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WORK RELATED FACTORS AND THEIR ASSOCIATION WITH FOOT AND ANKLE PAIN AMONG NURSES IN INTENSIVE CARE UNITS IN KARACHI, PAKISTAN

Michelle Ejaz[1], Dr. Maira Muneer[2], Dr. Okasha Anjum[3]

[1]Department of Allied Health Sciences, Indus University, Karachi, Pakistan, Email: michelleejaz4@gmail.com

[2]Lecturer/Academic Coordinator, Department of Allied Health Sciences, Indus University, Karachi, Pakistan, Email: maira.muneer00@gmail.com

[3]Head of Department/Assistant Professor, Department of Allied Health Sciences, Indus University, Karachi, Pakistan, Email: drokashaanjumpt@gmail.com

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Corresponding Author:
Michelle Ejaz, Department of Allied Health Sciences, Indus University, Karachi, Pakistan, Email: michelleejaz4@gmail.com

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ABSTRACT

BACKGROUND: Ankle and foot pain is common among ICU nurses due to prolonged standing, walking, and physically demanding tasks such as patient handling and airway management. This pain results from musculoskeletal strain, poor posture, inappropriate footwear, and limited rest. ICU nurses are at higher risk compared to others due to repetitive movements, awkward positions, and long shifts with minimal breaks. Psychosocial stress, high workloads, and lack of support further increase vulnerability. Studies report a prevalence ranging from 23% to 51.8% globally. This study aims to assess the prevalence and work-related factors contributing to foot and ankle pain in ICU nurses.

OBJECTIVE: The objective of this study was to determine the work-related factors and their association with foot and ankle pain among nurses in intensive care units in Karachi

METHODOLOGY: An observational cross-sectional study included 201 intensive care nurses from various hospitals across Karachi. Data was collected using Nordic Musculoskeletal Questionnaire (NMQ) and Manchester Foot Pain Questionnaire (MFPQ).

RESULT: Out of 201 ICU nurses, 85.1% believed their job contributed to foot and ankle musculoskeletal problems. A high prevalence of pain was reported, with 86.1% experiencing foot/ankle pain in the last 12 months. Notably, 68.7% had taken sick leave, and 68.2% had sought medical treatment for their symptoms. The Manchester Foot Pain and Disability Index revealed that 30.3% experienced pain most of the time and 31.8% reported it some of the time. Pain significantly affected daily functioning: 39.8% avoided walking long distances, 39.3% changed their walking style, and 42.8% avoided prolonged standing.

Chi-square analysis showed a statistically significant association between reported foot/ankle problems and avoidance of standing for long periods (p = 0.000). These results indicate a strong link between ICU work conditions and foot/ankle discomfort, leading to notable physical limitations.

INTRODUCTION:

Ankle and foot pain is an abnormal sensory and emotional experience caused by perceived inflammatory and degenerative damage to any tissue distal to the tibia or fibula, including bones, joints, ligaments, muscles, tendons, retinacula, fascia, bursa, nerves, skin, nails, and vascular structures. Ankle and foot tissue damage may result from mechanical, chemical, or thermal stimulation brought on by trauma, musculoskeletal loading, infection, or proximal or systemic illness. Nurses are forced to work long hours and care for a lot of patients in poor nations. Nursing is a physically and mentally taxing profession. Because nurses stand and walk for extended periods of time and are subjected to high physical demands, they are at a heightened risk of developing foot and ankle pain. Workers who spend a lot of time standing and walking frequently get ankle-foot pain. [1]

A vital part of the healthcare delivery system is nursing. It has grown significantly over time. In order to provide end-of-life care and to promote, preserve, and restore health, nursing care is crucial. Nurses suffer from a variety of musculoskeletal issues as a result of their long and constant work hours. Nurses report lower limb cramps from standing for extended periods of time, exhaustion, burning sensations in their feet, etc. [1]

Employing certified nurse's improves patient care in both clinical and financial ways. These benefits include lower medication errors, higher patient satisfaction, fewer falls, pressure ulcers, and healthcare- associated infections. The severity of the patients' needs, the volume of admissions and discharges, and the level of expertise all influence the optimal nurse-to-patient ratio for a particular unit. Nurse-to-patient ratios of 1:6 are advised, although they have not been adhered to.[8]Long periods of standing are necessary for many jobs, including those in the food industry, manufacturing, retail, and healthcare sectors [2] particularly nursing. Because they spend most of their time on their feet, nurses are more likely to experience foot and ankle issues. [5]Maintaining good foot health is essential for employment in various nursing care settings. Nurses who provide nursing care are subjected to extended standing and long- distance walking, which can lead to foot pain, swelling, and discomfort. Foot issues can also be linked to a number of musculoskeletal disorders (MSDs) that affect the neck or back. [3]One of the most demanding occupations, nursing is linked to a higher prevalence of musculoskeletal diseases and fatigue and foot pain in ICU nurses. It is reported that compared to other system illnesses, MSDs are more common among nurses. [4]

Critical care unit nurses put forth a lot of physical effort to meet patients' demands, which makes them more vulnerable to MSDs than nurses in other clinical settings. In contrast with no specialized nurses, critical care nurses are more likely to experience MSDs. This is particularly true for scrub nurses, who are more likely to suffer from MSDs since they actively participate in setting up and maintaining the surgical field and transferring medical equipment to surgeons. Their peculiar work habits include performing uncomfortable and immobile positions, raising and holding up large surgical tools while assisting the surgeon and providing patient care, and doing repeated actions for extended periods of time. Particularly, if they work as critical care nurses full-time, their risk of developing MSDs is increased.[4]Handling patients by hand has long been identified as the main biomechanical risk factor linked to the development of MSDs. Adjusting a patient in bed, moving a patient from a bed to a chair, or helping a patient walk are examples of high-risk patient handling duties that put healthcare personnel at risk for overexertion and uncomfortable

postures[6]Patients present a variety of difficulties, such as differences in stature, physical impairments, cognitive capacities, degree of cooperation, and conditional fluctuations. Uneven weight distribution is the primary cause of these uncomfortable postures that arise when lifting a given weight. [7] Nurses complains of cramps in the lower limb due to prolonged standing, fatigue, burning sensation of feet etc.[8] Psychosocial factors that impact the prevalence of MSDs include job stress, a lack of support from superiors and coworkers, a high perceived workload, or time pressure.[6] By highlighting preventive actions for foot and ankle discomfort, the incidence of these illnesses among nurses can be used to improve staff health. Our feet can sustain three times our own weight with each step we take. The weight on concrete surfaces does not much aid in shock absorption. Long periods of standing and uneven foot weight shifting because the plantar arches to stiffen or lose some of their flexibility. This results in incorrect or distorted foot position. Nurses may experience foot and ankle pain due to a variety of other complications, among which are obesity, inappropriate footwear, incorrect foot and ankle posture, improper weight bearing, and weight shifting. [8]

