RECOGNIZED BY:

HIGHER EDUCATION COMMISSION OF PAKISTAN

INDEXING

Crossref

Google Scholar

ResearchGate

Dimensions

LOCKSS

ICMJE
INTERNATIONAL COMMITTEE of MEDICAL JOURNAL EDITORS

PASTIC

IMEMR
INDEX MEDICIUS
FOR THE EASTERN MEDITERRANEAN REGION

DRJI
Directory of Research Journal Indexing

EuroPub
Directory of Academic and Scientific Journals

ASIAN Research Index

OCLC WorldCat®

Scilit

OPEN ARCHIVES

ASCI
Asian Science Citation Index

REVIEWER CREDITS

EZB Electronic Journals Library

Aims and Scope

Pakistan Biomedical Journal is an open access, peer-reviewed International journal that publishes in all fields of health, allied health and biomedical sciences for an internationally diverse authorship. Clinical studies, clinical trials, population studies, public health, discovery medicine, study of microbes, molecular and cellular biology, basic mechanisms of biology, genetics, cancer biology, molecular medicine, pharmacology, virology, chemical biology, immunobiology, chemical biology, physiological and pathological studies are within the scope of journal.

A highly-cited, multi disciplinary, international editorial board assures timely publication of manuscripts and reviews on latest advancements in biomedical sciences.

Types of Articles

- Research papers
- Short communications
- Review or mini-reviews
- Commentaries
- Perspectives, opinions
- Meta-analysis
- Case reports
- Case studies
- Case-control studies

Reviews on recent progress in biomedical sciences are commissioned by the editors. The purpose of the Pakistan Biomedical Journal is to publish scientific and technical research papers to bring attention of international researchers, scientists, academicians, health care professionals towards the recent advancements in biomedical sciences. The articles are collected in the form of reviews, original and clinical studies. It may serve as a global platform for scientists in relevant fields to connect and share ideas mutually. This journal is open to all the research professionals whose work fall within our scope. Submissions are welcome and may be submitted here.

submissions@pakistanbmj.com

@JournalPakistan
@Pakistanbmj

Title
The title of the paper should provide a concise statement of the contents of the paper. A good title is very important and will attract readers and facilitate retrieval by online searches, thereby helping to maximize citations. The title should include topical keywords and allude to the interesting conclusions of the paper. A title that emphasizes the main conclusions, or poses a question, has more impact than one that just describes the nature of the study.

Running Head
Running head should be added in the header along with the page numbers.

Type of Article
Research Article/ Case Report/ Review Article/ Opinion/ Short Communication/ Mini Review/ Letter to Editor

Running Title: A short version of the paper title.
Keywords: The major keywords used in the article have to be mentioned.

Authors
List here all author names Author[1], Author[2] and Author[3]
[1]Author department, University, Country
[2]Author department, University, Country
[3]Author department, University, Country

*Corresponding Author
Author name, Affiliation, Department Name, University Name, Address, City, State, Country, E-mail:

Abstract
Abstract should include a brief content of the article. It should be structured not more than 250 words. It should include following sub headings: Objective, Methods, Results, Conclusions.

Abbreviations
If there are any abbreviations in the article they have to be mentioned.

INTRODUCTION
Provide a context or background for the study (i.e., the nature of the problem and its significance). State the specific purpose or research objective of, or hypothesis tested by, the study or observation; the research objective is often more sharply focused when stated as a question. Both the main and secondary objectives should be made clear, and any pre-specified subgroup analyses should be described. Give only strictly pertinent references and do not include data or conclusions from the work being reported.

METHODS
The methods section should include only information that was available at the time the or plan of the protocol. All information gathered during the conduct of study should be included in the method section.
Study Design, Inclusion / Exclusion Criteria, Data Collection Procedure, Statistical Analysis.

RESULTS
Present your results in logical sequence in the text, tables, and illustrations, giving the main or most important findings first.

Do not repeat the data in text and in tables or illustrations; emphasize or summarize only important observations. When data are summarized in the results section, give numeric results not only as derivatives (for example, percentages) but also as the absolute numbers from which the derivatives were calculated, and specify the statistical methods used to analyze them. Table font should be 10 and caption should be above the table and below the figure.

Data should not be duplicated in both figures and tables. The maximum limit of tables and figures should not exceed more than 4. Mention the findings of the study in paragraph, while mentioning figure and table number in text in sequential order.

TABLE

Table should not be copy pasted or in picture form

DISCUSSION

Discuss your findings by comparing your results with other literature

REFERENCES

References should not be less than 20.
In text references should be in number style. For Example [1]
Follow the Pubmed Referencing style
Provide the DOI link

Example: Cook NR, Rosner BA, Hankinson SE, Colditz GA. Mammographic screening and risk factors for breast cancer. American Journal of Epidemiology. 2009 Dec; 170(11): 1422-32. doi: 10.1093/aje/kwp304.

If there are more than six authors, write *et al*. after the first six names.

CONCLUSION(S)

Conclusion should elucidate how the results communicate to the theory presented as the basis of the study and provide a concise explanation of the allegation of the findings.

ACKNOWLEDGEMENT

Provide the list of individuals who contributed in the work and grant details where applicable

Plagiarism policy

Similarity index should be less than 19 and less than 5 from individual sources.

Authorship Letter

Signed authorship letter by all authors including there current department, University, City, Country, Email.

Declaration Form

Signed declaration form submit by corresponding author.

The submission of article should include: manuscript according to journal guidelines, authorship letter, declaration form. It should be submitted to the following email id: submissions@pakistanbmj.com

EDITORIAL TEAM

VOLUME 08 ISSUE 07

Published by:
CrossLinks International Publishers
www.clip.com.pk
isni 0000000503896516

EDITORIAL BOARD

VOLUME 08 ISSUE 07

Advisory Board Members

International Members

Published by:
CrossLinks International Publishers
www.clip.com.pk
isni 0000000503896516

EDITORIAL BOARD

VOLUME 08 ISSUE 07

Published by:
CrossLinks International Publishers
www.clip.com.pk
isni 0000000503896516

TABLE OF CONTENTS

VOLUME 08 ISSUE 07

Published by:
CrossLinks International Publishers
www.clip.com.pk
isni 0000000503896516

TABLE OF

CONTENTS

VOLUME 08 ISSUE 07

Published by:
CrossLinks International Publishers
www.clip.com.pk
isni 0000000503896516

DOI: https://doi.org/10.54393/pbmj.v8i7.1275

PAKISTAN BIOMEDICAL JOURNAL
https://www.pakistanbmj.com/journal/index.php/pbmj/index
ISSN (E): 2709-2798, (P): 2709-278X
Volume 8, Issue 07 (July 2025)

Stillbirths: The Neglected Epidemic of Silent Loss

OPEN ACCESS

Prof. Dr. Anna Maria Lavezzi[1]

[1]Lino Rossi Research Center-Department of Biomedical, Surgical & Dental Sciences, University of Milan, Milan, Italy
anna.lavezzi@unimi.it

ARTICLE INFO

How to Cite:

Lavezzi, A. M. (2025). Stillbirths: The Neglected Epidemic of Silent Loss . Pakistan BioMedical Journal, 8(7), 01. https://doi.org/10.54393/pbmj.v8i7.1275

Each year, an estimated 2.6 million third-trimester stillbirths occur globally, 98% in low- and middle-income countries, yet this profound loss remains absent from major global health priorities. Stillbirths are not included in the Global Burden of Disease, disability-adjusted life years, or most international development goals [1]. In public health discourse, they are largely invisible. For affected families, the consequences extend beyond grief. In many regions, the loss of a stillborn child is compounded by social stigma, blame, and isolation. Rituals of mourning are often denied. Babies are not named or held, and their deaths are attributed to fate, sin, or spiritual causes. This erasure leaves women unsupported and silenced [2].

Despite perceptions of inevitability, many stillbirths are preventable. Over 1 million intrapartum stillbirths occur annually, often in settings where basic emergency obstetric care, infection screening, and nutrition programs could save lives. Evidence supports the impact of periconceptional folic acid supplementation, malaria prevention, syphilis treatment, and improved antenatal monitoring. In 68 priority countries, broad implementation of these interventions could reduce stillbirths by up to 45% [3]. However, progress is slow. Stillbirth reduction is not consistently included in national health strategies, and data remain scarce. In many countries, less than 5% of stillbirths are officially registered [4]. Without consistent classification and recording, intervention efforts are poorly targeted and their impact under measured.

Every Newborn Action Plan targets 12 or fewer stillbirths per 1,000 births by 2030, but at least 56 countries will need to more than double their current rate of progress. Achieving this goal requires political will, investment, and integration of stillbirth prevention into broader maternal and neonatal care frameworks [5].

We must insist on recognition, registration, and research. Governments must be held accountable for counting and reporting stillbirths. Interventions must be expanded, and community beliefs must be addressed with empathy and evidence. Every stillbirth is a human tragedy—and a signal of systemic failure. More than 7,000 families each day experience the reality of stillbirth. These losses must no longer be met with silence. Acknowledging the scale and causes of stillbirth is the first step toward prevention, justice, and healing.

REFERENCES

[1] Hathi PJ. The Causes and Consequences of Stillbirth's Neglect in the Global Measurement of Fertility and Mortality (Doctoral dissertation, University of California, Berkeley). 2025.

[2] Agena AG. Trends and Determinants of Intrapartum Stillbirth in the Public Health Facilities of Addis Ababa, Ethiopia. University of South Africa (South Africa). 2018.

[3] Bhutta ZA, Darmstadt GL, Haws RA, Yakoob MY, Lawn JE. Delivering Interventions to Reduce the Global Burden of Stillbirths: Improving Service Supply and Community Demand. BioMed Central Pregnancy and Childbirth. 2009 May; 9(Suppl 1): S7. doi: 10.1186/1471-2393-9-S1-S7.

DOI: https://doi.org/10.54393/pbmj.v8i7.1275

[4] Hug L, You D, Blencowe H, Mishra A, Wang Z, Fix MJ *et al.* Global, Regional, and National Estimates and Trends in Stillbirths from 2000 to 2019: A Systematic Assessment. The Lancet. 2021 Aug; 398(10302): 772-85. doi: 10.1016/S0140-6736(21)01112-0.

[5] Lawn JE, Blencowe H, Waiswa P, Amouzou A, Mathers C, Hogan D *et al.* Stillbirths: Rates, Risk Factors and Potential for Progress Towards 2030. Lancet. 2016; 387(10018): 587-603. doi: 10.1016/S0140-6736(15)00837-5.

DOI: https://doi.org/10.54393/pbmj.v8i7.1276

PAKISTAN BIOMEDICAL JOURNAL
https://www.pakistanbmj.com/journal/index.php/pbmj/index
ISSN (E): 2709-2798, (P): 2709-278X
Volume 8, Issue 07 (July 2025)

Review Article

OPEN ACCESS

The Effectiveness of Myofascial Release in Managing Pain, Improving Mental Health and Quality of Life in Fibromyalgia Patients: A Narrative Review

Gulzar Ahmad[1*], Iqra Shahid[1], Muqadas Ashraf[1], Syeda Narjis Zahra[1], Rabia Jawa[1], Ghulam Muhyyudin[1], and Muhammad Usmaan Ali[1]

[1]University of Management and Technology, Lahore, Pakistan

ARTICLE INFO

Keywords:
Myofascial Release, Fibromyalgia, Pain Management, Mental Health Issues

How to Cite:
Ahmad, G., Shahid, I., Ashraf, M., Zahra, S. N., Jawa, R., Muhyyudin, G., & Ali, M. U. (2025). The Effectiveness of Myofascial Release in Managing Pain, Improving Mental Health and Quality of Life in Fibromyalgia Patients: A Narrative Review: Myofascial Release in Managing Pain, Improving Mental Health in Fibromyalgia Patients. Pakistan BioMedical Journal, 8(7), 03-08. https://doi.org/10.54393/ pbmj.v8i7.1276

***Corresponding Author:**
Gulzar Ahmad
University of Management and Technology, Lahore, Pakistan
gulzarabbas8628@gmail.com

Received Date: 6th June, 2025
Revised Date: 20th July, 2025
Acceptance Date: 28th July, 2025
Published Date: 31st July, 2025

ABSTRACT

Fibromyalgia is a chronic condition characterized by widespread pain, mental health issues, and reduced quality of life. Myofascial release (MFR) has emerged as a potential treatment, targeting fascia to release tension and promote relaxation. This narrative review explores the impact of MFR on fibromyalgia symptoms, evaluating its efficacy, long-term effects, and comparative effectiveness. A comprehensive review of 14 studies published between 2021 and 2025 was conducted, including randomized controlled trials, quasi-experimental studies, systematic reviews, and case series. The results demonstrated that MFR significantly reduced pain intensity, improved mental health, and enhanced quality of life in patients with fibromyalgia. Specifically, MFR was associated with reduced pain, improved sleep quality, and better functional ability. The benefits of MFR were observed in various study designs, providing a promising approach for managing fibromyalgia symptoms. While MFR is a valuable addition to multidirectional treatment plans for fibromyalgia, further research is needed to establish standardized protocols. This review provides insights into MFR benefits and limitations, guiding clinical practice and future research. The findings suggest that MFR can be an effective treatment option for managing fibromyalgia symptoms, improving patient outcomes and quality of life. However, additional high-quality research is necessary to confirm the long-term efficacy and optimal application of MFR in clinical practice. By informing clinical practice and guiding future research, this review aims to contribute to the development of effective treatment strategies for fibromyalgia management. Overall, MFR shows promise in alleviating fibromyalgia symptoms and improving patient outcomes.

