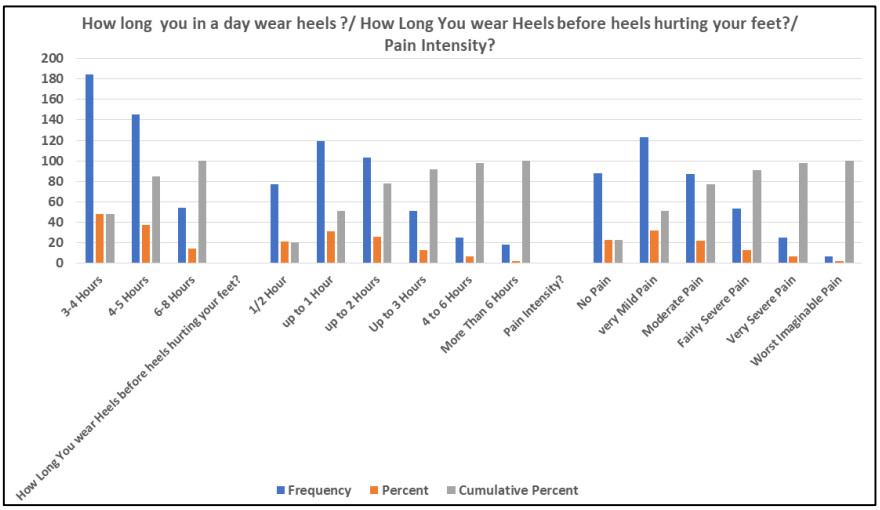


Fig 3: 184 women wore heels for 3-4 hours and 145 wore heels for 4-5 hours out of 383 participants.54 wears heels for 6-8 hours. Out of 383 participants, 199 wear heels for up to 1 hour, 103 wear heels for up to hours, and 8 women wear heels for more than hours. Out of 383 participants, 123 women experienced very mild pain, only 7 experienced the worst imaginable pain, and 88 women experienced no pain as a result of wearing heels

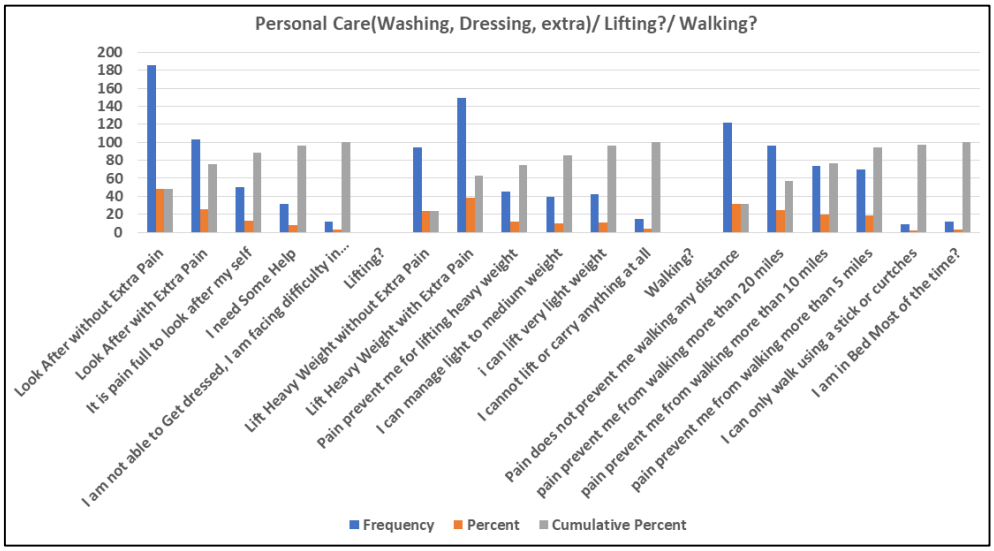


Fig 4: Out of 383 participants, 186 women can care for themselves without extra pain, 103 women can care for themselves with extra pain, 12 women cannot get dressed or even wash themselves without difficulty, and so on. Only 15 of the 383 participants can lift heavy weights with extra pain, while 149 cannot lift or carry anything at all. Out of 383 participants, 122women's pain prevents them from walking any distance, 90women's pain prevents them from walking more than 20 miles, and only 12women spent the majority of their time in bed due to wearing heels