Among nurses working in surgical units in Northwest Amhara, the prevalence of ankle–foot pain was 51.8%, with a 95% confidence interval of 46.9% to 57.5%. [20] At Ayder Specialized Hospital in Mekelle, Ethiopia, 43.7% of nurses reported experiencing ankle–foot pain, with a 95% confidence interval ranging from 38.5% to 49.1%.[1] In Australia, foot and ankle musculoskeletal disorders (MSDs) were the most commonly reported conditions among nurses in the previous seven days, with a prevalence of 43.8% (95% CI: 38.2%–49.4%).[15] In Japan the prevalence of foot and ankle pain was 23% and 51%.[3] In China, the overall 12-month prevalence of MSDs was 84.2%. [19] In Amhara Regional State, Northwest Ethiopia, 51.8% of nurses who worked in surgical facilities reported having ankle-foot pain.[20] Additionally, WRMD risk factors differ per hospital department. Depending on the workload, nurses in China's intensive care units may only take one or two brief breaks during their eight-hour shifts. ICU nurses perform a variety of tasks every day, including managing airways and preventing pressure sores. Determining the risk factors relevant to intensive care unit nurses could facilitate the creation of customized preventative measures. [10]Given that nurses often walk up to 8.6 km during a 12-hour shift, it is anticipated that their foot and ankle stress will be higher than that of the general public and white- collar workers. As a result, it has been noted that foot and ankle pain is common and negatively impacts everyday living and work quality. [9]Work-related musculoskeletal disorders can lead to absence at work or seeking other employment [10]

This purpose of the study is to determine the prevalence of foot and ankle pain in ICU nurses and the work related factors for this condition among ICU nurses

METHODOLOGY:

STUDY DESIGN: The research study followed an observational cross sectional study to investigate the work related factors and their association with foot and ankle pain among nurses in intensive care units in Karachi, Pakistan.

SAMPLING TECHNIQUE: Non-probability purposive sampling technique was used to RECRUIT Participant from different hospital setting accomplished the goal of this study

OUTCOME MEASURES: The outcome measures used in this study were the Nordic Musculoskeletal Questionnaire (NMQ) and the The Manchester Foot Pain Questionnaire (MFPQ). The NMQ was employed to evaluate the presence and distribution of musculoskeletal symptoms in various body regions, including the neck, shoulders, lower back, and wrists, over the past 12 months and past 7 days. The MFPQ was used to assess the severity, intensity and duration of foot/ankle pain in ICU nurses. Both tools are validated and widely used in occupational health research, providing a comprehensive understanding of ergonomic-related health concerns.

DATA ANALYSIS PROCEDURE: Data were analyzed using SPSS version 26

ETHICAL CONSIDERATION: Prior ethical approval was obtained from the Institutional Review Board of Indus University. Participation was voluntary, and confidentiality was maintained throughout the study. All respondents provided written informed consent before participation.

RESULT

DESCRIPTIVE STATISTICS

TABLE-1: GENDER DISTRIBUTION OF PARTICIPANTS

GENDER				
	Frequency	Percent	Valid Percent	Cumulative Percent
female	109	54.2	54.2	54.2
male	92	45.8	45.8	100.0
Total	201	100.0	100.0	

TABLE 1 presents the gender distribution of the participants involved in the study. Out of a total of 201 ICU nurses surveyed, **109 were female (54.2%)** and **92 were male (45.8%)**.

FIGURE 2 REPRESENTS A PIE CHART SHOWING MORE OF THE FEMALE POPULATION THAN THE MALE

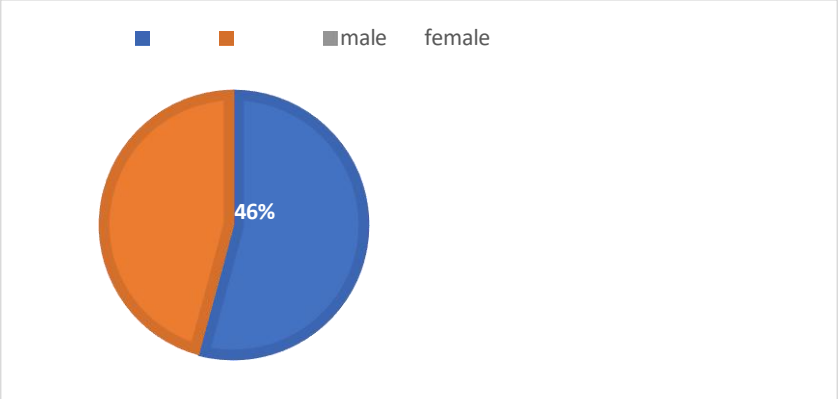

TABLE 2: AGE-WISE DISTRIBUTION OF STUDY SUBJECTS REPRESENTED IN FREQUENCY AND PERCENTAGE

AGE			
Frequency	Percent	Valid Percent	Cumulative Percent

Valid	19	1	.5	.5	.5
	22	4	2.0	2.0	2.5
	23	4	2.0	2.0	4.5
	24	7	3.5	3.5	8.0
	25	12	6.0	6.0	13.9
	26	11	5.5	5.5	19.4
	27	6	3.0	3.0	22.4
	28	18	9.0	9.0	31.3
	29	5	2.5	2.5	33.8
	30	17	8.5	8.5	42.3
	31	2	1.0	1.0	43.3
	32	13	6.5	6.5	49.8
	33	3	1.5	1.5	51.2
	34	4	2.0	2.0	53.2
	35	17	8.5	8.5	61.7
	36	10	5.0	5.0	66.7
	37	1	.5	.5	67.2
	38	5	2.5	2.5	69.7
	39	2	1.0	1.0	70.6
	40	7	3.5	3.5	74.1
	41	6	3.0	3.0	77.1
	42	10	5.0	5.0	82.1
	43	4	2.0	2.0	84.1
	44	4	2.0	2.0	86.1
	45	7	3.5	3.5	89.6
	46	1	.5	.5	90.0
	47	1	.5	.5	90.5
	48	5	2.5	2.5	93.0
	49	2	1.0	1.0	94.0
	50	5	2.5	2.5	96.5
	51	2	1.0	1.0	97.5
	55	2	1.0	1.0	98.5
	56	1	.5	.5	99.0
	57	1	.5	.5	99.5

	60	1	.5	.5	100.0
	Total	201	100.0	100.0	

TABLE 2 illustrates the age-wise distribution of the 201 ICU nurses who participated in the study. The participants ranged in age from **19 to 60 years**, reflecting a diverse and representative workforce. The most common age groups were **28 years (9.0%)**, **30 and 35 years (each 8.5%)**, followed by **25 years (6.0%)** and **32 years (6.5%)**

FIGURE 3: AGE-WISE DISTRIBUTION OF STUDY SUBJECTS REPRESENTED IN FREQUENCY AND PERCENTAGE

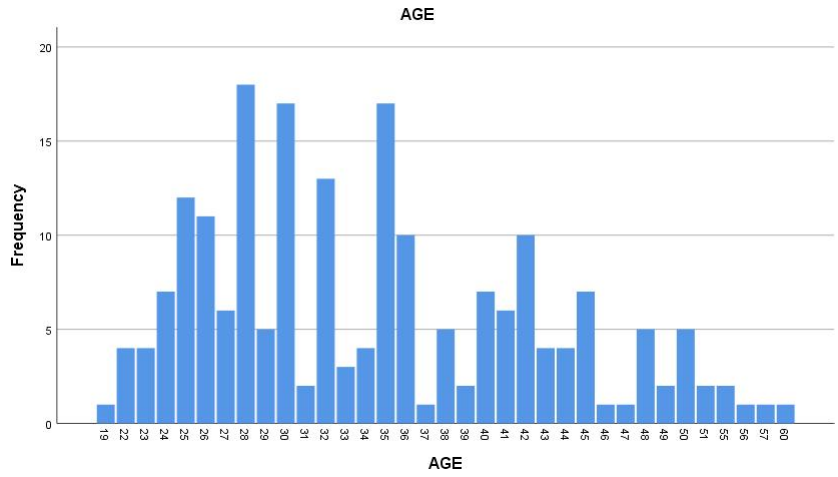

TABLE 3: HEIGHT DISTRIBUTION OF STUDY SUBJECTS REPRESENTED IN FREQUENCY AND PERCENTAGE

HEIGHT

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		5	2.5	2.5	2.5
	135cm	1	.5	.5	3.0
	140cm	1	.5	.5	3.5
	145cm	1	.5	.5	4.0
	150	1	.5	.5	4.5
	150cm	1	.5	.5	5.0
	151	1	.5	.5	5.5
	157	1	.5	.5	6.0
	4	1	.5	.5	6.5
	4.2	1	.5	.5	7.0
	4.9	1	.5	.5	7.5