INTRODUCTION

Fibromyalgia is a long-term and multi-system disorder and syndrome usually exhibiting widespread musculoskeletal pain, tenderness, cognitive issues, anxiety, depression, fatigue, sleep disturbances, joint stiffness and tender point [1]. Central sensitization, genetic factors, and psychosocial factors are some of the factors that have been cited recently to play a role in causing and sustaining fibromyalgia symptoms. Doctors identify fibromyalgia patients depending on two primary things namely: pain above the waist and below the waist and the duration of the experienced pain must be over three months [2]. Doctors also examine 18 sites and will look to see that there is pain on at least 11 sites to validate the diagnosis of fibromyalgia [3]. Fibromyalgia affects a significant portion of the global population, with women being more likely to develop the condition than men. Women are more likely to get fibromyalgia due to hormonal changes, anxiety, depression, and different pain responses. Despite its prevalence, fibromyalgia remains poorly understood and challenging to diagnose [4]. The imbalances in the brain

DOI: https://doi.org/10.54393/pbmj.v8i7.1276

chemicals which are characterized by increase in the excitatory signals and reduction of the pain-relieving signals contribute to the cause of fibromyalgia and cause increased sensitivity to pain [5]. Central sensitization is a very important aspect in developing and sustaining the symptoms of fibromyalgia, as the brain boosts the pain impulses, and as such, these pain impulses become painful over normal ones [6]. This increase in sensitization maybe in response to lentismines called trigger points, joint pain, spine pain, nerve-related pain sources, injuries or pain within the viscera [7]. Its occurrence can also be prompted by other factors such as emotional factors, psychosocial factors and factors involving attention [8]. Sleep disorders and fibromyalgia are also closely interrelated, with the studies showing that there is a kind of reciprocal connection between sleep disturbances and body-wide pain [9]. Fibromyalgia patients are characterized by a strong concentration on stimuli which concern pain, thereby enhancing the subjective feeling that they experience on pain. This increased awareness is frequently connected to cognitive-emotional sensitization, in which emotional and attentive aspects are critical to the perception of pains. The influence of social dynamics, e.g., family factors, on the sensitivity to pain can hardly be overestimated since it leads to the development of a vicious circle of anxiety and excessive pain. In addition, the prevalence of such mental illnesses like anxiety and depression among fibromyalgia patients is quite high, and they can further aggravate symptoms, such as sensation of pain and sensitivity. It has been revealed that depression may shift pain processing in the brain more specifically in the emotional parameters which may complicate addressing pain [10]. The insomnia, in particular, may be the prior condition of pain occurrence and determines the probability of its prolonged duration, which makes treatment of sleep disorders a priority in fibromyalgia treatment [11]. There are also studies which show that pain can be enhanced by sleep deprivation, spontaneous pain can also occur as well as mood changes, anxiety, and depression [12]. In fibromyalgia patients, disrupted sleep patterns, including frequent awakenings and abnormal brain activity during non-random eye movement sleep, may contribute to pain severity and poor sleep quality [13]. Fibromyalgia may involve fascial inflammation, triggering peripheral pain signals that lead to central sensitization. Fascia, a biological substance that supports connective tissue, can become injured, inflamed, or form adhesions, leading to pain and impaired function [14]. Fibromyalgia-diagnosed patient's often have adhesions in their fascia. These adhesions can cause the fascia to pull on surrounding structures, dysfunctional to healing process which contributing to pain and discomfort. MFR, a gentle technique that targets fascia, has been explored as a potential treatment to alleviate myofascial pain and improve quality of life. More studies are needed to understand its potential benefits for this group [15]. MFR is a Relaxation technique that applies gentle pressure to release fascial adhesions, promoting benefits like, reduced pain, Improved posture, Increased range of motion, and Enhanced quality of life [16]. MFR is a gentle technique that targets fascia, releasing tension and promoting relaxation. It involves sustained holds, stretches, and gentle traction to quiet the nervous system and induce profound changes. This approach is effective yet gentle, making it suitable for sensitive individuals [17]. For best results, Myofascial intensity should be moderate to avoid exacerbating pain while promoting long-term benefits [18]. Given the complexity of fibromyalgia and the limitations of current treatment options, there is a need for effective and non-invasive therapies that can address the multifaceted nature of this condition. By targeting the fascia and releasing tension in the connective tissue, MFR may offer a valuable approach for addressing the underlying mechanisms of fibromyalgia.

This review aims to provide a comprehensive overview of the current evidence on MFR for fibromyalgia symptoms, highlighting its potential benefits and limitations, and informing clinical practice and future research directions.

Role of Physiotherapy and Manual Therapy in Fibromyalgia

Pain, trouble sleeping and impairment in the quality of life are the most frequent fibromyalgia symptoms. The patients who have fibromyalgia can be treated through both pharmacological and non-pharmacological methods. This is very possible through manual therapy which is noninvasive in nature. Despite the fact that the term manual therapy is general and it encompasses the approach like joint manipulation, soft tissue manipulation, release of trigger points, massage therapy and myofascial release. This study specifically highlights the importance of one of the manual therapy techniques, myofascial release (MFR) in managing fibromyalgia symptoms. According to the available literature, MFR is recognized as a beneficial technique in managing fibromyalgia, but there are some variations in terms of the expected outcomes and methodology, which need close monitoring. Further high-quality research is needed to establish the optimal application of MFR for pain reduction, quality of life improvement, and mental health benefits in patients with fibromyalgia. Physiotherapy is proven to be effective in treating fibromyalgia patients. A review conducted by Antunes & Marques in 2022 has given insights into the

DOI: https://doi.org/10.54393/pbmj.v8i7.1276

present and future perspectives of physiotherapy treatments, such as exercise therapy, manual therapy (MFR). This study demonstrated the impact of various manual therapy techniques and exercise for managing fibromyalgia and concluded that all of them Manual therapy were having a positive impact. However, further high-quality research is required to see more benefits of physiotherapy treatment on fibromyalgia management in the future [19].

Efficacy and Mechanism of Myofascial Release (MFR) in Pain Reduction

Several studies, including randomized controlled trials and quasi-experimental studies, have demonstrated the effectiveness of MFR in reducing pain in patients with fibromyalgia [20, 21]. A randomized controlled trial conducted by Nina et al. demonstrated the effectiveness of MFR in modulating pain intensity and improving health status. Compared to passive stretching and a control group, MFR showed potentially greater benefits in reducing pain and enhancing overall health status, suggesting its value as a therapeutic approach for managing pain and promoting well-being [22]. MFR encompasses a spectrum of therapeutic techniques designed to address restrictions and tension within the fascial system. Three prominent approaches include direct myofascial release, indirect myofascial release, and trigger point therapy. Increased tissue length and better mobility are the results of myofascial release, which permits the collagen fibers in the fascia to undergo viscoelastic deformation. Chronic musculoskeletal pain can be effectively relieved by myofascial release via a number of physiological and biomechanical processes. These consist of increased blood flow, improved tissue flexibility and neuromuscular function modulation. Myofascial release has had beneficial results in a variety of disorders, including soft tissue injuries, osteoarthritis, and fibromyalgia, demonstrating its adaptability in treating a range of musculoskeletal problems. By releasing muscle knots and resolving hyperirritable sites, myofascial release can help desensitize pain receptors. The mechanistic rationale of MFR suggests that it works by breaking adhesions, increasing blood flow, and relieving pain pathways [23]. However, the variability in study findings and methodologies highlights the need for further high-quality research to establish the optimal application of MFR for pain reduction. These studies differ in the aspects that the systematic review study by Ughreja et al., which evaluates the effect of therapist-administered and self-administered myofascial release against Sham and no treatment and concluded that MFR shows better results when applied with adequate training [17].

MFR and Quality of Life Enhancement

MFR has also been shown to improve quality of life in patients with fibromyalgia, with studies demonstrating significant improvements in physical function, emotional well-being, and overall quality of life. The systematic review conducted by Yangting Lv *et al.*, and Yiwen Yin *et al.*, summarizes the role in clinical settings and highlights the importance of MFR for being having fewer side effects as it does not involve medications but uses slow pressure and stretching. It also gives insights into the efficacy of MFR in improving patients' ADLs, life, and psychological status along with reducing pain [24]. A retrospective Cohort Study conducted by Fulvio Dal to explore the improvements in functional status after Osteopathic manipulative treatment (OMT) based on myofascial release (MFR) in patients with moderate to severe fibromyalgia. The results of MFR based OMT showed significant improvement in Functional status, reduction in pain severity and improved quality of Life over a period of 4 months' treatment [25].

Mental Health Outcomes of MFR

In addition to its physical benefits, MFR has also been shown to have a positive impact on mental health in patients with fibromyalgia. The ten peer-reviewed studies (2021-2024) from the National Library of Medicine examined the relationship between MFR with pain, mental health, and sleep quality. These studies concluded with a positive relationship and MFR significantly improves mental status by reducing depression. Studies have demonstrated that MFR can reduce symptoms of depression and anxiety, and improve overall mental status [26]. As we know, Fascia oppositely responds to injury and repetitive use, which causes pain and stiffness. Usage of few kilogram pressure in MFR intervention over the fascia applied for a short duration, changes the characteristics of connective tissues. Thus, Pressure is reduced from painful areas when a stretch is produced during MFR that changes length of tissues that improves central sensitization in Fibromyalgia patients [17]. A review of 10 articles concluded that depression and anxiety are reduced by applying the MFR technique, that in result improves psychological health in fibromyalgia syndrome. Moreover, if MFR is combined with Relaxation techniques, it will help to better sleep quality and enhance quality of life as they are connected to Mental health. The combination of MFR with progressive relaxation techniques may be particularly effective in promoting mental well-being. Furthermore, it is suggested that MFR should be combined with progressive relaxation techniques [26].

Multidisciplinary and Guideline-Based Approaches

Study by Winslow *et al.*, on the management of fibromyalgia showed a multidisciplinary approach, incorporating helps

DOI: https://doi.org/10.54393/pbmj.v8i7.1276

to dissolve symptoms of fibromyalgia. This study also highlights the potential benefits of myofascial release, in decreasing the symptoms of fibromyalgia. Myofascial release, in particular, has shown promise in reducing symptoms and improving quality of life for individuals with fibromyalgia [27]. The Guidelines on Treating Fibromyalgia with Non-Pharmacological Therapies in China, which include MFR as a recommended therapy, demonstrate a commitment to delivering patient-centered care that is effective and accessible. By incorporating feedback from 122 patients, clinical doctors, and members of the Chinese Fibromyalgia Association, these guidelines ensure that the recommendations are relevant, clinically significant, and aligned with patient needs. The guidelines recommend light to moderate MFR, depending on patient need and trigger points and tense muscle groups, given the evidence supporting MFR's benefits for both physical and mental health in patients with fibromyalgia [28]. While the evidence suggests that MFR is a beneficial technique in managing fibromyalgia symptoms, there are several limitations to consider. Despite of presence of such remarkable results, some researchers, such as Antunes & Marques and Ughreja *et al.,* demanded additional high-quality RCTs with manual control groups in various geographical locations to validate and enhance generalizability. Moreover, studies with large sample sizes and diverse populations should also be considered. They also emphasized combining MFR with other interventions for future studies to draw the most definitive conclusions [19,17].

Gender Differences and Comparative Effectiveness of MFR

A study evaluated the importance of gender differences among Egyptian fibromyalgia patients in 2022. It stated that female patients show greater disease severity, signs, and tender points in comparison with male patients. Higher prevalence and progression of disease in females show an underestimation of disease in males. Moreover, studies with a large sample size are needed to evaluate gender differences in fibromyalgia patients [29]. The studies by Michelle *et al.* and Samar Negm *et al.* highlighted the importance of MFR in gender based studies, particularly focusing on women. The study by Samar Negm compared the Muscle Energy Technique (METs) with MFR in premenopausal women with Fibromyalgia. Both of these studies concluded that MFR showed Greater effects in managing the pain and improved Quality of Life as compared to METs's [30,31]. Cabezas conducted quasi quasi-experimental study to compare the effects of Myofascial release and Maitland mobilization to measure outcomes like pain, sleep quality, psychological, emotional, and cognitive factors. Results of these studies concluded that MFR showed Greater effects in managing the pain and improved Quality of life [32].

Clinical Guidelines

Fibromyalgia should be treated multidisciplinary, which involves pharmacological treatment approaches and non-pharmacological treatment approaches. It has been proposed that to improve the effectiveness of treatment, a combination of the liberal arts medicine (Western) and the Traditional Chinese Medicine (TCM) should be applied. TCM involves a number of non-drug methods that are in addition to mainstream medicine practices. Fibromyalgia could be managed under the numerous domestic and international guidelines, but Chinese guidelines are unique in the sense they include TCM practices like tai chi, acupuncture and cupping therapy. These standards preach a holistic approach to treatment that takes care of the physical, psychological, and emotional aspects of the situation. Based on these recommendations, non-drug treatment of fibromyalgia is believed to include the following: Tai chi, yoga, Pilates, among others, which facilitate relaxation, body awareness, and stress reduction. These include aerobic exercises, strength exercises to improve resistance strength, aquatic exercises, and the combined exercise programs that assist in enhancing physical function and dropping the pain levels. Along with acupuncture, cupping, and massage, designed to restore balance and relieve musculoskeletal pain. They are hyperbaric oxygen therapy, transcranial magnetic stimulation, transcranial direct current stimulation, low-level laser therapy, hydrotherapy, balneotherapy, newer methods, including virtual reality-based therapy and exergame therapy. Like cognitive-behavioral therapy (CBT), mindfulness-based therapies, internet-based delivery of psychological support, and structured health education. Including music therapy, dance therapy, etc., which increase expression of emotions and psychological well-being. This involves the consumption of food supplements and other complementary medicine products [28].

CONCLUSIONS

This review highlights myofascial release as a promising adjunctive therapy in fibromyalgia care. It offers measurable benefits in pain reduction, mental health stabilization, and quality of life enhancement. However, its integration into standard care requires further validation through robust, large-scale trials.

DOI: https://doi.org/10.54393/pbmj.v8i7.1276

Authors Contribution

Conceptualization: RJ, SNZ
Methodology: MA
Formal analysis: GA
Writing review and editing: GA, IS, GM, MUA

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Bennett RM, Jones J, Turk DC, Russell IJ, Matallana L. An Internet Survey of 2,596 People with Fibromyalgia. BMC Musculoskeletal Disorders.2007Mar;8(1):27. doi: 10.1186/1471-2474-8-27.