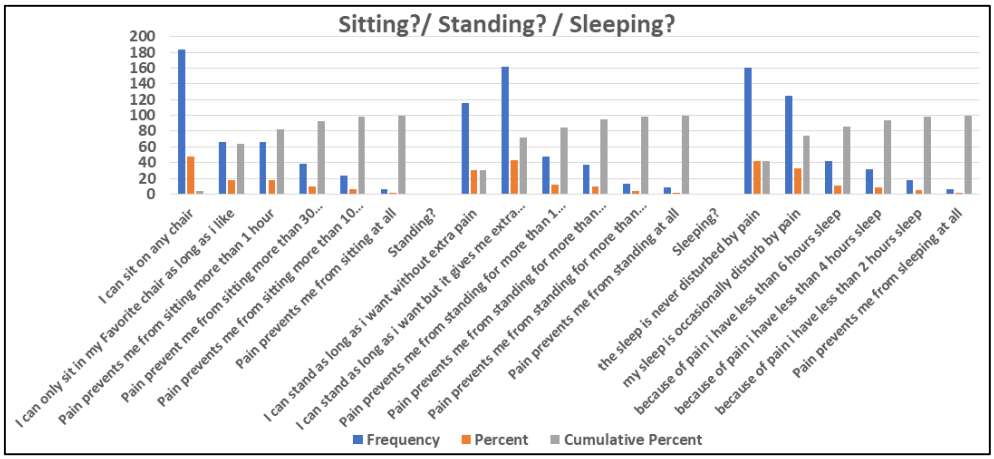


Fig 5: Out of 383 participants, 184women could sit in any chair, while only 6women were unable to sit at all due to pain. Out of 383 participants, 115women can stand for as long as they want without pain, but 162women can stand for as long as they want without pain, and 8women's pain prevents them from standing at all. Out of 383 participants, 160 women can sleep without being disturbed by pain, 125 women can sleep occasionally without being disturbed by pain, and only 6 women are unable to sleep at all due to pain

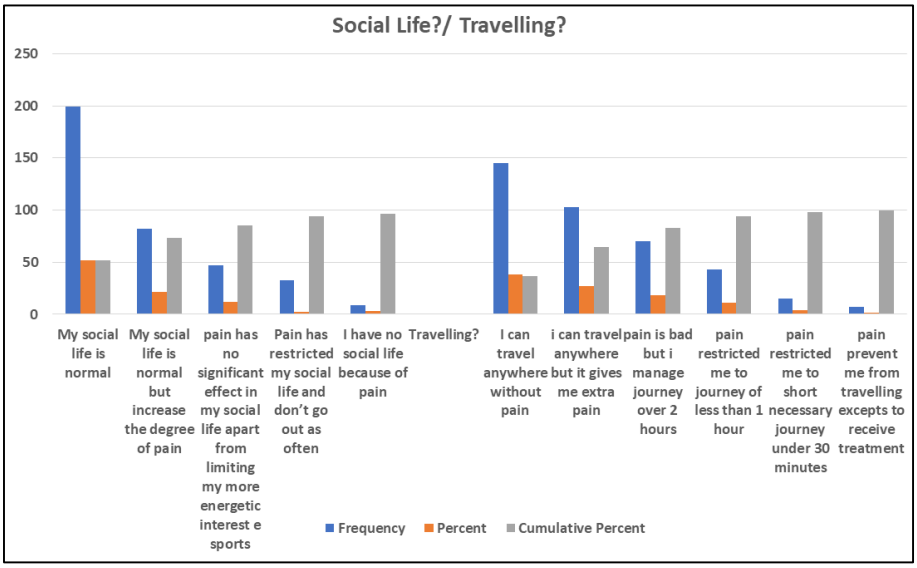
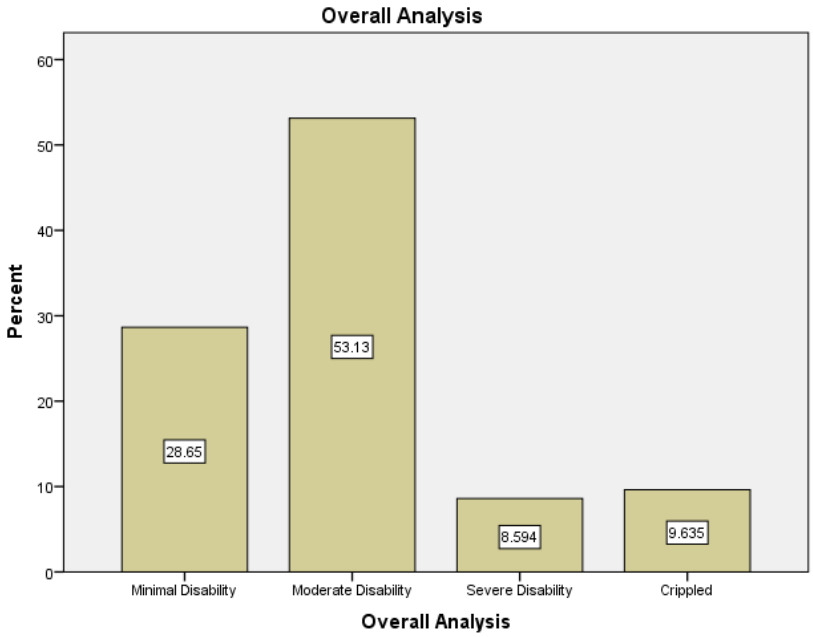