	5	15	7.5	7.5	14.9
	5.1	1	.5	.5	15.4
	5.2	21	10.4	10.4	25.9
	5.3	22	10.9	10.9	36.8
	5.4	18	9.0	9.0	45.8
	5.5	24	11.9	11.9	57.7
	5.6	19	9.5	9.5	67.2
	5.7	16	8.0	8.0	75.1
	5.8	9	4.5	4.5	79.6
	5.9	2	1.0	1.0	80.6
	5'0	2	1.0	1.0	81.6
	5'1	4	2.0	2.0	83.6
	5'2	7	3.5	3.5	87.1
	5'3	6	3.0	3.0	90.0
	5'4	2	1.0	1.0	91.0
	5'5	4	2.0	2.0	93.0
	5'6	3	1.5	1.5	94.5
	5'7	1	.5	.5	95.0
	5'8	2	1.0	1.0	96.0
	5'9	1	.5	.5	96.5
	6	5	2.5	2.5	99.0
	6.1	1	.5	.5	99.5
	6.2	1	.5	.5	100.0
	Total	201	100.0	100.0	

TABLE 3 presents the height distribution of the 201 ICU nurses who participated in the study. The most commonly reported heights were **5.5 feet (11.9%)**, **5.3 feet (10.9%)**, and **5.2 feet (10.4%)**, indicating that a majority of the participants fell within an average height range for adults in Pakistan.

FIGURE 4: HEIGHT WISE DISTRIBUTION OF STUDY SUBJECTS REPRESENTED IN FREQUENCY AND PERCENTAGE

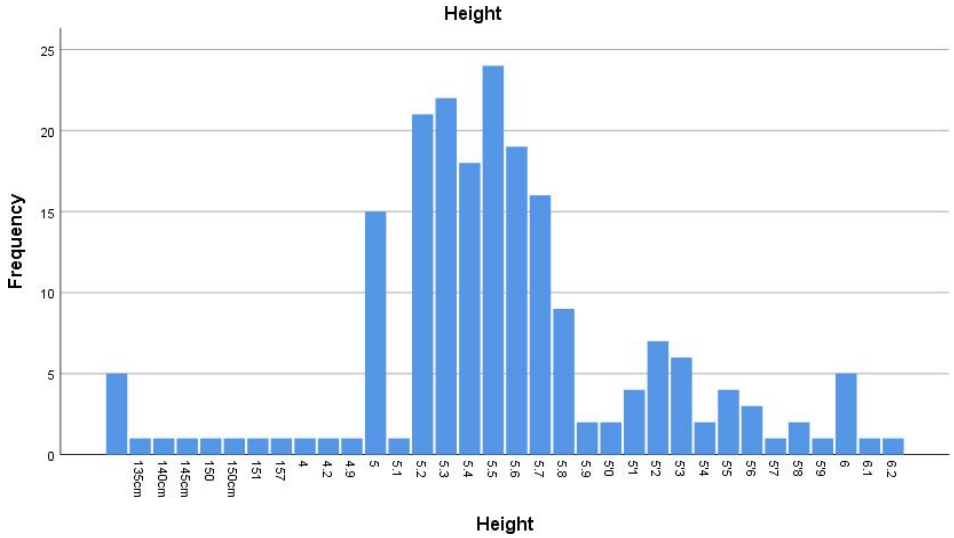

TABLE 4: WEIGHT WISE DISTRIBUTION OF STUDY SUBJECTS REPRESENTED IN FREQUENCY AND PERCENTAGE WEIGHT

Frequency			Percent	Valid Percent	Cumulative Percent
Valid	102kg	1	.5	.5	.5
	108kg	1	.5	.5	1.0
	29kg	1	.5	.5	1.5
	33kg	1	.5	.5	2.0
	36kg	1	.5	.5	2.5
	38kg	1	.5	.5	3.0
	39kg	1	.5	.5	3.5
	40kg	2	1.0	1.0	4.5
	41kg	1	.5	.5	5.0
	42kg	1	.5	.5	5.5
	45kg	3	1.5	1.5	7.0
	46kg	2	1.0	1.0	8.0
	49kg	1	.5	.5	8.5
	50kg	12	6.0	6.0	14.4
	51kg	2	1.0	1.0	15.4
	52kg	6	3.0	3.0	18.4
	53kg	2	1.0	1.0	19.4
	54kg	6	3.0	3.0	22.4
	55kg	23	11.4	11.4	33.8
	55klg	2	1.0	1.0	34.8

	56kg	3	1.5	1.5	36.3
	57kg	2	1.0	1.0	37.3
	58kg	16	8.0	8.0	45.3
	59kg	6	3.0	3.0	48.3
	60	1	.5	.5	48.8
	60kg	29	14.4	14.4	63.2
	62kg	9	4.5	4.5	67.7
	63kg	2	1.0	1.0	68.7
	64kg	5	2.5	2.5	71.1
	65kg	10	5.0	5.0	76.1
	67kg	1	.5	.5	76.6
	68kg	3	1.5	1.5	78.1
	69kg	3	1.5	1.5	79.6
	70kg	13	6.5	6.5	86.1
	72kg	4	2.0	2.0	88.1
	73kg	2	1.0	1.0	89.1
	75	1	.5	.5	89.6
	75kg	3	1.5	1.5	91.0
	78kg	5	2.5	2.5	93.5
	79kg	2	1.0	1.0	94.5
	80kg	7	3.5	3.5	98.0
	83kg	1	.5	.5	98.5
	84kg	1	.5	.5	99.0
	94kg	1	.5	.5	99.5
	95kg	1	.5	.5	100.0
	Total	201	100.0	100.0	

TABLE 4 shows the weight-wise distribution of the 201 ICU nurses included in the study. Participants' weights ranged from as low as **29 kg** to as high as **108 kg**, indicating a broad spectrum of body weight among the nursing staff. The most frequently reported weights were **60 kg (14.4%)**, **55 kg (11.4%)**, and **58 kg (8.0%)**,