[2] Siracusa R, Paola RD, Cuzzocrea S, Impellizzeri D. Fibromyalgia: Pathogenesis, Mechanisms, Diagnosis and Treatment Options Update. International Journal of Molecular Sciences.2021Apr;22(8):3891.doi: 10.3390/ijms22083891.

[3] Wolfe F, Clauw DJ, Fitzcharles MA, Goldenberg DL, Katz RS, Mease P, *et al.* The American College of Rheumatology Preliminary Diagnostic Criteria for Fibromyalgia and Measurement of Symptom Severity. Arthritis Care & Research.2010May;62(5): 600-10. doi: 10.1002/acr.20140.

[4] Wolfe F, Ross K, Anderson J, Russell IJ, Hebert L. The Prevalence and Characteristics of Fibromyalgia in the General Population. Arthritis & Rheumatism: Official Journal of the American College of Rheumatology.1995Jan;38(1):19-28.doi:10.1002/art.1780380104.

[5] Meyer HP. Myofascial Pain Syndrome and Its Suggested Role in the Pathogenesis and Treatment of Fibromyalgia Syndrome.Current Pain and Headache Reports.2002 Aug;6(4):274-83.doi:10.1007/s11916-002-0048-z.

[6] Muir WW III, Woolf CJ. Mechanisms of Pain and Their Therapeutic Implications. Journal of the American Veterinary Medical Association.2001Nov;219(10): 1346-56. doi: 10.2460/javma.2001.219.1346.

[7] Vierck CJ Jr. Mechanisms Underlying Development of Spatially Distributed Chronic Pain (Fibromyalgia). Pain.2006Oct;124(3):242-63.doi:10.1016/j.pain.2006.06.001.

[8] Brosschot JF. Cognitive-Emotional Sensitization and Somatic Health Complaints. Scandinavian Journal of Psychology.2002Apr;43(2):n.p.doi:10.1111/1467-9450.00276.

[9] Clauw DJ. Fibromyalgia and Related Conditions. Mayo Clinic Proceedings.2015May;90(5):680-92.doi: 10.1016/j.mayocp.2015.03.014.

[10] Giesecke T, Gracely RH, Williams DA, Geisser ME, Petzke FW, Clauw DJ. The Relationship Between Depression, Clinical Pain, and Experimental Pain in a Chronic Pain Cohort.Arthritis and Rheumatism. 2005 May; 52(5): 1577-84. doi: 10.1002/art.21008.

[11] Finan PH, Goodin BR, Smith MT. The Association of Sleep and Pain: An Update and a Path Forward.The Journal of Pain.2013Dec;14(12):1539-52.doi:10.1016/j.jpain.2013.08.007.

[12] Haack M, Sanchez E, Mullington JM. Elevated Inflammatory Markers in Response to Prolonged Sleep Restriction Are Associated with Increased Pain Experience in Healthy Volunteers.Sleep.2007Sep; 30(9):1145-52. doi: 10.1093/sleep/30.9.1145.

[13] Parrino L, Grassi A, Milioli G. Cyclic Alternating Pattern in Polysomnography: What Is It and What Does It Mean?. Current Opinion in Pulmonary Medicine.2014Nov;20(6):533-41.doi:10.1097/MCP.0000000000000100.

[14] Ge HY, Nie H, Madeleine P, Danneskiold-Samsøe B, Graven-Nielsen T, Arendt-Nielsen L. Contribution of the Local and Referred Pain from Active Myofascial Trigger Points in Fibromyalgia Syndrome.Pain®. 2009Dec;147(1-3):233-40.doi:10.1016/j.pain.2009.09.019.

[15] Nadal-Nicolás Y, Rubio-Arias JA, Martínez-Olcina M, Reche-García C, Hernández-García M, Martínez-Rodríguez A. Effects of Manual Therapy on Fatigue, Pain, and Psychological Aspects in Women with Fibromyalgia. International Journal of Environmental Research and Public Health.2020Jun;17(12):4611. doi: 10.3390/ijerph17124611.

[16] Ceca D, Elvira L, Guzman JF, Pablos A. Benefits of a Self-Myofascial Release Program on Health-Related Quality of Life in People with Fibromyalgia: A Randomized Controlled Trial. The Journal of Sports Medicine and Physical Fitness.2017Jan;57(7-8):993-1002. doi: 10.23736/S0022-4707.17.07025-6.

[17] Lv Y and Yin Y. A Review of the Application of Myofascial Release Therapy in the Treatment of Diseases. Journal of Multidisciplinary Healthcare. 2024 Dec; 17: 4507-17. doi: 10.2147/JMDH.S481706.

[18] Bervoets DC, Luijsterburg PA, Alessie JJ, Buijs MJ, Verhagen AP. Massage Therapy Has Short-Term Benefits for People with Common Musculoskeletal Disorders Compared to No Treatment: A Systematic Review. Journal of Physiotherapy.2015 Jul; 61(3): 106-16. doi: 10.1016/j.jphys.2015.05.018.

DOI: https://doi.org/10.54393/pbmj.v8i7.1276

[19] Antunes MD and Marques AP. The Role of Physiotherapy in Fibromyalgia: Current and Future Perspectives. Frontiers in Physiology.2022Aug;13: 968292. doi: 10.3389/fphys.2022.968292.

[20] Aljarallah SA, Alrobian SA, Alsaleem RI, Attamimi MR, Alsaleh RS. Evaluating the Efficacy of Myofascial Release Therapy in Managing Musculoskeletal Disorders: Impact on Pain and Mobility in Patients with Fibromyalgia and Chronic Neck Pain. IJSAT-International Journal on Science and Technology. 2024 Jul; 15(3): n.p.

[21] Aslam S and Ilahi N. Effects of Myofascial Release on the Pain and Quality of Life in Patients with Fibromyalgia. Iranian Rehabilitation Journal.2024 Dec; 22(4): 701-8. doi: 10.32598/irj.22.4.2183.1.

[22] Schulze NB, Barreto TD, Alencar GG, da Silva TA, Duarte AL, Ranzolin A, *et al.* The Effect of Myofascial Release of the Physiological Chains on the Pain and Health Status in Patients with Fibromyalgia, Compared to Passive Muscle Stretching and a Control Group: A Randomized Controlled 1Clinical Trial. Disability and Rehabilitation.2024Jul;46(16):3629-42. doi: 10.1080/09638288.2023.2255130.

[23] Sur M, Roy SD, Singha P, Bhattacharjee K. Unlocking Relief: Myofascial Release in Chronic Musculoskeletal Pain Management. International Journal of Orthopaedics and Physiotherapy. 2024; 6: 17-20. doi: 10.33545/26648989.2024.v6.i1a.20.

[24] Ughreja RA, Venkatesan P, Gopalakrishna DB, Singh YP. Effectiveness of Myofascial Release on Pain, Sleep, and Quality of Life in Patients with Fibromyalgia Syndrome: A Systematic Review. Complementary Therapies in Clinical Practice.2021 Nov; 45: 101477. doi: 10.1016/j.ctcp.2021.101477.

[25] Dal Farra F, Chiesa A, Risio RG, Vismara L, Bergna A. Fast Improvements in Functional Status After Osteopathic Manipulative Treatment Based on Myofascial Release in Patients with Moderate or Severe Fibromyalgia: A Retrospective Study. Journal of Complementary and Integrative Medicine.2023 Dec; 20(4): 779-87. doi: 10.1515/jcim-2021-0139.

[26] Takefuji Y. Exploring the Impact of Myofascial Release on Mental Health and Sleep Quality. Sleep and Vigilance.2025 Mar; 1: 1-4. doi: 10.1007/s41782-025-00301-1.

[27] Winslow BT, Vandal C, Dang L. Fibromyalgia: Diagnosis and Management. American Family Physician. 2023 Feb; 107(2): 137-44.

[28] Li X, Pan H, Wang L, Zhou Q, Ma Y, Wang Q, *et al.* Guidelines on Treating Fibromyalgia with Nonpharmacological Therapies in China.Journal of Evidence-Based Medicine.2025Jun;18(2):e70044. doi: 10.1111/jebm.70044.

[29] Moshrif A, Shoaeir MZ, Abbas AS, Abdel-Aziz TM, Gouda W. Evaluating Gender Differences in Egyptian Fibromyalgia Patients Using the 1990, 2011, and 2016 ACR Criteria. Open Access Rheumatology: Research and Reviews.2022Apr;:67-74.doi:10.2147/OARRR.S358255.

[30] da Silva Guarnaschelli ME, Contarim AT, de Oliveira Silva LB, Luiz GB, Graminha CV, de Carvalho EE. Effects of Myofascial Release Techniques in Women with Fibromyalgia: Case Series. Brazilian Journal of Physical Therapy.2024 Apr; 28: 100926. doi: 10.1016/j.bjpt.2024.100926.

[31] Negm S, ElDeeb A, Shehata M, Abdou E, Kentiba E, Hassan E. Comparison of Muscle Energy Techniques and Myofascial Release in Premenopausal Women with Fibromyalgia. Health, Sport, Rehabilitation. 2025 Jan; 12(2): n.p.

[32] Cabezas-Yagüe E, Martínez-Pozas O, Gozalo-Pascual R, Blanco EM, Paños RL, Jiménez-Ortega L, *et al.* Comparative Effectiveness of Maitland Spinal Mobilization Versus Myofascial Techniques on Pain and Symptom Severity in Women with Fibromyalgia Syndrome: A Quasi-Randomized Clinical Trial with 3-Month Follow Up.Musculoskeletal Science and Practice.2024;73:103160.doi:10.1016/j.msksp.2024.103160.

DOI: https://doi.org/10.54393/pbmj.v8i7.1255

PAKISTAN BIOMEDICAL JOURNAL
https://www.pakistanbmj.com/journal/index.php/pbmj/index
ISSN (E): 2709-2798, (P): 2709-278X
Volume 8, Issue 07 (July 2025)

Original Article

OPEN ACCESS

A Qualitative Exploration of Awareness, Perceptions, and Help-Seeking Behaviors among Parents of Post-Partum Depression in Islamabad, Pakistan

Tehmina Sultan[1*], Aiman Naveed[2], Ikhlaq Ahmad[1], Muhammad Mohsin Latif Kiani[3], Muhammad Waqar Ul Hassan[4], Syed Jawad Ali Bukhari[5], Minal Naveed[6] and Abeer Naveed[6]

[1]Department of Public Mental Health, Health Services Academy, Islamabad, Pakistan
[2]Department of Public Health, PRIME Consulting, Islamabad, Pakistan
[3]Department of Research, National Institute of Population Studies, Islamabad, Pakistan
[4]Department of Emergency and ICU, Farooq Hospital, Islamabad, Pakistan
[5]Department of Anesthesia, Bahria International SAFARI Hospital, Islamabad, Pakistan
[6]Department of Public Health, Health Services Academy, Islamabad, Pakistan

ARTICLE INFO

Keywords:
Postpartum Depression, Parental Awareness, Perceptions, Help-Seeking Behaviors

How to Cite:
Sultan, T., Naveed, A., Ahmad, I., Kiani, M. M. L., Hassan, M. W. U., Bukhari, S. J. A., Naveed, M., & Naveed, A. (2025). A Qualitative Exploration of Awareness, Perceptions, and Help-Seeking Behaviors among Parents of Post-Partum Depression in Islamabad, Pakistan: Awareness, Perceptions, and Help-Seeking Behaviors among Parents of PPD. Pakistan BioMedical Journal, 8(7), 09-13. https://doi.org/10.54393/pbmj.v8i7.1255

***Corresponding Author:**
Tehmina Sultan
Department of Public Mental Health, Health Services Academy, Islamabad, Pakistan
tehmina1102020@gmail.com

Received Date: 10th June, 2025
Revised Date: 20th July, 2025
Acceptance Date: 27th July, 2025
Published Date: 31st July, 2025

ABSTRACT

Postpartum depression (PPD) profoundly impacts mothers' and fathers' mental health but remains underdiagnosed and stigmatized in the majority of low-resource settings. Cultural role expectations and gender roles further accentuate awareness and help-seeking in Pakistan. This research investigated parental awareness, perceptions, and help-seeking behavior towards PPD within Islamabad. **Objectives:** To investigate parental knowledge of PPD, determine barriers and facilitators to seeking help, evaluate the awareness and utilization of available resources and support systems for PPD. **Methods:** A two-stage qualitative design was employed, utilizing a non-probability purposive sampling technique. In Phase 1, EPDS was used to screen parents for symptoms of depression. During Phase 2, 12 mothers and 8 fathers who screened positive had in-depth interviews. Thematic analysis was applied to examine socio-cultural, emotional, and system factors that shape PPD experiences. **Results:** Findings identified a few parents with awareness of PPD, and strong stigma was present among both parents. Mothers outlined emotional exhaustion, pressure to be in control and happy, and insufficient time for seeking care. Fathers also reported emotional repression, cultural expectations, and concerns about being judged. Stigma, time, limited mental health service availability, and gender roles were identified as shared barriers. Spouses' and peers' casual support was a primary facilitator of seeking help. **Conclusions:** The study concluded that limited awareness, cultural stigma, and gendered expectations hinder help-seeking for postpartum depression among parents.