Fig 6: Out of 383 participants, 199women have a normal social life; 145women can travel anywhere without pain; and 7women's pain prevents them from receiving treatment



Therapeutic Management

After it was established that wearing a high heel caused back pain. We separated the patients with severe back disability and subjected them to 3 weeks of therapeutic treatment. We divided the patients into two groups. Each group contained 25 patients. The patients of group 1 were treated with self-management counseling and some manual therapy. In terms of patient self-management, we taught them how to maintain their postural stability and use of comfort shoes and sleeping mattresses, as well as guided them through some regular exercises such as aerobic exercise, back strengthening exercise, and spine stabilization [12]. We required them to complete all exercises at home and provide feedback on a daily basis. We were providing physical therapy to a second group of patients in the city hospital Lahore's physical therapy department. Second group, we applied all those treatments that we applied in the first group, but in addition, we applied some therapeutic devices treatment on patients for pain management. We gave them therapeutic ultrasound treatment, applied a hot/cold pad, and used TENS on their backs for three weeks. After applying two different kinds of treatment for 3 weeks on two different groups, it is concluded that the patients of group 1 getting all traditional manual treatment and self-management gave good results, but the patients of group 2 that were additionally treated with therapeutic devices showed better and remarkable results than group 1.

Results

Data was collected using EPITOOL online calculator and out of 384 sample sizes, only 383 participants were qualified to be included in the following research work because 1 questionnaire was either not returned or not filled completely. So, the response rate of (383) was recorded. In our study, 171 women were those whose back hurts when they wear heels, 118 women were those whose back hurts occasionally, 10 women were those who suffered with back pain every time they moved, and 25 women were those who suffered with backache every time they rested).We discovered that the intensity of pain was 123women's effects with very mild pain, 87women's effects with moderate back pain, 53women's effects with fairly severe pain, women's effects with very severe pain out of 383 participants. Variations in intensity of pain may be due to wearing a pair of high heels and women's height, or it may be due to prolonged and uncomfortable use of shoe and shoe heel, or it may be due to matters a lot that when wearing heels, someone is in a resting or sitting position or either she is continuously moving, or walking puts your spine at attainable risk of future pain. Backache is most common in pregnant women or in those women who receive cesarean section for their baby delivery. Because during pregnancy, back muscles become tight due to belly muscles more elasticity and causes back pain when these women wear heels. They think this pain is due to heels. The cause of back pain due to c section is due to anesthesia which is given in epidural space which later on causes back pain. Lying prone is also a cause of pain because it changes the normal curve of the spine that can lead to pain in the neck or in the lower back. If someone, does it for a long time, then she is putting more stress on her body and can cause more harm. In our research, we found women with excessively long heel heights who suffered from back pain as a result of wearing heels, which disrupted the base of support and center of gravity more than the normal range. We also observe that the weight of females also causes back pain. Many websites strongly believe that lower lumber lordosis is increasing or has a stronger association with heel wearing. But available research of these articles in particular does not support those theories. The female patients with severe back pain were separated and treated with two different kinds of physiotherapy treatments. After applying two different kinds of treatment for 3 weeks on two different groups, it is concluded that the patients of group 1 who got all traditional manual treatment and self-management gave good results, but the patients of group 2 that were additionally treated with therapeutic devices showed better and remarkable results than group 1. Overall, the findings show that women who wear heels suffer from back pain, which has an impact on their social lives, travel, sleeping, standing, sitting, walking, and personal life care such as dressing, washing, and so on. However, if they change their lifestyle and seek physiotherapy treatment, they will be able to overcome their back pain.