FIGURE 5: WEIGHT WISE DISTRIBUTION OF STUDY SUBJECTS REPRESENTED IN FREQUENCY AND PERCENTAGE

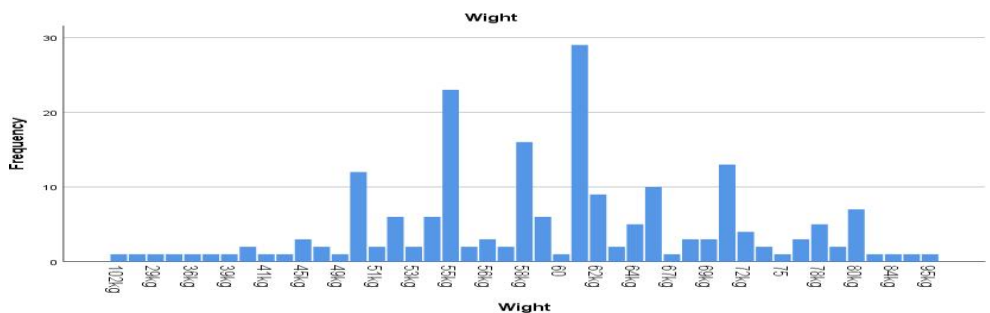

FIGURE 6: OCCUPATION

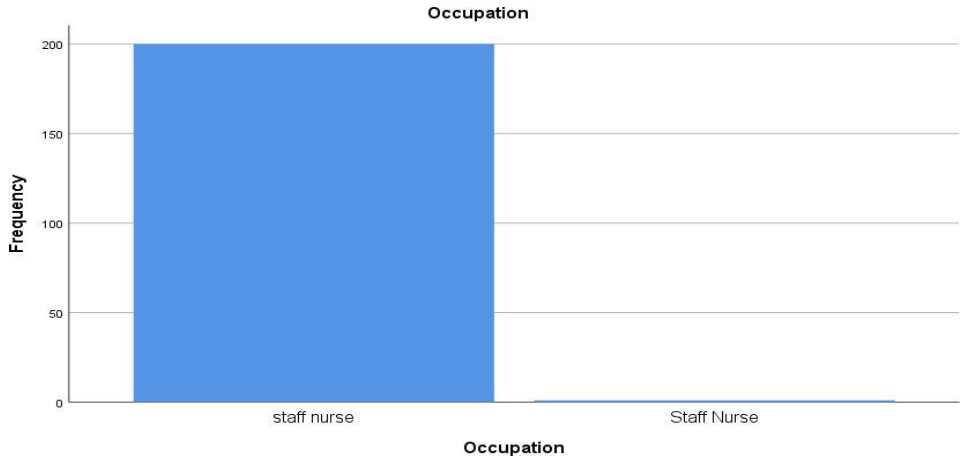

TABLE 5: PRESENTING THE MARITAL STATUS OF THE ICU NURSES MARITAL STATUS

Frequency			Percent	Valid Percent	Cumulative Percent
Valid	Married	122	60.7	60.7	60.7
	unmarried	79	39.3	39.3	100.0
	Total	201	100.0	100.0	

TABLE 5 presents the marital status of the ICU nurses who participated in the study. Out of 201 respondents, **122 (60.7%) were married**, while **79 (39.3%) were unmarried**.

FIGURE 7:MARITAL STATUS

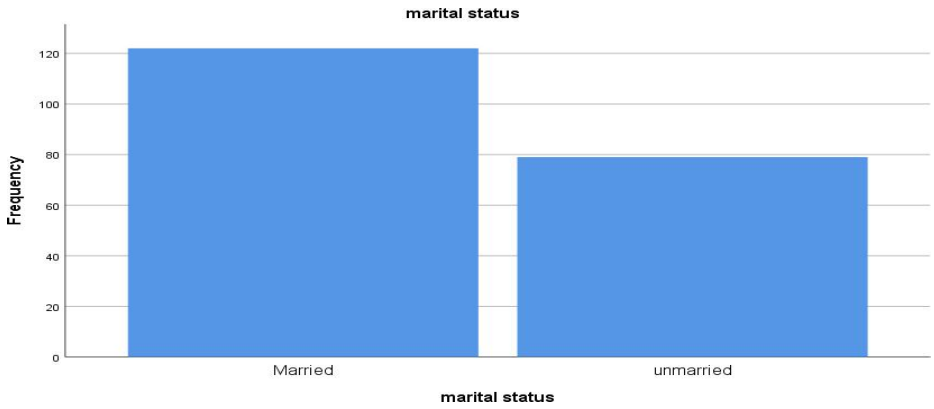

TABLE 6: DISTRIBUTION OF THE STUDY SUBJECTS ACCORDING TO THE STANDARDIZED NORDIC QUESTIONNAIRE.

Body Region	Pain in Last 12 Months		Disability Due to Pain		Pain in Last 7 Days	
Neck:	**N**	**%**	**N**	**%**	**N**	**%**
NO	77	38.3	77	38.3	77	38.3
YES	124	61.7	124	61.7	124	61.7
Shoulders:						
No	105	52.2	106	52.7	106	52.7
Yes	96	47.8	95	47.3	95	47.3
Elbows:						
No	165	82.1	165	82.1	165	82.1
Yes	36	17.9	36	17.9		17.9
Wrists/ Hands:						
No	158	78.6	158	78.6	158	78.6
Yes	43	21.4	43	21.4	43	21.4
Upper Back:						
No	163	81.1	159	79.1	159	79.1
Yes	38	18.9	42	20.9	42	20.9
Lower Back:						
No	28	13.9	28	13.9	28	13.9
Yes	173	86.1	173	86.1	173	86.1
Hips/ Thighs:						
No	136	67.7	136	67.7		67.7
Yes	65	32.3	65	32.3	65	32.3
Knees:						
No	117	58.2	116	57.7		57.7
Yes	84	41.8	85	42.3		42.3

Ankles/ Feet:						
No	28	13.9	28	13.9	28	13.9
Yes	173	86.1	173	86.1	173	86.1

TABLE 6 presents the distribution of reported musculoskeletal symptoms among ICU nurses based on the **Standardized Nordic Musculoskeletal Questionnaire (NMQ)**, focusing on pain experienced in the last 12 months, during the last 7 days, and disability caused by pain in various body regions.

The data reveals that the **most commonly affected areas** were the **lower back** and **ankles/feet**, with **86.1%** of participants reporting pain and associated disability in both regions. This high prevalence suggests a significant burden of musculoskeletal strain, likely due to the nature of ICU work, which involves prolonged standing, walking, and manual patient handling.

Neck pain was also highly reported, with **61.7%** experiencing pain in the last year and within the past week, and the same percentage indicating related disability. **Shoulder pain** followed closely, affecting **47.8%**, while **knee pain** was reported by **41.8%** of the nurses, indicating notable lower limb involvement in musculoskeletal complaints.

Less frequently affected regions included the **elbows (17.9%)**, **wrists/hands (21.4%)**, **upper back (20.9%)**, and **hips/thighs (32.3%)**. However, these figures still represent a significant portion of the sample and may reflect repetitive tasks, awkward postures, and sustained muscle loading.

Overall, the results underscore the high prevalence of work-related musculoskeletal disorders among ICU nurses, particularly affecting the spine and lower extremities. These findings highlight the need for ergonomic interventions, proper footwear, adequate rest periods, and musculoskeletal health awareness programs to mitigate the occupational health risks faced by this population.

TABLE 7: SHOWING RESPIONSE FROM ICU NURSES IF YES, HAS THIS PROBLEM PREVENTED YOU FROM CARRYING OUT NORMAL ACTIVITIES (E.G., WORK, HOUSE CHORES)?