INTRODUCTION

Childbirth is perceived to be a joyous occasion for both mothers and fathers, but sometimes it can bring the experiences of sadness, feeling lost and depressed, and this condition, when it leads to a more severe form it turns out to become post-partum depression [1]. According to several research studies, postpartum depression in mothers is common after giving birth, with prevalence rates ranging from 10% to 15% [2]. About 10% of men had prenatal and postpartum depression, which was relatively more common in the three to six months after giving birth [3]. Postpartum depression (PPD) is a mood illness that impacts people within a year of giving birth [4]. PPD is characterized by symptoms of depression, low self-esteem, lack of interest, anxiety, sleep problems, loss of appetite, impatience with a hostile attitude toward newborns, self-blame, and feelings of shame. Changes in

DOI: https://doi.org/10.54393/pbmj.v8i7.1255

eating and sleeping habits, trouble bonding with their child, and feelings of hopelessness are among the symptoms that people with PPD may encounter [5]. The Edinburgh Postnatal Depression Scale (EPDS), a 10-item questionnaire, is the most widely utilized method for screening [6]. According to meta-analyses, postpartum depression affects 7–9% of new fathers and 8–17% of new moms [7]. Pakistan has the highest occurrence rate of postpartum depression in the South Asian region, which is alarming, with rates ranging from 28% to 63% [8]. Research on fathers' PPD and parental stress revealed that fathers experience the same kinds of mood swings as mothers do during the transition to parenthood, and that their mental health has a big influence on the development of the child and the family's overall health [9,10]. Fathers whose partners experience maternal PPD are thought to have PPD rates ranging from 24% to 50% [11]. The availability of mental health professionals is extremely low, particularly in rural areas, leading to a significant treatment gap [12]. This study emphasizes the necessity for a qualitative exploration of PPD in Islamabad and for broadening a comprehensive understanding of the phenomenon and recommendations for maternal and paternal mental health policies and interventions. Considering Islamabad's socio-cultural setting and ingrained attitudes toward mental health, there is a gap in existing literature regarding how parents understand and cope with postpartum depression which requires context-sensitive cultural evidence. Parents' lived experiences should be understood through a qualitative paradigm, as attitudes and help-seeking patterns cannot be fully obtained using quantitative methods. This is the reason why this study aims to explore PPD in parents in Islamabad comprehensively.

The present study aimed to examine the perception of parents on the symptoms and causes of PPD, analyze factors that influence their help-seeking behavior, and assess the knowledge and use of mental health resources and support systems.

METHODS

This study employed a qualitative methodology using a non-probability purposive sampling technique. The study was conducted from 18th July 2024 to 20th September 2024 at Health Services Academy, a degree-awarding institute chartered by the Federal Government. Ethical approval (No. 000680/HSA/MSPH-2023), dated 18th July 2024, was obtained from the Institutional Review Board (IRB) of the Health Services Academy, Islamabad. Informed consent was obtained from all participants before data collection. To maintain confidentiality and anonymity, personal identifiers were removed from transcripts, and pseudonyms were used in reporting quotes. Participants were informed of their right to withdraw at any time. In cases of emotional distress during interviews, appropriate support and mental health referrals were provided. During the screening phase, 30 mothers and 25 fathers were contacted. Of these, 19 mothers and 16 fathers tested positive for postpartum depression (PPD). The research team continuously reviewed transcripts and, after interviewing 12 mothers and 8 fathers, determined that data saturation had been reached, as no new insights were emerging. Eligibility criteria included: being aged 18 years or above; having experienced the postpartum period within the last 12 months; and reporting depressive symptoms. Participants were excluded if they had a severe mental health condition impairing their ability to contribute reliable data or were unable to communicate in Urdu, the interview language. Data were collected through 45-minute semi-structured in-depth interviews developed according to study objectives and reviewed by experts in qualitative research and maternal mental health. Open-ended questions encouraged detailed responses. Interviews, conducted at Federal General Hospital, Islamabad, were audio-recorded (with consent), transcribed verbatim, and translated into English. Thematic analysis followed Braun and Clarke's six-phase approach. Familiarization involved a thorough review of transcripts. An inductive coding process was applied to generate initial codes. Similar codes were grouped into broader themes. Themes were refined and validated by the research team to ensure alignment with study objectives. Final themes, such as "Awareness and Understanding of PPD" and "Use of Support Systems and Resources," were supported with participant quotes to ensure credibility.

RESULTS

The findings are organized in two main ways: participant demographic characteristics and qualitative findings in the thematic analysis. Mothers had a mean age of 28 years, while fathers averaged 31 years (Table 1).

Table 1: Demographic Characteristics of Participants

Variables	Mothers (n=12)	Fathers (n=9)
Mean Age	28 years	31 years
Education Level		
No Education	3 (25%)	2 (22%)
Middle	3 (25%)	3 (33%)
Metric	3 (25%)	2 (22%)
Intermediate	2 (17%)	0 (0%)
Graduation	1 (8%)	2 (22%)
Employment Status		
Employed	2 (17%)	1 (11%)
Self-Employed	0 (0%)	3 (33%)
Unemployed	10 (83%)	5 (56%)

DOI: https://doi.org/10.54393/pbmj.v8i7.1255

Number of Children		
1	5 (42%)	3 (33%)
2	7 (58%)	6 (67%)
Residence		
Rural	5 (42%)	4 (44%)
Urban	7 (58%)	5 (56%)
Cultural Background		
Punjabi	8 (67%)	6 (67%)
Pashtun	3 (25%)	3 (33%)
Sindhi	1 (8%)	0 (0%)

The key themes and subthemes that emerged from the data are summarized in the present study, along with verbatim quotes and explanations to support each theme (Table 2).

Table 2: Key Themes and Sub-Themes with Supporting Quote

Theme: Awareness and Understanding of Postpartum Depression	
Knowledge of Symptoms and Signs	"I didn't know that not being able to sleep and feeling like crying all the time could be signs of an illness." (ID-M6) Mothers' unawareness of symptoms of PPD caused them to delay its identification as a mental illness and taking action. "After the birth of the baby, I used to feel extremely lonely, as if no one cared about me." (ID-F4) Fathers saw emotional difficulties in their partners but might have been unable to recognize them as symptoms of postpartum depression.
Perceptions of Causes	"I felt that maybe the complications during my baby's birth were the reason why my heart always felt so restless." (ID-M5) Mothers associated their emotional sufferings with medical issues, expressing their inclination towards explaining PPD as a physical issue and not as a mental illness. "Worrying about the household's financial situation and my wife's changing behavior ruined my mental state." (ID-F3) Fathers identified economic pressures and relationship stresses as contributing elements.
Impact on Family and Relationships	"After the baby was born, it felt like my own life had been lost somewhere; spending time with my husband was out of the question." (ID-M2) Mothers usually felt that their individual identity and relationship as a couple was undervalued following birth. "After the baby arrived, our attention shifted from each other to only the baby, which affected our relationship." (ID-F8) Fathers view that the new roles of parenthood strained their marriage, indicating how they believe postpartum issues can interfere with communication and intimacy in the couples
Socio-Cultural Influences on PPD Perceptions	
Cultural Stigma and Shame	"People taunt me that I'm fortunate yet still not happy, so in such a situation, asking anyone for help feels embarrassing." (ID-M9) Social judgment and cultural attitudes amplify shame, deterring mothers from seeking help for their mental illness. "In our society, it's believed that men don't get d epressed, so I never spoke about my struggles." (ID-F3) Gender norms impose stigma, compelling men to suffer silently in terms of psychological distress without social sanction to ventilate.
Gendered Experiences of PPD	"After becoming a mother, people's expectations I ncreased, but no one asked how I was feeling." (ID-M10) Mothers are under increased societal pressure to occupy caregiving positions, while their emotional health is forgotten, a reflection of the gendered burden on women. "When my wife was distressed, I felt like I couldn't do anything; I didn't understand how I could help." (ID-F1) Fathers reported feeling powerless and in the dark, echoing uncertain cultural expectations about perinatal mental health.
Barriers and Facilitators to Help-Seeking Behavior	
Barriers to Seeking Help	"The situation at home was such that I never got the time to go to a doctor; everyone kept saying that it would get better with time." (ID-M5) Household chores and common cultural assumptions that emotional suffering will naturally sort itself out keep mothers from receiving timely professional care. "I felt that if I expressed my feelings, my family might start doubting my abilities." (ID-F4) Fear of being judged or perceived as weak is a major obstacle for fathers, deterring frank expression of their struggles with mental health.
Facilitators to Help-Seeking	"When my husband supported me and insisted on taking me to the doctor, I felt encouraged." (ID-M4) Support from spouses and families can be a crucial factor in encouraging mothers to access treatment. "When I talked to a colleague who had experienced all this, I felt that I wasn't alone, it was very helpful." (ID-F3) Peer support and shared experience diminish feelings of loneliness and enable fathers to confront and recognize mental health issues.
Utilization of Support Systems and Resources	
Awareness of Available Resources	"I didn't even know that there was any treatment or help available for depression." (ID-M1) The unawareness of mothers regarding mental health care, implying that there is not enough information to deter them from accessing proper care. "I used to think that the hospital services were only for helping my wife; no one told me anything about myself." (ID-F6) Fathers tend to feel marginalized by the healthcare system and how inadequate information and support for men drive their unmet mental health needs.
Actual Use of Services	"I once tried to get help from someone, but due to lack of time and taking care of the baby, I couldn't continue." (ID-M5) Practical barriers, including time and childcare obligations, can restrict mothers' capacity to regularly engage with mental health services despite their willingness to do so. "I didn't go for counseling on my own, but I did take part in the discussions during my wife's counseling sessions." (ID-F4) Involvement of fathers with support services tends to be indirect and secondary, and the case for being more inclusive in involving fathers in the process needs to be made.
Effectiveness of Support Systems	"Counseling helped me; it felt like someone was listening to me and understanding me." (ID-M2) When mothers attend counseling, they get a lot of benefit from emotional validation and support. "I felt that counseling helped me understand how I could support my wife." (ID-F4) Fathers are empowered by heightened awareness and the ability to offer effective support, pointing to the general family-level advantages of such services.

DOI: https://doi.org/10.54393/pbmj.v8i7.1255

DISCUSSION

This research sheds light on mothers' and fathers' lived experiences of postpartum depression (PPD) in Islamabad, with low awareness, stigma, and gendered expectations as the primary obstacles to help-seeking. Mothers and fathers in the study demonstrated limited initial awareness of PPD symptoms, often mistaking them for routine postpartum changes or personal weaknesses. Mothers described feelings of persistent sadness, lack of interest in the baby, and overwhelming fatigue, while fathers noted emotional disconnection and existential concerns. One study highlights the psychological distress, including sadness and fatigue, commonly reported by mothers experiencing postpartum depression [13]. Participants assigned postpartum depression to various causes. Mothers tended to associate emotional suffering with the physical and emotional travail of giving birth, pressures from societal norms, and feelings of inefficacy. Fathers, however, cited economic pressures and financial instability as primary stressors influencing their mental health. These views are consistent with research indicating that complications during childbirth and economic issues are strong predictors of postpartum depression [14, 15]. Both mothers and fathers reported that postpartum depression impacted their relationship dynamics. Mothers told how it became challenging to spend time with their husbands as the workload of baby care demanded so much of them. Fathers said that they completely diverted their attention to the child, leading to less intimacy and closeness between partners. These observations are characteristic of how the postpartum period can stress couple relationships and lower marital satisfaction [16, 17]. Socio-cultural influences greatly influenced parents' perceptions of PPD. Mothers reported feeling judged and informed that they were "unfortunate" not to feel joyful, while fathers reported that society holds the view that men do not become depressed. This indicates how norms of masculinity and societal expectations present challenges to men in conveying vulnerability and asking for help [18]. The research identifies that mothers reported that expectations rose after having a child, to the point of feeling overwhelmed and incapable. Fathers, in turn, felt upset at being unable to assist in any way, tamping down their feelings to live up to societal norms of strength and supportiveness [18, 19]. Mothers described never having time to go to a doctor because of family commitments, while fathers worried that their feelings being shared would make their family question their competence. These obstacles mirror how stigma, cultural norms, and practical difficulties constrain help-seeking for both parents [18,20]. Mothers were motivated to help when their partners persisted in insisting, they see a doctor, whereas fathers benefited from discussing with a co-worker who had shared experiences. Such supportive relationships were critical to helping motivate help-seeking [21, 22]. Limitations of the study include that purposive sampling might have introduced selection bias. Findings from Islamabad cannot be generalized to other socio-cultural backgrounds. Local language-to-English translation of interviews could have resulted in some loss of meaning or cultural detail.

CONCLUSIONS

Mothers expressed emotional burnout and restricted access to care, whereas fathers encountered economic constraints and cultural opposition to emotional demonstration. Spousal and familial support helped enable help-seeking. Including paternal voices enhances culturally responsive, gender-sensitive mental health knowledge and enhances postpartum care accessibility.

Authors Contribution

Conceptualization: TA, AN, IA, MMLK
Methodology: AN, IA, MMLK
Formal analysis: AN, IA, MMLK
Writing review and editing: AN, IA, MMLK, MWH, SJAB, MN, AN

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Rodríguez-Almagro J, Hernández-Martínez A, Rodríguez-Almagro D, Quirós-García JM, Martínez-Galiano JM, Gómez-Salgado J. Women's Perceptions of Living a Traumatic Childbirth Experience and Factors Related to a Birth Experience. International Journal of Environmental Research and Public Health. 2019 May;16(9):1654. doi: 10.3390/ijerph16091654.

[2] Shorey S, Chee CY, Ng ED, Chan YH, San Tam WW, Chong YS. Prevalence and Incidence of Postpartum Depression Among Mothers: A Systematic Review and Meta-Analysis. Journal of Psychiatric Research. 2018 Sep; 104Healthy : 235–48. doi: 10.1016/j.jpsychires.2018.08.001.

[3] Canário C, Figueiredo B. Anxiety and Depressive Symptoms in Women and Men from Early Pregnancy to 30 Months Postpartum. Journal of Reproductive and Infant Psychology. 2017 Oct;35(5):431-49. doi: 10.1080/02646838.2017.1368464.

DOI: https://doi.org/10.54393/pbmj.v8i7.1255

[4] Serati M, Redaelli M, Buoli M, Altamura AC. Perinatal Major Depression Biomarkers: A Systematic Review. Journal of Affective Disorders. 2016 Mar; 193: 391–404. doi: 10.1016/j.jad.2016.01.027.

[5] Liu X, Wang S, Wang G. Prevalence and Risk Factors of Postpartum Depression in Women: A Systematic Review and Meta-Analysis. Journal of Clinical Nursing. 2022 Oct; 31(19–20): 2665–77. doi: 10.1111/jocn.16121.