Discussion

This survey study documented heel wearing by working women with back pain and its associated functional limitations and its therapeutic management. Most of the heels worn by working women experience back pain. Heeled footwear has been in use with the aid of girls for hundreds of years [13]. Obeyed footwear has been being used by ladies for quite a long time. In any case, not all people wearing heels experience the ill effects of clinical issues. In the ancient Egyptian Empire, high heel shoes were represented to separate the lower middle classes from the honorability by way of ordinary people or poor strolled shoes and only rich people wore high heel shoes, so in old Egypt, people were married that high heels once wear having higher economic status. "Exploration suggests that prolonged heel use can both wounds. "Obeyed shoes incline the upward and downward movement of the foot while twisting the toes ahead, forcing the feet into this position; additionally, it may be a source of the gastrocnemius muscle to shorten [14]. When walking in high-heeled shoes, there is a significant decrease in lower leg plantar flexor muscle development, while the hip flexor muscle exerts more effort as it moves from position to swing stage. Diminished viability of lower leg plantar flexors during late position brings about a compensatory upgraded hip flexor pull off. Wearing high heels causes significant muscle development and increased work at the hip and knee [15]. wearing of high heels is to expand a person's probability of encountering a parallel lower leg sprain. Long-term use of high heels may increase a person's risk of experiencing a horizontal lower leg sprain due to the flexed and rearranged stance of the plantar [16]. In 2015 Cultivate *et al*., discovered indications of an increase in lower leg hyper-extends in patients wearing high heels for a delayed term. In 2017 Esenyel depicted changes in the biomechanics of strolling, like an increase in plantar flexion in individuals utilizing high heels. In the specific investigation, we were not ready to survey the variations in biomechanics of feet while wearing high impact points as it is a simple observational investigation. Wearing a high impact point shoe may cause foot and impact point pain [17]. There is also a significant change in subtalar joint pivot while walking on a high obeyed shoe. High-heeled shoes increase the lordotic bend of the lumbar spine. Expanded lower leg plantar flexion initiates an active chain of remuneration up the lower limit, culminating in hypertonic psoas muscle, resulting in lumbar hyperlordosis. The hyper lordotic lumbar spine thusly will lead to back torment. In 2019 Brent discovered adjustment in biomechanics of the lumbar spine. In delayed high heels wear, chain of occasions around the lower leg were watched, as expanded lower leg plantar flexion which thus prompted an expansion in the lordotic curve. In 2014 Eisenhardt estimated pressure circulation under foot for exposed feet versus impact point stature and discovered an increment in circulation identified with heel stature. In 2017 Opila-Correia considered the kinematics of great obeyed strolling and found that high obeyed strolling was related to expanded knee flexion in the position stage. In 2016 Kerrigan used biomechanical step examination and opposite elements to assess joint loadings during high heel strolling and discovered that level moderate high heels may be linked to knee osteoarthritis [18]. Electromyography examination of the lower appendage muscles in high impact point clients and normal footwear clients appeared to essentially expanded leg muscle movement. According to the findings of a study conducted on 384 volunteers wearing heels who participated in the study, there was a delayed length of wear in years/long stretches of wear every day that resulted in heel torment that essentially influenced their day by day exercises [19]. Moreover, from this examination, it was seen that delayed wear of heels at the appointed time, likewise came about toward the rear torment, which again was discovered to be straightforwardly corresponding to the span of wear in years. Despite the fact that we have determined certain decisive outcomes from the examination, it has not many entanglements [20]. For example, it is an observational study, and the results were absolutely constructed on factual investigation of the survey reports. Many studies on conformed footwear considered impact point stature of more than 9 cm as high heel, but in our study, low heel is measured between 2.5 cm, whereas heels between 2.5 5 cm are considered reasonable, and more than that is considered high heels [21]. Besides, we could not have clear segregation of the kind of sole worn without any changes in the ultimate result of the sole kind worn. 11,12 The current study established that long heels caused heel pain as well as back pain [22]. In heels worn by working women to prevent back pain, there should be some experimental research on that topic. Our study is based on back pain caused by wearing heels, but back pain can also be caused by pregnancy, trauma, disc bulge, accident, and other factors [23]. Our research is only on females, but the male population is also affected by back pain. Do not wear heels higher than 2 inches; the better the heel, the greater strain on the ball of the foot (see a few numbers in this right here) Wear high heels for short periods of time throughout the day; if you are going to a wedding, for example, bring flats to alternate for dancing [24]. Do not put-on excessive heels each day – transfer them up. Stretch your leg muscle groups before and after sporting excessive heels. Try to avoid heels with pointed feet that could place even greater strain and stress on your toes. Insert leather-based insoles to limit slipping (in case your foot is slipping round, it reasons you to grip harder, which causes even greater stress and strain to your legs and spine). It could not harm to try the above guidelines and see if your pain gets higher [25].

Conclusion

The frequency of back pain and its associated functional limitations in working heel wearing women is as follows This investigation was finished with the aim of breaking the legend or then again affirming the truth that high impact point footwear causes impact point torment and back annoyance [26]. We able to establish a statically critical connection while wearing heels for two hours per day and for many years, despite back pain. One issue with this investigation was the small sample size, which was done as an observational study based on a survey assessment. We conclude that there is 28.65% minimal disability, 53.13% moderate disability, 8.594% is severe disability and 9.635% are crippled (severe damage or malfunctioning). The two different types of physiotherapy treatment given to group 1 and group 2 patients; both groups show positive results after treatment, but group 2 patients receive more positive treatment. So, we can say that after these research findings, back pain and its associated functional limitations due to wearing heels in working women is minimal to moderate. Women are not severely affected by back pain and with its associated functional limitations. But if they do their self-care and take

physiotherapy treatment, they will be cured from backpain.

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