Frequency		Percent	Valid Percent	Cumulative Percent
no	13	6.5	6.5	6.5
yes	185	92.0	92.0	98.5
Yes	3	1.5	1.5	100.0
Total	201	100.0	100.0	

TABLE 7 presents responses from ICU nurses regarding whether their musculoskeletal problems have prevented them from performing normal daily activities such as work or household chores. A significant majority, **185 participants (92.0%)**, reported **"yes"**, indicating that their discomfort had impacted their daily functioning. Additionally, **3 participants (1.5%)** also responded "Yes" (with different capitalization), confirming the same. Only **13 participants (6.5%)** stated that their musculoskeletal issues had **not** interfered with their normal activities.

TABLE 9: SHOWING RESPONSE FROM ICU NURSES DO YOU BELIEVE YOUR WORK HAS CONTRIBUTED TO ANY OF THE MUSCULOSKELETAL ISSUES REPORTED ABOVE?

Frequency			Percent	Valid Percent	Cumulative Percent
Valno		21	10.4	10.4	10.4
id	not sure	9	4.5	4.5	14.9
	yes	171	85.1	85.1	100.0
	Total	201	100.0	100.0	

TABLE 9 explores the perception of ICU nurses regarding the contribution of their work to the musculoskeletal issues they reported. An overwhelming majority, **171 participants (85.1%)**, believed that their job duties directly contributed to the development of these conditions. Meanwhile, **9 participants (4.5%)** were **not sure**, and **21 participants (10.4%)** believed that their work was **not** a contributing factor.

TABLE 10: PRESENTS DATA ON SICK LEAVE DUE TO MSK ISSUES
HAVE YOU TAKEN SICK LEAVE DUE TO MUSCULOSKELETAL PROBLEMS IN THE PAST 12 MONTHS?

Frequency			Percent	Valid Percent	Cumulative Percent
Valid	no	63	31.3	31.3	31.3
	yes	138	68.7	68.7	100.0
	Total	201	100.0	100.0	

TABLE 10 presents the data on sick leave taken due to musculoskeletal problems among ICU nurses in the past 12 months. A substantial majority, **138 participants (68.7%)**, reported that they had taken sick leave because of musculoskeletal issues, while **63 participants (31.3%)** did not require any leave.

TABLE 11: PRESENTING NUMBER OF LEAVES TAKEN DUE TO MSK PAIN IF YES ,HOW MANY DAYS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	65	32.3	32.3	32.3
	1	51	25.4	25.4	57.7
	2	44	21.9	21.9	79.6
	3	19	9.5	9.5	89.1
	4	8	4.0	4.0	93.0
	5	3	1.5	1.5	94.5
	10	2	1.0	1.0	95.5
	11	3	1.5	1.5	97.0
	14	1	.5	.5	97.5
	15	1	.5	.5	98.0
	24	1	.5	.5	98.5

	30	3	1.5	1.5	100.0
	Total	201	100.0	100.0	

TABLE 11 illustrates the number of days ICU nurses were unable to perform their normal activities due to musculoskeletal issues. While **32.3% (65 participants)** reported no days of disruption, a significant proportion experienced varying degrees of functional limitation. Specifically, **25.4% (51 participants)** were affected for 1 day, and **21.9% (44 participants)** reported 2 days of work disruption. Smaller percentages reported longer durations, including up to **30 days** in a few cases.

TABLE 12: REPRESENTING MEDICAL TREATMENT FOR MSK PROBLEMS HAVE YOU SOUGHT MEDICAL TREATMENT FOR ANY MUSCULOSKELETAL PROBLEMS?

Frequency		Percent	Valid Percent	Cumulative Percent
no	64	31.8	31.8	31.8
yes	137	68.2	68.2	100.0
Total	201	100.0	100.0	

TABLE 12 shows the frequency of ICU nurses who sought medical treatment for musculoskeletal problems. Out of 201 participants, a notable **68.2% (137 nurses)** reported seeking medical attention, while **31.8% (64 nurses)** did not pursue any treatment.

TABLE 13: PRESENTS THE MODIFICATIONS OR INTERVENTIONS UNDERTAKEN BY ICU NURSES IF YES,WHAT MODIFICATIONS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	breaks	1	.5	.5	.5
	madication	1	.5	.5	1.0
	medication	14	7.0	7.0	8.0
	medications	4	2.0	2.0	10.0
	medicine,panadol	3	1.5	1.5	11.4
	no	65	32.3	32.3	43.8
	nuberol	21	10.4	10.4	54.2
	nuberol and panadol	3	1.5	1.5	55.7
	nuberol forte	6	3.0	3.0	58.7
	nuberol,physio	3	1.5	1.5	60.2
	painkiller	1	.5	.5	60.7

	panadol	50	24.9	24.9	85.6
	panadol,	1	.5	.5	86.1
	panadol,nuberol	3	1.5	1.5	87.6
	panadol,u/s physio	1	.5	.5	88.1
	physical therapy	4	2.0	2.0	90.0
	physio	3	1.5	1.5	91.5
	yes	17	8.5	8.5	100.0
	Total	201	100.0	100.0	

TABLE 13 presents the modifications or interventions undertaken by ICU nurses in Karachi in response to musculoskeletal problems. A significant number of participants reported self-management primarily through medications. The most frequently mentioned remedies included **Panadol (24.9%)**, **Nuberol (10.4%)**, and combinations such as **Nuberol and Panadol (1.5%)** or **Nuberol Forte (3.0%)**. Some participants also reported using **physical therapy** (2.0%), **physiotherapy sessions** (1.5%), and **ultrasound therapy with physiotherapy** (0.5%). A small percentage relied on **general painkillers**, while **32.3%** made no modifications despite experiencing symptoms.

TABLE 14: SHOWING FREQUENCY OF FOOT OR ANKLE PAIN I HAVE PAIN IN MY FOOT/ANKLE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	all of the time	15	7.5	7.5	7.5
	most of the time	61	30.3	30.3	37.8
	most of time	1	.5	.5	38.3
	most time	1	.5	.5	38.8
	none of the time	1	.5	.5	39.3
	None of the time	15	7.5	7.5	46.8
	rarely	17	8.5	8.5	55.2
	some of the time	26	12.9	12.9	68.2
	some time	64	31.8	31.8	100.0
	Total	201	100.0	100.0	

TABLE 14 illustrates the distribution of participants' responses regarding the frequency of foot or ankle pain. The data reveals that **31.8%** of ICU nurses reported experiencing foot or ankle pain **"some time"**, while **30.3%** reported pain **"most of the time."** A smaller group, **7.5%**, experienced pain **"all of the time,"** indicating persistent discomfort. On the lower end of the spectrum, **8.5%** reported pain **"rarely,"** and **15 individuals (7.5%)** stated they had pain **"none of the time."**

TABLE 15: SHOWING RESPONSE ON STATEMENT BELOW:
I AVOID WALKING LONG DISTANCES BECAUSE OF PAIN IN MY FOOT/ANKLE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	all of the time	21	10.4	10.4	10.4
	most of the time	62	30.8	30.8	41.3
	none of the time	21	10.4	10.4	51.7
	rarely	17	8.5	8.5	60.2
	some of the time	80	39.8	39.8	100.0
	Total	201	100.0	100.0	

TABLE 15 presents the participants' responses to the statement: *"I avoid walking long distances because of pain in my foot/ankle."* The majority of respondents, **39.8%**, reported avoiding walking long distances **"some of the time,"** followed by **30.8%** who reported this behavior **"most of the time."** Additionally, **10.4%** stated they avoid walking **"all of the time,"** indicating significant functional limitation.