[6] Lakkis NA and Mahmassani, DM. Screening Instruments for Depression in Primary Care: A Concise Review for Clinicians. Postgraduate Medicine. 2015 Jan; 127(1): 99–106. doi: 10.1080/00325481.2015.992721.

[7] Rao WW, Zhu XM, Zong QQ, Zhang Q, Hall BJ, Ungvari GS, *et al.* Prevalence of Prenatal and Postpartum Depression in Fathers: A Comprehensive Meta-Analysis of Observational Surveys. Journal of Affective Disorders. 2020 Feb; 263: 491–9. doi: 10.1016/j.jad.2019.10.030.

[8] Klainin P and Arthur DG. Postpartum Depression in Asian Cultures: A Literature Review. International Journal of Nursing Studies. 2009 Oct; 46(10): 1355–73. doi: 10.1016/j.ijnurstu.2009.02.012.

[9] Baldwin S, Malone M, Sandall J, Bick D. Mental Health and Well-being During the Transition to Fatherhood: A Systematic Review of First-Time Fathers' Experiences. JBI Evidence Synthesis. 2018 Nov;16(11):2118-91. doi: 10.11124/JBISRIR-2017-003773.

[10] Ramchandani P, Stein A, Evans J, O'Connor TG. Paternal Depression in the Postnatal Period and Child Development: A Prospective Population Study. The Lancet. 2005 Jun; 365(9478): 2201–5. doi: 10.1016/S0140-6736(05)66778-5.

[11] Holopainen A and Hakulinen T. New Parents' Experiences of Postpartum Depression: A Systematic Review of Qualitative Evidence. JBI Evidence Synthesis. 2019 Sep; 17(9): 1731–69. doi: 10.11124/JBISRIR-2017-003909.

[12] Javed A, Khan MN, Nasar A, Rasheed A. Mental Healthcare in Pakistan. Taiwanese Journal of Psychiatry. 2020 Jan; 34(1): 6–14. doi: 10.4103/TPSY.TPSY_8_20.

[13] Yim IS, Tanner Stapleton LR, Guardino CM, Hahn-Holbrook J, Dunkel Schetter C. Biological and Psychosocial Predictors of Postpartum Depression: Systematic Review and Call for Integration. Annual Review of Clinical Psychology. 2015 Mar; 11(1): 99–137. doi: 10.1146/annurev-clinpsy-101414-020426.

[14] Smorti M, Ponti L, Pancetti F. A Comprehensive Analysis of Post-Partum Depression Risk Factors: The Role of Socio-Demographic, Individual, Relational, and Delivery Characteristics. Frontiers in Public Health. 2019 Oct; 7: 295. doi: 10.3389/fpubh.2019.00295.

[15] Gastaldon C, Solmi M, Correll CU, Barbui C, Schoretsanitis G. Risk Factors of Postpartum Depression and Depressive Symptoms: Umbrella Review of Current Evidence from Systematic Reviews and Meta-Analyses of Observational Studies. The British Journal of Psychiatry. 2022 Oct; 221(4): 591–602. doi: 10.1192/bjp.2021.222.

[16] Saligheh M, Rooney RM, McNamara B, Kane RT. The Relationship between Postnatal Depression, Sociodemographic Factors, Levels of Partner Support, and Levels of Physical Activity. Frontiers in Psychology. 2014 Jul; 5: 597. doi: 10.3389/fpsyg.2014.00597.

[17] Edward KL, Castle D, Mills C, Davis L, Casey J. An Integrative Review of Paternal Depression. American Journal of Men's Health. 2015 Jan; 9(1): 26–34. doi: 10.1177/1557988314526614.

[18] Pedersen SC, Maindal HT, Ryom K. "I Wanted to Be There as a Father, but I Couldn't": A Qualitative Study of Fathers' Experiences of Postpartum Depression and Their Help-Seeking Behavior. American Journal of Men's Health. 2021 Jun; 15(3): 15579883211024375. doi: 10.1177/15579883211024375.

[19] Johansson M, Benderix Y, Svensson I. Mothers' and Fathers' Lived Experiences of Postpartum Depression and Parental Stress After Childbirth: A Qualitative Study. International Journal of Qualitative Studies on Health and Well-Being. 2020 Jan; 15(1): 1722564. doi: 10.1080/17482631.2020.1722564.

[20] Rahman A, Surkan PJ, Cayetano CE, Rwagatare P, Dickson KE. Grand Challenges: Integrating Maternal Mental Health into Maternal and Child Health Programmes. PLOS Medicine. 2013 May; 10(5): e1001442. doi: 10.1371/journal.pmed.1001442.

[21] Atif M, Saeed Z, Halaki M, Chow CM, Greenow CR. A Qualitative Exploration of Experiences and Perceptions in Recent Parents Screening Positive for Perinatal Depression in Karachi, Pakistan. JPMA. The Journal of the Pakistan Medical Association. 2023 Sep; 73(9): 1874–7. doi: 10.47391/JPMA.7934.

[22] Essadek A, Marie A, Rioux MA, Corruble E, Gressier F. Perception of Paternal Postpartum Depression Among Healthcare Professionals: A Qualitative Study. InHealthcare. 2023 Dec; 12(1): 68. doi: 10.3390/healthcare12010068.

DOI: https://doi.org/10.54393/pbmj.v8i7.1240

PAKISTAN BIOMEDICAL JOURNAL
https://www.pakistanbmj.com/journal/index.php/pbmj/index
ISSN (E): 2709-2798, (P): 2709-278X
Volume 8, Issue 07 (July 2025)

Original Article

OPEN ACCESS

Correlation Between Menopausal Symptoms and Quality of Life in Post-Menopausal Women

Dania Sijjil[1], Syed Kissa Zehra Zaidi[1], Sidra Manzoor[1], Amna Mahmood[1], Noor Fatima[1] and Yasha Sajjad[1*]

[1]School of Allied Health Sciences, Combined Military Hospital Lahore Medical College and Institute of Dentistry, National University of Medical Sciences, Lahore, Pakistan

ARTICLE INFO

Keywords:
Quality of Life, Post-Menopause, Women, Health, Short-Form-36

How to Cite:
Sijjil, D., Zaidi, S. K. Z., Manzoor, S., Mahmood, A., Fatima, N., & Sajjad, Y. (2025). Correlation Between Menopausal Symptoms and Quality of Life in Post-Menopausal Women: Menopausal Symptoms and Quality of Life in Post-Menopausal Women. Pakistan BioMedical Journal, 8(7), 14-19. https://doi.org/10.54393/pbmj.v8i7.1240

***Corresponding Author:**
Yasha Sajjad
School of Allied Health Sciences, Combined Military Hospital Lahore Medical College and Institute of Dentistry, National University of Medical Sciences, Lahore, Pakistan
yashasajjad68@gmail.com

Received Date: 7th May, 2025
Revised Date: 2nd July, 2025
Acceptance Date: 13th July, 2025
Published Date: 31st July, 2025

ABSTRACT

Lack of public awareness calls for this research, as women's post-menopausal health and quality of life are neglected in Pakistan. **Objective:** To find the relation between Quality of Life (QoL) and Menopausal Symptoms in postmenopausal women. **Methods:** A cross-sectional study was conducted for six months. Post-menopausal women were considered based on non-probability convenience sampling, and 267 of them were recruited. In this study, the age range was 45 to 85 years. Outcome measure tools included are the Menopausal Rating Scale (MRS) and Short Form 36 (SF-36). The data collected were entered into SPSS version 23.0 for analysis. **Results:** This study used Pearson's Test because the data were parametric, based on a p-value more than 0.05, according to the Kolmogorov-Smirnov test. The majority of the women, i.e. 165 (61.8%), were working. Results showed that the QoL diminishes as the severity of post-menopausal symptoms increases. Key findings included that out of all nine domains of Short-Form-36, Physical Functioning was vastly affected, with a percentage mean of 69.42% altogether. **Conclusions:** A negative relation came into view between the QoL and post-menopausal symptoms. It entails that with increasing severity of post-menopausal symptoms, QoL deteriorates.

INTRODUCTION

A non-pathologic routine a woman lives after the cessation of menses is called the menopause. It is a normal aging process in women. The age-related estrogen deficiency is completely normal and non-pathological. This deficiency leads to the stoppage of periods. The median age at which women face this transition is 51 years old. Although the menopausal symptoms that come along can be very painful and unpleasant, it is not considered a disease, and maybe for this reason, not a lot of awareness is brought to it. And therefore, fewer interventions are encouraged. The conclusion of menstruation starts with diminished ovarian follicles, associated with ageing, low levels of estradiol and inhibin, causing suppressive effects on gonadotropin production. There are spiked levels of Luteinizing Hormone and Follicle Stimulating Hormone. There is a decline in Estrogen production and ultimately, menstruation ceases. [1]. The severity of the symptoms might vary in women; some face troubling symptoms while others do not get any bothersome symptoms at all. Severe reduction in hormone production may cause symptoms of menopause to linger in the post-menopausal stage. These symptoms include hot flashes, sweating at night, dry vagina, and discomfort

DOI: https://doi.org/10.54393/pbmj.v8i7.1240

during intercourse. Others include skin dryness, hair loss, weight variation, sleeplessness, mental stress, changes in sex drive and urinary incontinence [1, 2]. Quality of life (QoL) is the subjective measure of a person's satisfaction with their life experiences. It measures subjective happiness, social and personal satisfaction, security and safety; it encompasses crucial domains such as physical mobility, mental well-being, social relationships, and environment [3]. Over 300 women of various ethnicities were studied in the Study of Women's Health Across the Nation (SWAN). It was found that the symptoms seem to cause distress during menopause as well, and these symptoms have caused lower QoL [4]. Genetic factors impact vasomotor symptoms, including a rise in night sweating and hot flashes, and these gene-guided influences may vary across racial and ethnic groups [5]. Some women, in their post-menopausal era, gripe about chest discomfort and palpitations; although palpitations are usually harmless, the incidence of cardiovascular diseases increases [6]. It is crucial to note that hormonal changes during menopause can impact mental health, making women vulnerable to depression and anxiety [7]. A symptom of menopause that not many women are comfortable talking about is low sex drive. They are not as easily aroused; furthermore, lower levels of estrogen and androgen result in uncomfortable intercourse due to lack of lubrication, minimal desire, etc. [8]. Furthermore, menopause can disturb sleep patterns, leading to insomnia [9]. Insomnia can reduce quality of life significantly. In 2019, Enrica Bonanni, with team members, suggested that hot flashes caused insomnia, which again increased the occurrences of depression [10]. Additionally, it was found that there is a substantial correlation between osteoporosis and Health Related Quality of Life (HRQoL) in the 60-year-old and above age group in women of Korea [11]. More than 50% of post-menopausal women are reported to have urinary incontinence. This leads women towards a more sedentary lifestyle with little time for physical activity and a lack of intimacy. This consequently results in overall compromised performance of the body, the musculoskeletal fitness decreases, respiratory disorders become inevitable, and increased circulatory problems come forward as well [12]. The preceding studies on postmenopausal symptoms and their effect on quality of life have not considered women from Pakistan, leaving a gap in comprehension of menopausal symptoms and how they influence QoL across women in Pakistan. Furthermore, women's health has been largely neglected in Pakistan, and this compels the need for the current study. Unlike previous studies, this particular study also includes widows and sexually inactive women to study whether symptoms vary.

This study aimed to find the association between menopausal symptoms, their severity, and how they influence quality of life in post-menopausal women.

METHODS

This was an analytical cross-sectional study, with a non-probability convenience sampling technique. The ethical review board based at a medical college in Lahore approved this study, and the IRB number of this study was Case#,713/ERC/CMH/LMC. The study was completed for six months 01-05-2023 to 31-10-2023. Before recruiting any participant, a formal written consent was taken from all the study participants. Two hundred and sixty-five women were selected to participate in this study. This sample size was calculated using the Cochran formula and by putting the estimated prevalence rate of 0.514 based on a previous study [13] and a confidence level of 0.95. This study recruited women aged 45 to 85 years, with the presence or absence of one or more conditions of osteoporosis, hypertension, and/or diabetes after menopause. Patients with diagnosed depression or anxiety, neuromuscular issues and any physical disability were excluded based on the self-report of participants. After selection of the sample, these women were asked to fill out the Menopause Rating Scale (MRS) and Short Form 36 (SF-36) questionnaires. MRS consists of 11 questions regarding the menopausal symptoms with a severity ranging from 0-4. The total score adds up to 44. The score is divided into no/little complaints (0-4), mild (5-8), moderate (9-15), and severe (>16). The higher the score of MRS was, the higher the severity of the symptoms was [14]. SF-36 was a questionnaire to determine quality of life (QoL), including both mental and physical aspects. Its domains cover all physical, emotional, general, social, and psychological health. The maximum score was 100, which entails better health conditions, whereas a minimum score of 0 means diminished health status [15]. It has high reliability, and its Cronbach's alpha stands at 0.791 [16]. MRS was also a reliable tool with Cronbach's alpha = 0.904 [17]. Participants were asked to fill out both questionnaires. Then, the data gathered through these questionnaires underwent statistical analysis. Using the Kolmogorov-Smirnov Test, it was determined that the data were parametric in nature as $p>0.05$ for all the variables; and for correlation analysis, Pearson correlation test, i.e. a parametric test was utilized.

RESULTS

Statistical analysis provided a negative Pearson's correlation and a p-value of <0.001 between QoL and post-menopausal symptoms. It depicts that the QoL worsens as the severity of post-menopausal symptoms increases (Table 1).

DOI: https://doi.org/10.54393/pbmj.v8i7.1240

Table 1: Descriptive Stats of Study Population

Variables		Frequency (%) / Mean ± SD
Age	Mean ± SD	51.50 ± 5.5
Menopause Rating Scale (MRS)	Total Score	14.42 ± 7.86
Reproductive Hx	Present	237 (88.8%)
	Absent	30 (11.2%)
Occupation	Housewife	165 (61.8%)
	Working	102 (38.2%)

The study shows physical functioning is mostly affected in post-menopausal women out of all nine domains of SF-36, representing different aspects of quality of life (Table 2).