On the other hand, **10.4%** reported **"none of the time,"** and **8.5%** said **"rarely,"** suggesting that about **18.9%** of the nurses are less affected in this regard.Overall, the findings highlight that nearly **81%** of ICU nurses experience some level of mobility restriction due to foot or ankle pain.

TABLE 16: SHOWING RESPONSE ON STATEMENT BELOW:
I CHANGE THE WAY I WALK DUE TO PAIN IN MY FOOT/ANKLE

Frequency			Percent	Valid Percent	Cumulative Percent
Vali	all of the time	16	8.0	8.0	8.0
d	most of the time	52	25.9	25.9	33.8
	none of the time	24	11.9	11.9	45.8
	rarely	27	13.4	13.4	59.2
	rarewly	1	.5	.5	59.7
	some of the time	79	39.3	39.3	99.0
	some time	2	1.0	1.0	100.0
	Total	201	100.0	100.0	

TABLE 16 presents the participants' responses to the statement: *"I change the way I walk due to pain in my foot/ankle."* A significant proportion of respondents, **39.3%**, indicated that they alter their gait **"some of the time,"** while **25.9%** reported doing so **"most of the time."** Furthermore, **8.0%** of the nurses acknowledged changing their walking pattern **"all of the time,"** which highlights a considerable impact on natural locomotion. Conversely, **11.9%** reported **"none of the time,"** and **13.4%** said **"rarely,"** indicating a smaller group experiencing minimal gait alteration. Minor inconsistencies in response entries such as *"rarewly"* (0.5%) and *"some time"* (1.0%) may represent data entry variations, but collectively support the same trend.In summary, approximately

74% of ICU nurses reported some degree of altered walking pattern due to foot or ankle pain.

TABLE 17: SHOWING RESPONSE ON STATEMENT BELOW I WALK SLOWLY BECAUSE OF PAIN IN MY FOOT/ANKLE

Frequency		Percent	Valid Percent	Cumulative Percent
all of the time	25	12.4	12.4	12.4
most of the time	45	22.4	22.4	34.8
none of the time	22	10.9	10.9	45.8
rarely	28	13.9	13.9	59.7
some of the time	79	39.3	39.3	99.0
some time	2	1.0	1.0	100.0
Total	201	100.0	100.0	

TABLE 17 illustrates participants' responses to the statement: *"I walk slowly because of pain in my foot/ankle."* The majority of ICU nurses, **39.3%**, reported walking slowly **"some of the time,"** followed by **22.4%** who indicated doing so **"most of the time."** Additionally, **12.4%** of the respondents experienced this **"all of the time,"** reflecting a significant and consistent impact on mobility.

Meanwhile, **13.9%** stated **"rarely,"** and **10.9%** responded **"none of the time,"** suggesting a smaller subgroup with minimal to no functional limitation in walking pace due to pain. A small proportion (1.0%) selected **"some time,"** likely a variation of the intended "some of the time" option, which still supports the overall trend.

Collectively, over **75%** of the nurses indicated experiencing slower walking at least occasionally due to foot or ankle discomfort.

TABLE 18: PRESENTING RESPONSE TO THE STATEMENT GIVEN BELOW: I HAVE TO STOP AND REST MY FOOT/ANKLE BECAUSE OF PAIN

Frequency			Percent	Valid Percent	Cumulative Percent
Valid	all of the time	20	10.0	10.0	10.0
	most of the time	54	26.9	26.9	36.8
	none of the time	22	10.9	10.9	47.8
	rarely	26	12.9	12.9	60.7
	some of the time	79	39.3	39.3	100.0
	Total	201	100.0	100.0	

TABLE 18 presents responses to the statement: *"I have to stop and rest my foot/ankle because of pain."* A significant proportion of ICU nurses—**39.3%**—reported needing to stop and rest **"some of the time,"** highlighting intermittent yet impactful pain episodes. Furthermore, **26.9%** experienced this **"most of the time,"** and **10.0%** indicated **"all of the time,"** suggesting that over a third of participants endure frequent interruptions in mobility due to foot or ankle pain. Conversely, **12.9%** selected **"rarely,"** and **10.9%** reported **"none of the time,"** indicating that a smaller group is less affected by such limitations. Overall, **76.2%** of respondents acknowledged the need to stop and

rest at least occasionally, reflecting how foot and ankle discomfort substantially impairs physical endurance and workplace efficiency.

TABLE 19:PRESENTING RESPONSE TO THE STATEMENT GIVEN BELOW: I AVOID STANDING FOR A LONG TIME BECAUSE OF PAIN IN MY FOOT/ANKLE

Frequency		Percent	Valid Percent	Cumulative Percent
all of the time	12	6.0	6.0	6.0
most of the time	59	29.4	29.4	35.3
none of the time	19	9.5	9.5	44.8
rarely	25	12.4	12.4	57.2
some of the time	86	42.8	42.8	100.0
Total	201	100.0	100.0	

TABLE 19 illustrates the participants' responses to the statement: *"I avoid standing for a long time because of pain in my foot/ankle."* The findings indicate that a substantial proportion of ICU nurses experience discomfort significant enough to alter their behavior. Specifically, **42.8%** reported avoiding prolonged standing **"some of the time,"** while **29.4%** said they avoid it **"most of the time."** An additional **6.0%** reported avoidance **"all of the time,"** indicating chronic or severe pain that consistently limits standing tolerance.

Meanwhile, **12.4%** responded **"rarely,"** and **9.5%** stated **"none of the time,"** showing that only a small segment of the participants remains unaffected by foot/ankle discomfort during prolonged standing.

Overall, **78.2%** of respondents acknowledged some level of limitation due to foot or ankle pain

TABLE 20: PRESENTING RESPONSE TO THE STATEMENT GIVEN BELOW: I CATCH THE BUS OR USE THE CAR INSTEAD OF WALKING, BECAUSE OF PAIN IN MY FOOT/ANKLE

Frequency		Percent	Valid Percent	Cumulative Percent
all of the time	24	11.9	11.9	11.9
all off the time	1	.5	.5	12.4
most of the time	68	33.8	33.8	46.3
none of the time	24	11.9	11.9	58.2
rarely	18	9.0	9.0	67.2
some of the time	66	32.8	32.8	100.0
Total	201	100.0	100.0	

TABLE 20 presents data on the statement: *"I catch the bus or use the car instead of walking because of pain in my foot/ankle."* The responses reveal that a significant portion of ICU nurses have altered their transportation habits due to foot or ankle pain. Specifically, **33.8%** reported using motor transport **"most of the time,"** while **32.8%** indicated doing so **"some of the time."** Additionally, **11.9%** reported this behavior **"all of the time,"** and one participant (0.5%) gave a duplicate spelling variant. Combined, this shows that **approximately 79%** of participants avoid walking in favor of vehicles at

least occasionally due to foot/ankle pain.
On the other hand, **11.9%** stated they **"never"** opt for motor transport for this reason, and **9.0%** reported doing so **"rarely."** This minority reflects the group that remains physically unaffected or minimally impacted in terms of mobility and transportation.

TABLE 21:PRESENTING RESPONSE TO THE STATEMENT GIVEN BELOW: I FEEL SELF-CONSCIOUS ABOUT MY FOOT/ANKLE

Frequency		Percent	Valid Percent	Cumulative Percent
all of the time	29	14.4	14.4	14.4
most of the time	51	25.4	25.4	39.8
most of time	3	1.5	1.5	41.3
none of the time	25	12.4	12.4	53.7
rarely	20	10.0	10.0	63.7
some of the time	73	36.3	36.3	100.0
Total	201	100.0	100.0	

TABLE 21 illustrates responses to the statement: *"I feel self-conscious about my foot/ankle."* The findings suggest that a notable proportion of ICU nurses experience psychological or emotional concerns related to their foot or ankle condition.

Specifically, **14.4%** of participants reported feeling self-conscious **"all of the time,"** while **25.4%** stated this occurs **"most of the time,"** and another **1.5%** (with a minor variant in wording) indicated similar frequency. Additionally, **36.3%** mentioned feeling self-conscious **"some of the time."** Collectively, **77.6%** of participants reported at least occasional self-consciousness, reflecting a considerable emotional burden linked to their musculoskeletal issues.

In contrast, only **12.4%** reported **"none of the time,"** and **10%** said **"rarely,"** suggesting a smaller segment is either unaffected emotionally or has minimal psychological discomfort.

TABLE 22: PRESENTING RESPONSE TO THE STATEMENT GIVEN BELOW: THE PAIN IN MY FOOT/ANKLE IS MORE PAINFUL IN THE EVENING

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	all of the time	23	11.4	11.4	11.4
	most of the time	64	31.8	31.8	43.3
	none of the time	20	10.0	10.0	53.2
	none of time	1	.5	.5	53.7
	rarely	19	9.5	9.5	63.2
	some of the time	74	36.8	36.8	100.0
	Total	201	100.0	100.0	

TABLE 22 presents the distribution of ICU nurses' responses to the statement: *"The pain in my foot/ankle is more painful in the evening."* The data reveals that evening pain is a common experience among the participants.Specifically, **11.4%** of respondents reported experiencing this pain **"all of**

the time," and **31.8%** noted it occurs **"most of the time."** An additional **36.8%** experienced evening pain **"some of the time,"** suggesting that **80%** of participants deal with increased foot/ankle pain by the end of the day. In contrast, a much smaller percentage reported less evening pain: **10.5%** said **"none of the time"** (including a minor wording variation), and **9.5%** said **"rarely."** This suggests only about **20%** are unaffected by evening pain.

TABLE 23:PRESENTING RESPONSE TO THE STATEMENT GIVEN BELOW: I GET SHOOTING PAINS IN MY FOOT/ANKLE

Frequency			Percent	Valid Percent	Cumulative Percent
Valid	all of the time	19	9.5	9.5	9.5
	most of the time	60	29.9	29.9	39.3
	none of the time	25	12.4	12.4	51.7
	rarely	30	14.9	14.9	66.7
	some of the time	67	33.3	33.3	100.0
	Total	201	100.0	100.0	

TABLE 23 reflects the responses of ICU nurses regarding the statement: *"I get shooting pains in my foot/ankle."* The data shows a significant number of participants experiencing this symptom at varying frequencies.

Out of 201 nurses, **9.5%** reported experiencing shooting pain **"all of the time,"** while **29.9%** indicated **"most of the time."** An additional **33.3%** selected **"some of the time,"** suggesting that over **72%** of respondents experience shooting foot or ankle pain intermittently or regularly.

On the other hand, **12.4%** of participants reported having **no such pain**, and **14.9%** said they **rarely** experience it. These results highlight that only about **27%** of the sample are largely unaffected by this type of pain.

TABLE 24: PRESENTING RESPONSE TO THE STATEMENT GIVEN BELOW: THE PAIN IN MY FOOT/ANKLE PREVENTS ME FROM CARRYING OUT MY WORK/EVERYDAY ACTIVITIES

Frequency		Percent	Valid Percent	Cumulative Percent
all of the time	24	11.9	11.9	11.9
most of the time	63	31.3	31.3	43.3
none of the time	21	10.4	10.4	53.7
rarely	20	10.0	10.0	63.7
some of time	73	36.3	36.3	100.0
Total	201	100.0	100.0	

TABLE 24 presents the responses to the statement: *"The pain in my foot/ankle prevents me from carrying out my work/everyday activities."* This question assesses the functional impact of foot and ankle pain on ICU nurses' professional and daily responsibilities.

Out of 201 participants, **11.9%** reported being hindered **all of the time**, while **31.3%** stated they are affected **most of the time**. A further **36.3%** experience limitations **some of the time**, indicating that nearly **80%** of the respondents experience some level of disruption in their work or daily life due to foot/ankle pain.

TABLE 25: REFLECTS THE IMPACT OF FOOT AND ANKLE PAIN ON THE SOCIAL AND RECREATIONAL ACTIVITIES OF ICU NURSES.

I AM UNABLE TO DO ALL MY SOCIAL OR RECREATIONAL ACTIVITIES BECAUSE OF PAIN IN MY FOOT/ANKLE

Frequency			Percent	Valid Percent	Cumulative Percent
Valid	all of the time	17	8.5	8.5	8.5
	most of the time	64	31.8	31.8	40.3
	none of the time	24	11.9	11.9	52.2
	rarely	14	7.0	7.0	59.2
	severe	5	2.5	2.5	61.7
	some of the time	67	33.3	33.3	95.0
	some of time	10	5.0	5.0	100.0
	Total	201	100.0	100.0	

Table 25 reflects the impact of foot and ankle pain on the social and recreational activities of ICU nurses. A significant portion of participants, 33.3% (n=67), reported that they were unable to engage in all their social or recreational activities **"some of the time"** due to pain. Additionally, 31.8% (n=64) reported experiencing this limitation **"most of the time"**, while 8.5% (n=17) were affected **"all of the time"**, indicating a considerable burden on daily life. Only 11.9% (n=24) stated that they experienced **"none of the time"** limitations, suggesting they were unaffected in this regard. Smaller proportions reported **"rarely"** (7.0%, n=14) or **"severe"** (2.5%, n=5) impact. Interestingly, a duplicate category—**"some of time"**—was also noted with 5.0% (n=10), which may indicate a data entry inconsistency but still supports the overall trend. These findings underscore that foot and ankle pain is a common barrier to participation in social and recreational activities among ICU nurses,

highlighting the need for preventive and rehabilitative interventions.

TABLE 26:INDICATES THAT THE INTENSITY OF FOOT AND ANKLE PAIN AMONG ICU NURSES OVER THE PAST FOUR WEEKS

DURING THE PAST 4 WEEKS HOW WOULD YOU DESCRIBE THE PAIN YOU USUALLY HAVE IN YOUR FOOT/ANKLE?

Frequency		Percent	Valid Percent	Cumulative Percent
every night	2	1.0	1.0	1.0
a mild	61	30.3	30.3	31.3
limoderate	72	35.8	35.8	67.2
dmost nights	2	1.0	1.0	68.2
none	18	9.0	9.0	77.1
severe	30	14.9	14.9	92.0
very mild	16	8.0	8.0	100.0
Total	201	100.0	100.0	

TABLE 26 indicates that the intensity of foot and ankle pain among ICU nurses over the past four weeks varies widely. The largest group, 35.8%, reported experiencing *moderate* pain, while 30.3% described their pain as *mild*. A smaller segment, 14.9%, experienced *severe* pain, and 8% rated their pain as *very mild*. Interestingly, 9% of participants stated they had *no* pain during this period, suggesting that a minority remain unaffected. Additionally, a small number reported a temporal pattern to their pain, with 1% experiencing pain *every night* and another 1% *most nights*.