Table 2: Percentage Means and Standard Deviations of SF-36 Domains of Study Population

SF-36 Domains	Mean ± SD
Physical Functioning	69.42 ± 21.15
Role Limitations due to Physical Health	66.67 ± 33.14
Role Limitations due to Emotional Problems	57.21 ± 37.34
Energy/Fatigue	50.82 ± 21.35
Emotional Wellbeing	56.99 ± 19.96
Social Functioning	59.20 ± 22.49
Pain	69.43 ± 25.19
General Health*	55.77 ± 29.67
Health Changes	60.68 ± 30.32

Results demonstrate that a negative correlation exists between QoL and menopausal symptoms, with $p<0.05$. Weak correlation of severity of menopausal symptoms exists with role limitations based on physical and emotional health; general health and overall well-being of participants, with $r<0.4$. Moreover, moderate correlations were found between increasing intensity of post-menopause-oriented symptoms and other remaining domains of QoL, such as physical functioning, energy reserves, pain levels, and emotional and social health dimensions (Table 3).

Table 3: Pearson Correlation Coefficient and p-value between QoL Domains and Menopausal Symptoms

SF-36 Domains	Pearson Correlation Coefficient	p-Value	95% CI Width
Physical Functioning	-0.484	<0.001*	0.185
Role Limitations due to Physical Health	-0.281	<0.001*	0.222
Role Limitations due to Emotional Problems	-0.221	<0.001*	0.230
Energy/Fatigue	-0.531	<0.001*	0.173
Emotional Wellbeing	-0.498	<0.001*	0.181
Social Functioning	-0.539	<0.001*	0.171
Pain	-0.504	<0.001*	0.181
General Health	-0.382	<0.001*	0.206
Health Changes	-0.289	<0.001*	0.221

Findings demonstrate the frequency distribution of menopausal symptoms among the sample population. Hot flashes, irritability and physical and mental exhaustion are among the most prevalent symptoms. Minimal changes in sexual health symptoms were observed among the participants (Table 4).

Table 4: Menopausal Symptoms and Frequency Distribution among Study Population

Variables	Frequency (%)
Hot Flashes	
None	29 (10.9%)
Mild	77 (28.8%)
Moderate	105 (39.3%)
Severe	46 (17.2%)
Extremely severe	10 (3.7%)
Heart Discomfort	
None	134 (50.2%)
Mild	67 (25.1%)
Moderate	47 (17.6%)
Severe	17 (6.4%)
Extremely severe	2 (0.7%)
Sleep Problems	
None	98 (36.7%)
Mild	65 (24.3%)
Moderate	79 (29.6%)
Severe	21 (7.9%)
Extremely Severe	4 (1.5%)
Depressive Mood	
None	49 (18.4%)
Mild	86 (32.2%)
Moderate	91 (34.1%)
Severe	41 (15.4%)
Extremely Severe	0 (0%)
Irritability	
None	30 (11.2%)
Mild	81 (30.3%)
Moderate	108 (40.4%)
Severe	41 (15.4%)
Extremely Severe	7 (2.6%)
Anxiety	
None	69 (25.8%)
Mild	77 (28.8%)
Moderate	68 (25.5%)
Severe	46 (17.2%)
Extremely Severe	7 (2.6%)
Physical and Mental Exhaustion	
None	29 (10.9%)
Mild	67 (25.1%)
Moderate	117 (43.8)
Severe	48 (18%)
Extremely Severe	6 (2.2%)
Changes in Sexual Health	
None	186 (69.7%)
Mild	46 (70.2%)
Moderate	26 (9.7%)

DOI: https://doi.org/10.54393/pbmj.v8i7.1240

Severe	6 (2.2%)
Extremely Severe	3 (1.1%)
Bladder Problems	
None	125 (46.8%)
Mild	90 (33.7%)
Moderate	32 (12%)
Severe	17 (6.4%)
Extremely Severe	3 (1.1%)
Dryness of Vagina	
None	135 (50.6%)
Mild	92 (34.5%)
Moderate	21 (7.9%)
Severe	19 (7.1%)
Extremely Severe	0 (0%)
Joint and Muscular Discomfort	
None	63 (23.6%)
Mild	60 (22.5%)
Moderate	85 (31.8%)
Severe	30 (11.2%)
Extremely Severe	29 (10.9%)

DISCUSSION

The current research aimed to find the relation between the post-menopausal symptoms and QoL. The symptoms of menopause, especially post-menopause, get severe as women age, and it has a drastic effect on their QoL. To depict this relation, the causes and factors behind it, and to find the most affected body system during post-menopause, this study was completed. According to the present study, the post-menopausal symptoms had a negative relation with the quality of life, i.e. the quality of life diminished with the increasing severity of post-menopausal symptoms, with $p<0.05$ against all domains of Short Form 36 (SF-36). The SF-36 domains that are greatly influenced by the severity of post-menopausal symptoms include physical functioning and pain. Rathnayake *et al.* through Menopause Rating Scale (MRS) and Short Form 36 (SF-36), deduced a negative correlation between the post-menopausal symptoms and quality of life, with a p-value of <0.001. The SF-36 domains of physical activities, role performance, comfort, and physical health have a p-value of less than 0.001, just like the present study. Additionally, they concluded that other domains, such as role performance, energy levels, emotional health, social function, general health, and psychological well-being, had p-values greater than 0.05; hence, it is not in alignment with the present study. This can be due to the difference in anthropometric measurements and/or social factors of the women life of the sample of the previous study and the current study [18]. A study conducted by Ngai, supports the findings of the current study. With the help of the MRS scale and Medical Outcomes Study Short-Form-36, the study proved the negative correlation between post-menopausal symptoms and functional and mental quality of life, showing a p-value of <0.001, like the present study. This study also researched the Sense of Coherence and various types of Coping Techniques the women were undergoing, for instance, problem-oriented coping, emotion-based coping, adaptive coping, and maladaptive coping. Use of these coping strategies must have helped women in improving emotional, behavioural, and social symptoms, which can be the reason for the severity of physical symptoms, which, hence, produced similar results as the present study [15]. In the present study, the domain of physical functioning presented the highest mean of 69.42 out of all SF-36 health domains. El Hajj *et al.* investigated the relation between the menopausal symptoms and quality of life in Lebanese women. Using the Menopause-Specific Quality of Life Questionnaire (MENQOL) and the International Physical Activity Questionnaire, the study found that the menopausal symptoms affected the general health of the menopausal women. In post- and peri menopausal women, the musculoskeletal system was vastly affected among all other systems, with the highest mean of 3.2, which supports the findings of the present study. Contrarily, El Hajj *et al.* say that if looked at exclusively in post-menopausal women, sexual health is mostly affected, whereas the present study states that the functional activity is mostly deteriorated in post-menopausal women. The inclusion criteria used in the present study are 45-85 years and include widows and some sexually inactive women, so the main reported issues were relevant to musculoskeletal health. On the other hand, El Hajj *et al.* included women aged 40-60 years, most of whom were sexually active. These women were educated and conscious about their health, none of which were considered in the present study [19]. Contrary to the current study, Barati *et al.* use the Menopausal QoL Questionnaire (MENQOL) to state that the widely prevalent symptoms are vasomotor, scoring a mean ± SD of 3.46 ± 2.40, while the physical-related symptoms fall below with a mean ± SD of 2.36 ± 2.41. The present study included women aged between 45 to 85 years, whereas Barati *et al.* included women of ages between 45 to 60 years [20]. The difference in ages of women included in the sample can again be the cause of the difference in the findings of the studies, since skeletal structure deterioration is a normal process during ageing, and the present study includes a sufficient number of older women [21]. Analogous with the present research, Smail *et al.* prove that the musculoskeletal system is mostly deteriorated in post-menopausal women. As per the MENQOL, the study showed that the symptom which was most common in postmenopausal women was myalgia and arthralgia, with a percentage of 78.6%, and pain in the back with a percentage of 75.7%, both of which determine physical functioning. The similarity in the results can be

DOI: https://doi.org/10.54393/pbmj.v8i7.1240

due to the same culture and ethnicity of Emirati and Pakistani women [22]. This study projects that women face multiple challenges to their physical health, psychological health and overall well-being during post menopause phase of their lives.

CONCLUSIONS

It was concluded that the negative correlation exists between the quality of life (QoL) and symptoms of post-menopause, stating that menopause hurts all physical, vasomotor, mental, and sexual function in women.

Authors Contribution

Conceptualization: DS, SM
Methodology: DS, SKZZ, SM, AM, NF
Formal analysis: YS
Writing review and editing: SKZZ, SM, YS

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Peacock K, Carlson K, Ketvertis KM, Doerr C. Menopause (Nursing). Stat Pearls [Internet]. 2023 Dec.

[2] Monteleone P, Mascagni G, Giannini A, Genazzani AR, Simoncini T. Symptoms of Menopause Global Prevalence, Physiology and Implications. Nature Reviews Endocrinology. 2018 Apr; 14(4): 199-215. doi: 10.1038/nrendo.2017.180.

[3] Haraldstad K, Wahl A, Andenæs R, Andersen JR, Andersen MH, Beisland E *et al.* A Systematic Review of Quality of Life Research in Medicine and Health Sciences. Quality of life Research. 2019 Oct; 28(10): 2641-50. doi: 10.1007/s11136-019-02214-9.

[4] Avis NE, Ory M, Matthews KA, Schocken M, Bromberger J, Colvin A. Health-Related Quality of Life in A Multiethnic Sample of Middle-Aged Women: Study of Women's Health Across the Nation (SWAN). Medical Care. 2003 Nov; 41(11): 1262-76. doi: 10.1097/01.MLR.0000093479.39115.AF.

[5] Zhao W, Smith JA, Yu M, Crandall CJ, Thurston RC, Hood MM *et al*. Genetic Variants Predictive of Reproductive Aging Are Associated with Vasomotor Symptoms in A Multiracial/Ethnic Cohort. Menopause. 2021 Aug; 28(8): 883-92. doi: 10.1097/GME.0000000000001785.

[6] Ryczkowska K, Adach W, Janikowski K, Banach M, Bielecka-Dabrowa A. Menopause and Women's Cardiovascular Health: Is It Really an Obvious Relationship? Archives of Medical Science. 2022 Dec; 19(2): 458. doi: 10.5114/aoms/157308.

[7] Alblooshi S, Taylor M, Gill N. Does Menopause Elevate the Risk for Developing Depression and Anxiety? Results from A Systematic Review. Australasian Psychiatry. 2023 Apr; 31(2): 165-73. doi: 10.1177/10398562231165439.

[8] Scavello I, Maseroli E, Di Stasi V, Vignozzi L. Sexual Health in Menopause. Medicina. 2019 Sep; 55(9): 559. doi: 10.3390/medicina55090559.

[9] Zolfaghari S, Yao C, Thompson C, Gosselin N, Desautels A, Dang-Vu TT *et al.* Effects of Menopause on Sleep Quality and Sleep Disorders: Canadian Longitudinal Study on Aging. Menopause. 2020 Mar; 27(3): 295-304. doi: 10.1097/GME.0000000000001462.

[10] Bonanni E, Schirru A, Di Perri MC, Bonuccelli U, Maestri M. Insomnia and Hot Flashes. Maturitas. 2019 Aug; 126: 51-4. doi: 10.1016/j.maturitas.2019.05.001.

[11] Park H. The Impact of Osteoporosis on Health-Related Quality of Life in Elderly Women. Biomedical Research. 2018 Sep; 29(16): 3223-7. doi: 10.4066/biomedicalresearch.29-18-941.

[12] Kołodyńska G, Zalewski M, Rożek-Piechura K. Urinary Incontinence in Postmenopausal Women–Causes, Symptoms, Treatment. Menopause Review/Przegląd Menopauzalny. 2019 Apr; 18(1): 46-50. doi: 10.5114/pm.2019.84157.

[13] Senthilvel S, Vasudevan S, Anju PS, Sukumaran A, Sureshbabu J. Assessment of Symptoms and Quality of Life among Postmenopausal Women in A Tertiary Care Hospital in Kochi, South India: A Hospital-Based Descriptive Study. Journal of Mid-Life Health. 2018 Oct; 9(4): 185-90. doi: 10.4103/jmh.JMH_98_18.

[14] Heinemann LA, DoMinh T, Strelow F, Gerbsch S, Schnitker J, Schneider HP. The Menopause Rating Scale (MRS) as Outcome Measure for Hormone Treatment? A Validation Study. Health and Quality of Life Outcomes. 2004 Nov; 2(1): 67. doi: 10.1186/1477-7525-2-67.

[15] Ngai FW. Relationships Between Menopausal Symptoms, Sense of Coherence, Coping Strategies, and Quality of Life. Menopause. 2019 Jul; 26(7): 758-64. doi: 10.1097/GME.0000000000001299.

[16] Zhang Y, Bo QU, Lun SS, Guo Y, Liu J. The 36-Item Short Form Health Survey: Reliability and Validity in Chinese Medical Students. International Journal of Medical Sciences. 2012 Aug; 9(7): 521. doi: 10.7150/ijms.4503.

[17] Mathialagan S, Ramasamy S, Nagandla K, Siew WF, Sreeramareddy CT. Menopause Rating Scale (MRS) in the Malay Language-Translation and Validation in A Multiethnic Population of Selangor, Malaysia. BioMed

DOI: https://doi.org/10.54393/pbmj.v8i7.1240

Central Women's Health. 2022 Aug; 22(1): 347. doi: 10.1186/s12905-022-01922-8.

[18] Rathnayake N, Lenora J, Alwis G, Lekamwasam S. Prevalence and Severity of Menopausal Symptoms and the Quality of Life in Middle-Aged Women: A Study from Sri Lanka. Nursing Research and Practice. 2019; 2019(1): 2081507. doi: 10.1155/2019/2081507.

[19] El Hajj A, Wardy N, Haidar S, Bourgi D, Haddad ME, Chammas DE *et al.* Menopausal Symptoms, Physical Activity Level and Quality of Life of Women Living in the Mediterranean Region. PIOS One. 2020 Mar; 15(3): e0230515. doi: 10.1371/journal.pone.0230515.

[20] Barati M, Akbari-Heidari H, Samadi-Yaghin E, Jenabi E, Jormand H, Kamyari N. The Factors Associated with the Quality of Life among Postmenopausal Women. BioMed Central Women's Health. 2021 May; 21(1): 208. doi: 10.1186/s12905-021-01361-x.

[21] Mi B, Xiong Y, Knoedler S, Alfertshofer M, Panayi AC, Wang H *et al.* Ageing-Related Bone and Immunity Changes: Insights into the Complex Interplay Between the Skeleton and the Immune System. Bone Research. 2024 Aug; 12(1): 42. doi: 10.1038/s41413-024-00346-4.

[22] Smail L, Jassim G, Shakil A. Menopause-Specific Quality of Life Among Emirati Women. International Journal of Environmental Research and Public Health. 2020 Jan; 17(1): 40. doi: 10.3390/ijerph17010040.

DOI: https://doi.org/10.54393/pbmj.v8i7.1267

PAKISTAN BIOMEDICAL JOURNAL

https://www.pakistanbmj.com/journal/index.php/pbmj/index

ISSN (E): 2709-2798, (P): 2709-278X

Volume 8, Issue 07 (July 2025)

Original Article

OPEN ACCESS

Association of Dry Eye, Sleep Quality, Anxiety and Depression among Young Pakistani Adults: A Cross-Sectional Study

Maryam Jabbar[1], Ayesha Asim[1], Syeda Rakia Bukhari[1], Sonia Basri[1], Alishba Hayat[1], Haram Waqas[1] and Misbah Safdar[1*]

[1]Department of Optometry, The University of Faisalabad, Faisalabad, Pakistan

ARTICLE INFO

Keywords:

Dry Eye Disease, Depression, Sleep Quality, Hospital Anxiety And Depression Scale, Pittsburgh Sleep Quality Index

How to Cite:

Jabbar, M., Asim, A., Bukhari, S. R., Basri, S., Hayat, A., Waqas, H., & Safdar, M. (2025). Association of Dry Eye, Sleep Quality, Anxiety and Depression among Young Pakistani Adults: A Cross- Sectional Study : Dry Eye, Sleep, Anxiety, and Depression in Young Adults. Pakistan BioMedical Journal, 8(7), 20-25. https://doi.org/10.54393/pbmj.v8i7.1267

***Corresponding Author:**

Misbah Safdar

Department of Optometry, The University of Faisalabad, Faisalabad, Pakistan

2021-bs-op-26@tuf.edu.pk

Received Date: 10th June, 2025

Revised Date: 24th July, 2025

Acceptance Date: 27th July, 2025

Published Date: 31st July, 2025

ABSTRACT

Tear film instability is a hallmark of dry eye disease, a multifactorial disorder which is affected by several variables such as sleep quality, depression and anxiety. **Objectives:** To examine the connections between anxiety, depression, dry eye and sleep quality. **Methods:** A cross-sectional study was carried out at Madinah Teaching Hospital, Faisalabad. Prerequisites for inclusion were being between the ages of 20-35 years and not having any clinically significant eye disorders or reported sleep disorders. Patients who were taking medication or who had undergone surgery in the six months prior were not included. Descriptive statistics, Pearson correlation and multiple linear regression were used to assess the results of the HADS, OSDI and PSQI, which were used to measure symptoms of anxiety and depression, dry eye and sleep quality, respectively. **Results:** Multiple linear regression revealed a significant ($p<0.001$) relationship between the OSDI and PSQI subscales (sleep latency, sleep disturbances and use of sleep medications). Other indicators that did not show statistically significant relationships with the regression model included subjective sleep quality, sleep duration, habitual sleep efficiency, and dysfunction during the day ($p>0.001$). Multiple linear regression analysis revealed that the OSDI and the other variables HADS-A, HADS-D and PSQI total score were related to the following values: $p=0.29$, $p=0.001$and $p<0.001$, respectively. **Conclusions:** Dry eye was closely associated with depression and disturbed sleep, although it did not significantly correlate with anxiety. The OSDI scores and the PSQI subscale showed significant associations, suggesting a link between dry eye and sleep quality.

INTRODUCTION

Dry eye disease (DED) is a complicated disorder that affects the ocular surface and tear film [1]. Millions of people worldwide are impacted by prevalence estimates that vary from 5% to 50%, depending on the population being studied [2]. DED presents a significant financial burden due to both direct treatment expenses and reduced productivity at work [3]. Common symptoms include burning in the eyes, light sensitivity, ocular discomfort and blurred vision [4]. Because they make it more difficult to work, socialize and perform everyday activities, these symptoms have the potential to drastically reduce quality of life [5, 6]. Dry eye disease pertains to two varieties: chronic and episodic. Episodes of DED are frequently caused by factors such as prolonged visual demands that reduce blinking. If these underlying causes persist over time, episodic DED may gradually give way to the chronic type of DED [7-9]. Anxiety and depression are two of the most prevalent mood disorders, and dry eye may severely impact a patient's mental health and quality of life [10]. The phrase sleep disorders encompass a range of ailments, including insomnia and obstructive sleep apnea, that impair the quality of sleep. In recent years, these anomalies have increased in frequency [11, 12]. Reduced tear production and elevated tear osmolarity could be the cause of the link between sleep deprivation and DED [13]. The link between sleep quality and dry eye disease (DED) has been

DOI: https://doi.org/10.54393/pbmj.v8i7.1267

the subject of numerous studies conducted in nations such as the United States, South Korea, Japan and Turkey [14–17]. No previous study has examined the connections between sleep disturbances, anxiety, depression and dry eye disease (DED) in the Pakistani population, despite the growing recognition of these connections. It was hypothesized that people with DED would experience more psychological distress and have worse sleep than people without DED.

This study aims to assess the association between dry eye disease, anxiety, depression and sleep quality among adults in Faisalabad, Pakistan, given the rising incidence of DED and mental health issues, particularly in urban areas.

METHODS

The cross-sectional study has 370 individuals who were recruited at the Madina Teaching Hospital in Faisalabad, Pakistan, between March and May 2025. TUF/IRB/19/25 was the reference number of the ethical approval letter for this study received from the University of Faisalabad's Ethical Institutional Review Board. The procedure employed in this investigation adhered to the principles of the Helsinki Declaration. Every participant in the study provided their informed consent. Using the Rao-Soft software, the study's sample size was determined to be 370 participants. A 95% confidence level, a population size of 10,000 and a 5% margin of error were among the parameters employed in the computation. To find study participants, a method of non-probability purposive sampling was used. Participants in the study had to be 20 -35 years of age, university-educated adults of both genders, with a clinically verified diagnosis of dry eye disease, good general health, sufficient cognitive ability, and enough English proficiency to understand and fill out the study questionnaires on their own. Individuals with anterior segment ocular problems, bilateral cataracts, severe glaucoma or a history of ocular surgery within the last three months were not included. People with systemic conditions such as serious heart diseases, autoimmune diseases, neurological or behavioural disorders and allergic diseases were also not included. Individuals who were on hormonal contraceptives, antidepressants, anti-anxiety medications or had a history of anxiety or depression were not allowed to participate. Additionally, excluded were women who were lactating or pregnant. Medical and demographic data were collected from each participant. The Ocular Surface Disease Index (OSDI), a self-administered questionnaire intended to identify the severity of self-reported dry eye disease (DED), was filled out by each participant. Participants were divided into normal (0–12), mild (13–22), moderate (23–32), and severe (33–100) based on their sum of OSDI scores. A DED score of 13 or higher was considered indicative. The Ocular Surface Disease Index (OSDI)© is used to quantify the particular impacts of dry eye [18]. The Pittsburgh Sleep Quality Index (PSQI) was used to evaluate the quality of sleep during the previous month [19]. Subjective sleep quality, sleep latency, length, habitual sleep efficiency, sleep interruptions, use of sleep aids, and dysfunction throughout the day are the seven factors assessed by this questionnaire. The overall score ranges from 0 to 21, with each PSQI component having a value between 0 and 3. Poorer sleep quality is implied by higher scores. Poor sleep was indicated by a total score higher than 7. Snaith and Zigmond developed the Hospital Anxiety and Depression Scale (HADS) to evaluate patients for symptoms of anxiety and depression in normal hospital settings [20]. The 14 items are divided into two subscales, one for depression and one for anxiety, each containing seven items. Anxiety or despair may be present if the total score is 8 or above. A four-point Likert scale (0–3) is used to provide a score to each item. The extensive usage of HADS is explained by its exceptional reliability and accuracy in clinical and research settings. Data were collected using the English versions of the OSDI, PSQI and HADS questionnaires because there were no verified Urdu translations available at the time of the study. To ensure that participants could consistently complete these tools, English language proficiency had been added to the inclusion criteria. Statistical analysis was conducted using IBM SPSS software (Version 23.0). While mean ± standard deviation (SD) is used to demonstrate continuous variables like age, frequency distributions were utilized to highlight categorical data like gender and the frequency of dry eyes. The associations between psychological stress (assessed by the HADS), sleep quality (assessed by the PSQI), and dry eye symptoms (assessed by the OSDI) were examined using Pearson correlation analysis. Multiple linear regression models were also used to investigate the potential mediating effects of total PSQI and HADS scores on the relationship between OSDI scores. The relationship between particular PSQI subscale scores and OSDI scores was examined using both multiple linear regression analysis and Pearson correlation. Standardized regression coefficients (Beta) were used to reflect the quantity of the direct and indirect effects, while unstandardized regression coefficients (B) were used to determine their significance. Statistical significance was defined as a p-value of less than 0.05.

RESULTS

The demographic data collected for this study included age and gender. The sample size was 370 individuals in total. For statistical analysis, frequency distribution and descriptive statistics were applied. Participants' mean age was 22.10 ± 1.94 years. There were 110 male (29.7%) and 260 female (70.3%) among the participants. The frequency

DOI: https://doi.org/10.54393/pbmj.v8i7.1267

distribution of DED severity in the study population showed that 255 participants (68.91%) did not have DED. Of the people diagnosed with DED, 24 (6.48%) had severe DED, 50 (13.51%) had moderate DED, and 41 (11.08%) had mild DED, respectively (Table 1).

Table 1: Frequency of Non-DED and DED Grades

Demographic Variables		Frequency (%)
Age (Years)	Mean ± SD	22.10 ± 1.94
Gender	Male	110 (29.7%)
	Female	260 (70.3%)
Non-DED	–	255 (68.91%)
DED	Mild	41 (11.08%)
	Moderate	50 (13.51%)
	Severe	24 (6.48%)

Both the OSDI and PSQI subscale components underwent descriptive analysis. The sample had a comparatively low level of dry eye symptoms, as indicated by the mean OSDI score of 15.03 ± 18.78. Sleep latency was 0.78 ± 0.76, sleep duration was 0.89 ± 0.87, habitual sleep efficiency was 0.42 ± 0.68, sleep disturbance was 0.72 ± 0.73, use of sleep medication was 0.34 ± 0.57, subjective sleep quality was 0.94 ± 0.67, and daytime dysfunction was 0.62 ± 0.73 among the PSQI components. Pearson correlation coefficients were used to assess the relationships between OSDI and metrics for sleep quality. Significant positive correlations were found between the OSDI score and sleep disturbance ($r=0.398$, $p<0.001$), sleep medication use ($r=0.235$, $p<0.001$), daytime dysfunction ($r=0.242$, $p<0.001$), sleep latency ($r=0.284$, $p<0.001$), subjective sleep quality ($r=0.186$, $p<0.001$) and sleep duration ($r=0.164$, $p=0.001$). These findings suggest that poorer sleep quality is associated with higher levels of dry eye complaints (Table 2).

Table 2: Descriptive statistics and Correlation Matrix Analysis for OSDI and PSQI Subscales

Variable	Mean ± SD	Pearson correlation coefficient (r) with OSDI	p-Value (1-tailed)
OSDI	15.03 ± 18.78	-	-
Subjective Sleep Quality	0.94 ± 0.67	0.186	p<0.001
Sleep Latency	0.78 ± 0.76	0.284	p<0.001
Sleep Duration	0.89 ± 0.87	0.164	p<0.001
Habitual Sleep Efficiency	0.42 ± 0.68	0.157	p<0.001
Sleep Disturbance	0.72 ± 0.73	0.398	p<0.001
Use of Sleep Medication	0.34 ± 0.57	0.235	p<0.001
Day Time Dysfunction	0.62 ± 0.73	0.242	p<0.001

To ascertain which elements of sleep quality are predictive of OSDI scores, a multiple linear regression analysis was employed. The model was statistically significant ($F(7,362) = 14.47$, $p<0.001$) and accounted for over 22% of the variation in OSDI values ($R2=0.219$, Adjusted $R2 =0.203$). The variables that were shown to be substantially linked with higher OSDI scores were sleep disturbance ($B=7.19$, $p<0.001$), sleep latency ($B=3.30$, $p=0.011$) and the use of sleep medication ($B=4.48$, $p=0.006$). Other characteristics such as subjective sleep quality, duration of sleep, habitual sleep efficiency and dysfunction during the day did not show statistically significant relationships in the regression model (Table 3).