TABLE 27: PRESENTS THE FREQUENCY OF FOOT OR ANKLE PAIN AT NIGHT DURING THE PAST FOUR WEEKS IN ICU NURSES: DURING THE PAST 4 WEEKS HAVE YOU BEEN TROUBLED BY PAIN FROM YOUR FOOT/ANKLE IN BED AT NIGHT?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		5	2.5	2.5	2.5
	every night	16	8.0	8.0	10.4
	most nights	57	28.4	28.4	38.8
	no nights	27	13.4	13.4	52.2
	only 1 or 2 nights	37	18.4	18.4	70.6
	some nights	59	29.4	29.4	100.0
	Total	201	100.0	100.0	

TABLE 27 presents the frequency with which ICU nurses experienced foot or ankle pain at night during the past four weeks. A substantial proportion, **29.4%**, reported being troubled by pain on *some nights*, while **28.4%** experienced it on *most nights*. **18.4%** indicated they had pain on *only 1 or 2 nights*, and **13.4%** reported *no pain at night*, suggesting that nearly one in seven participants were unaffected during sleep. A smaller group, **8%**, experienced pain *every night*, indicating chronic nighttime discomfort. Additionally, **2.5%** of responses appear as missing or ambiguous (left

blank). These results highlight that **a majority of nurses (over 70%) experienced pain in bed at night to some degree**, which can significantly impact sleep quality and overall well-being. Persistent pain during rest periods may lead to fatigue, reduced recovery, and decreased job performance, emphasizing the need for proper foot care, ergonomic footwear, and workplace modifications to alleviate nighttime symptoms.

FEET/ANKLE-12M * I AVOID STANDING FOR A LONG TIME BECAUSE OF PAIN IN MY FOOT/ANKLE CROSSTABULATION

Count

		I avoid standing for a long time because of pain in my foot/ankle					
		all of the time	most of the time	none of the time	rarely	some of the time	Total
FEET/ANKL	no	0	3	10	6	9	28
E-12M	yes	12	56	9	19	77	173
Total		12	59	19	25	86	201

The cross-tabulation analysis revealed a statistically significant association between ICU nurses experiencing foot or ankle problems in the past 12 months and their tendency to avoid standing for prolonged periods due to pain. Among the 173 participants who reported such musculoskeletal issues, a substantial proportion indicated avoidance behavior: 32.4% reported avoiding standing "most of the time," 44.5% did so "some of the time," and 6.9% avoided it "all of the time." In contrast, among the 28 nurses without reported foot or ankle issues, the majority did not exhibit the same level of avoidance. The Pearson Chi-Square test yielded a value of 32.503 with a p-value of .000, confirming that the relationship between foot/ankle problems and the avoidance of prolonged standing is highly significant. These findings highlight how musculoskeletal discomfort directly impacts functional capacity and daily work behavior among ICU nurses, underlining the need for preventive ergonomic measures and supportive interventions in the workplace.

TABLE 28: CHI-SQUARE TESTS CHI-SQUARE TESTS

Value		df	Asymptotic Significance (2- sided)
Pearson Chi-Square	32.503[a]	4	.000

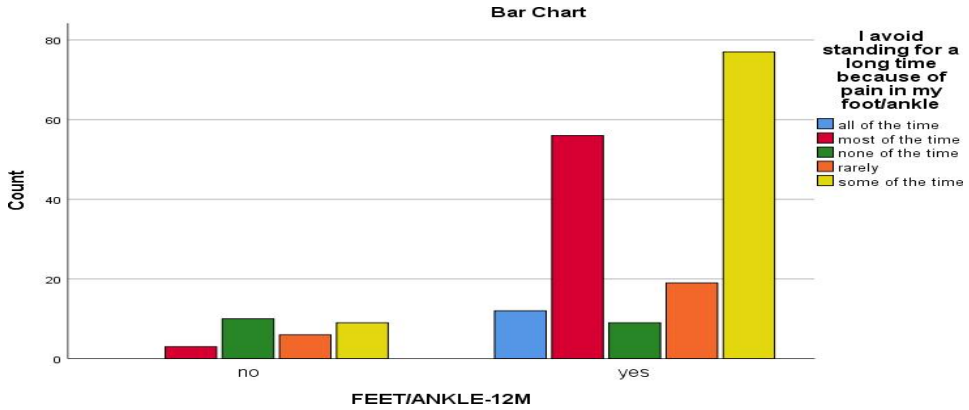

FIGURE 8:FEET/ANKLE

DISCUSSION

The present study aimed to determine the work-related factors and their association with foot and ankle pain among ICU nurses in Karachi. The findings reveal a high prevalence of musculoskeletal issues, particularly foot and ankle pain, significantly affecting nurses' functional abilities and daily activities. Among 201 respondents, 85.1% believed their job contributed to their musculoskeletal symptoms, and 92% reported that these issues interfered with their normal work routines. These results are consistent with previous literature that highlights healthcare professionals, particularly nurses in intensive care units, as a high-risk group due to prolonged standing, inadequate footwear, heavy patient handling, and long shifts. Additionally, data from the Manchester Foot Pain and Disability Index (MFPDI) indicate that 31.8% of participants reported foot or ankle pain "some of the time," while 30.3% experienced it "most of the time." A large proportion of nurses admitted to modifying their walking patterns (39.3%), avoiding walking long distances (39.8%), or slowing their walking speed (39.3%) due to pain. This underscores the substantial impact of occupational demands on lower limb health and mobility. Chi-square analysis revealed a significant relationship between reported foot/ankle problems and avoidance of prolonged standing ($p = 0.000$). Nurses who experienced pain were significantly more likely to avoid standing for long periods, a clear indication of pain-related functional limitation. These findings support the growing concern that work conditions in ICUs, such as standing on hard surfaces for extended hours, can lead to chronic lower extremity disorders.

Medical treatment seeking behavior was also notable, with 68.2% of nurses consulting healthcare services, and commonly used interventions included over-the-counter medications like Panadol, Nuberol, and physical therapy. However, the reliance on symptomatic treatment rather than ergonomic or preventive interventions indicates a need for organizational health strategies.

LIMITATIONS

The study design was cross-sectional; hence, it cannot establish causality between work-related factors and foot/ankle pain.

Self-reported data may be subject to recall bias or exaggeration of symptoms.

Lack of biomechanical assessments or clinical examinations may limit the depth of musculoskeletal diagnosis.

The study was limited to hospitals in Karachi, which may restrict the findings' applicability to other regions or healthcare settings.

RECOMMENDATIONS

Hospitals should implement ergonomic training and awareness programs targeting foot and ankle health.

Provision of anti-fatigue mats, supportive footwear, and scheduled breaks can mitigate prolonged standing hazards.

Periodic screening and preventive physiotherapy sessions should be offered to ICU nurses. Further longitudinal studies with clinical assessments are recommended to better understand the progression and management of work-related foot and ankle disorders.

CONCLUSION

The findings of this study highlight a significant burden of foot and ankle pain among ICU nurses in Karachi, with strong associations to occupational demands like prolonged standing and poor ergonomic support. These issues not only compromise physical health but also hinder nurses' work efficiency and quality of life. Prompt attention to occupational health practices, combined with preventive care and supportive policies, is essential to safeguard the well-being of frontline healthcare workers in intensive care settings

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