Table 3: Multiple Linear Regression Analysis Between OSDI and PSQI Subscale

Predictors	B	SE	Beta	t	p-Value	95% CI (Lower, Upper)
(Constant)	2.49	1.76	–	1.416	0.158	-0.97, 5.95
Subjective Sleep Quality	0.72	1.44	0.026	0.498	0.619	-2.12, 3.55
Sleep Latency	3.30	1.29	0.134	2.562	0.011	0.77, 5.83
Sleep Duration	0.82	1.09	0.038	0.755	0.451	-1.32, 2.95
Habitual Sleep Efficiency	2.25	1.36	0.081	1.660	0.098	-0.42, 4.92
Sleep Disturbance	7.19	1.39	0.278	5.155	p<0.001	4.45, 9.93
Use of Sleep Medication	4.48	1.62	0.137	2.770	0.006	1.30, 7.67
Daytime Dysfunction	1.48	1.36	0.058	1.095	0.274	-1.18, 4.1

Model Summary: $R = 0.468$, $R^2 = 0.219$, Adjusted $R^2 = 0.203$, $F(7,362) = 14.47$, $p<0.001$

Descriptive and correlation analyses were performed, including the OSDI, PSQI and HADS. The HADS-Depression subscale had a mean of 7.73 ± 2.89, while the HADS-Anxiety subscale had a mean of 8.23 ± 3.08. A sleep disturbance was suggested by a total average PSQI score of 4.71 ± 2.81. To investigate relationships between OSDI, HADS and PSQI total scores, Pearson correlation coefficients were computed. OSDI and HADS-A ($r=0.189$, $p<0.001$), HADS-D ($r=0.251$, $p<0.001$), and PSQI total score ($r=0.422$, $p<0.001$) showed significant positive relationships. Furthermore, both anxiety and depression showed significant relationships with PSQI scores and a moderate correlation with one another ($r=0.332$, $p<0.001$), suggesting a connection between emotional distress, sleep quality and symptoms of dry eyes (Table 4).

Table 4: Descriptive Statistics and Correlation Matrix Analysis for OSDI, PSQI, HADS-A and HADS-D

Variables	Mean ± SD	Pearson correlation coefficient (r) with OSDI	p-Value
OSDI	15.03 ± 18.78	–	–
HADS-A	8.23 ± 3.08	0.189	p<0.001
HADS-D	7.73 ± 2.89	0.251	p<0.001
PSQI Total	4.71 ± 2.81	0.422	p<0.001

A multiple linear regression analysis was performed to determine if anxiety (HADS-A), depression (HADS-D), and sleep quality (PSQI) significantly predicted dry eye symptoms (OSDI). The model was significant ($F(3,366) = 32.45$, $p<0.001$) and explained nearly 21.0% of the variation in OSDI values ($R2=0.210$). The adjusted R2 of.204 indicated a very good model fit. Regression coefficients showed that the two best predictors of OSDI were PSQI ($B=2.54$, $p<0.001$)

DOI: https://doi.org/10.54393/pbmj.v8i7.1267

and HADS-D (B=1.04, p=0.001). PSQI_TOTAL (B=2.540, p<0.001): Sleep quality had the strongest and most significant correlation with OSDI. For every unit rise in PSQI (worsening sleep), OSDI increased by 2.54 units. B=0.32, p=0.299, however, indicates that HADS-A was not a statistically significant predictor. These results suggest that poor sleep, depression and anxiety are important factors that contribute to the severity of dry eye symptoms, even while anxiety alone does not predict OSDI scores. Higher anxiety levels are somewhat linked to more dry eye symptoms, according to the findings, which showed a small but statistically significant positive correlation between HADS-A (anxiety) scores and OSDI. In contrast to anxiety, depressive symptoms as assessed by the HADS-D showed a somewhat higher connection with OSDI, indicating a more significant association between depression and dry eye. The PSQI total score, which measures overall sleep quality, showed the largest and most significant positive connection with the severity of dry eye symptoms among the three components. This implies that the development of dry eye symptoms is significantly influenced by sleep disturbances (Table 5).

Table 5: Multiple Linear Regression Analysis Between OSDI, PSQI, HADS-A and HADS-D

Predictors	B	SE	β	t	p	95% CI for B
Intercept	-7.60	3.08	—	-2.46	0.014	-13.66, -1.53
PSQI	2.54	0.32	0.379	7.90	<0.001	1.91, 3.17
HADS-A	0.32	0.31	0.052	1.04	0.299	-0.28, 0.92
HADS-D	1.04	0.32	0.160	3.23	0.001	0.41, 1.68

Model fit: $F(3,366) = 32.45$, $p<0.001$, $R^2 = 0.210$, Adjusted $R^2 = 0.204$
The results show that both poor sleep quality and elevated depression levels are significantly correlated with the severity of dry eye symptoms. In the multivariate model, anxiety did not function as an independent predictor. This implies that treating depression and sleep deprivation may help reduce dry eye symptoms, particularly in groups with borderline psychological distress.

DISCUSSION

This study examined the moderating effect of sleep on the relationships among anxiety, depression, and dry eye disease (DED). The results showed that subjective sleep quality and sleep latency appeared as mediators in the connection between DED and depression. These findings are consistent with those of Wu *et al.* who found that anxiety and depression were more common in people with DED and problems with sleep [21]. Symptoms of dry eye disease (DED) might negatively impact mood and mental health [22, 23]. Many theories have been put up to explain the association between DED and depression, even though its exact genesis is still unknown. First, it is believed that depression and DED are comorbid conditions [10, 24] with comparable risk factors such as female sex and menopause, indicating that sex hormones may contribute to the pathophysiology of both conditions. The second factor that may exacerbate DED symptoms is somatization, which is present in more than 80% of depressed individuals [25]. Furthermore, this study proposes two potential pathways, sleep latency and subjective sleep quality that could help clarify the connection between DED and psychological discomfort, such as anxiety and depression. He *et al.* conducted a cross-sectional study in 2022 in which they evaluated 321 clinic-based DED patients in China during the COVID-19 pandemic for anxiety, depression and sleep disturbance using the OSDI, HADS, and PSQI. The majority of participants reported both anxiety (26.8%) and depression (26.5%), and there was a significant correlation between mood and sleep measures and the severity of DED symptoms [26]. However, present research only found a significant association between sleep and depression, not anxiety, despite including a wide age range of community-based, university-educated Pakistanis. Variations in the environment, cultural background, and the recruitment of younger and generally healthier adults could all account for this discrepancy. These methodological and demographic differences strengthen the interpretation of our findings in the specific context of Pakistan. Magno *et al.* reported that even after treating additional relevant conditions, patients with dry eye had significantly lower sleep quality across all demographic categories [27]. Ayaki *et al.* further validated the effect of DED on sleep by finding that initiating dry eye treatment significantly improved the quality of sleep for newly diagnosed DED patients [28]. These results are consistent with our observations. This study emphasizes the connections between anxiety, depression, bad sleep quality and dry eye disease (DED), highlighting the necessity of managing DED with a multidisciplinary approach. Practitioners are encouraged to screen for psychological and sleep disorders and take into consideration early referrals to sleep or mental health specialists because DED can significantly impair quality of life. Incorporating validated diagnostic tools into clinical evaluations can help guide focused interventions. This cross-sectional study clarifies the relationship between psychological stress, sleep issues and dry eye, although it does not establish causation. It is more difficult to understand the long-term effects in the absence of follow-up. This study suggests that future longitudinal studies should look into the possible long-term impacts of these factors.

CONCLUSIONS

It was concluded that there was no significant association between dry eye disease and anxiety, although it was significantly associated with depression and poor sleep quality. Therefore, when a patient present with DED, it is advised that eye care providers carefully screen for anxiety, depression and sleep problems as part of a comprehensive therapy approach.

DOI: https://doi.org/10.54393/pbmj.v8i7.1267

Authors Contribution

Conceptualization: SB
Methodology: AH, HW, MS
Formal analysis: AA, SRB
Writing review and editing: MJ

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Hakim FE and Farooq AV. Dry Eye Disease: An Update in 2022. Journal of the American Medical Association. 2022 Feb; 327(5): 478-9. doi: 10.1001/jama.2021.19963.

[2] Papas EB. The Global Prevalence of Dry Eye Disease: A Bayesian View. Ophthalmic and Physiological Optics. 2021 Nov; 41(6): 1254-66. doi: 10.1111/opo.12888.

[3] Chan C, Ziai S, Myageri V, Burns JG, Prokopich CL. Economic Burden and Loss of Quality of Life from Dry Eye Disease in Canada. British Medical Journal Open Ophthalmology. 2021 Sep; 6(1). doi: 10.1136/bmjophth-2021-000709.

[4] Tsubota K, Pflugfelder SC, Liu Z, Baudouin C, Kim HM, Messmer EM *et al.* Defining Dry Eye from A Clinical Perspective. International Journal of Molecular Sciences. 2020 Dec; 21(23): 9271. doi: 10.3390/ijms21239271.

[5] Pan H, Pan X, Gu D, Wang X. Effects of Social Support on Vision-Related Quality of Life in Older Adults with Dry Eye Disease: The Chain Mediating Role of Illness Perception and Coping Style. Frontiers in Psychology. 2024 Jul; 15: 1411661. doi: 10.3389/fpsyg.2024.1411661.

[6] Cutrupi F, De Luca A, Di Zazzo A, Micera A, Coassin M, Bonini S. Real Life Impact of Dry Eye Disease. In Seminars in Ophthalmology. 2023 Nov; 38(8): 690-702. doi: 10.1080/08820538.2023.2204931.

[7] Liu M, Kumar A, Bukkapatnam S, Kuttolamadom M. A Review of the Anomalies in Directed Energy Deposition (DED) Processes and Potential Solutions-Part Quality and Defects. Procedia Manufacturing. 2021 Jan; 53: 507-18. doi: 10.1016/j.promfg.2021.06.093.

[8] Oganov A, Yazdanpanah G, Jabbehdari S, Belamkar A, Pflugfelder S. Dry Eye Disease and Blinking Behaviors: A Narrative Review of Methodologies for Measuring Blink Dynamics and Inducing Blink Response. The Ocular Surface. 2023 Jul; 29: 166-74. doi: 10.1016/j.jtos.2023.05.011.

[9] Sabucedo-Villamarin B, Garcia-Queiruga J, Cacabelos-Torres L, Giraldez MJ, Yebra-Pimentel E, Pena-Verdeal H. Short-Term Changes in Tear Film Stability and Tear Volume Following the Application of Various DED Management Options in a Healthy Young Population. Journal of Personalized Medicine. 2025 Apr; 15(5): 173. doi: 10.3390/jpm15050173.

[10] Morthen MK, Magno MS, Utheim TP, Snieder H, Hammond CJ, Vehof J. The Physical and Mental Burden of Dry Eye Disease: A Large Population-Based Study Investigating the Relationship with Health-Related Quality of Life and Its Determinants. The Ocular Surface. 2021 Jul; 21: 107-17. doi: 10.1016/j.jtos.2021.05.006.

[11] Bijwadia J. Current Classification of Sleep Disorders. In Dental Sleep Medicine: A Clinical Guide. 2022 Sep: 71-101. doi: 10.1007/978-3-031-10646-0_3.

[12] Anghel L, Ciubară A, Nechita A, Nechita L, Manole C, Baroiu L *et al.* Sleep Disorders Associated with Neurodegenerative Diseases. Diagnostics. 2023 Sep; 13(18): 2898. doi: 10.3390/diagnostics13182898.

[13] Li A, Zhang X, Guo Y, Wang J, Hao Y, Gu Y *et al.* The Association Between Dry Eye and Sleep Disorders: The Evidence and Possible Mechanisms. Nature and Science of Sleep. 2022 Dec: 2203-12. doi: 10.2147/NSS.S378751.

[14] Sariyeva İsmayılov A and Aydin Guclu O. The Effect of OSAS Risk, Excessive Daytime Sleepiness, Insomnia Severity and Sleep Quality on Dry Eye Syndrome. Sleep and Biological Rhythms. 2020 Jul; 18(3): 259-65. doi: 10.1007/s41105-020-00267-9.

[15] An Y and Kim H. Sleep Disorders, Mental Health, and Dry Eye Disease in South Korea. Scientific Reports. 2022 Jun; 12(1): 11046. doi: 10.1038/s41598-022-14167-0.

[16] Citradewi AA, Widiana IG, Susila NK, Djelantik AA. Correlation of Depression, Anxiety and Stress Level on Dry Eye Disease Severity. International Journal of Health Sciences. 2022 Sep; 6(S9): 1733-44. doi: 10.53730/ijhs.v6nS9.12747.

[17] McCann P, Abraham AG, Mukhopadhyay A, Panagiotopoulou K, Chen H, Rittiphairoj T *et al.* Prevalence and Incidence of Dry Eye And Meibomian Gland Dysfunction in the United States: A Systematic Review and Meta-Analysis. Journal of the American Medical Association Ophthalmology. 2022 Dec; 140(12): 1181-92. doi: 10.1001/jamaophthalmol.2022.4394.

[18] Schiffman RM, Christianson MD, Jacobsen G, Hirsch JD, Reis BL. Reliability and Validity of the Ocular

DOI: https://doi.org/10.54393/pbmj.v8i7.1267

Surface Disease Index. Archives of Ophthalmology. 2000 May; 118(5): 615-21. doi: 10.1001/archopht.118.5.615.

[19] Zarrabi H, Novin MH, Soleimani R, Shirkhan Maleki B, Speily SK. The Psychometric Properties of the Persian Version of the Smoking Urge Questionnaire in the General Population. Caspian Journal of Neurological Sciences. 2024 Jul; 10(3): 218-24. doi: 10.32598/CJNS.10.38.488.1.

[20] Snaith RP and Zigmond AS. The Hospital Anxiety and Depression Scale. British Medical Journal (Clinical research ed.). 1986 Feb; 292(6516): 344. doi: 10.1136/bmj.292.6516.344.

[21] Wu M, Liu X, Han J, Shao T, Wang Y. Association Between Sleep Quality, Mood Status, and Ocular Surface Characteristics in Patients with Dry Eye Disease. Cornea. 2019 Mar; 38(3): 311-7.

[22] He Q, Chen Z, Xie C, Liu L, Yang H, Wei R. Relationship Between Dry Eye Disease and Emotional Disorder: The Mediating Effect of Health Anxiety. Frontiers in Public Health. 2022 Feb; 10: 771554. doi: 10.3389/fpubh.2022.771554.

[23] Zhou Y, Murrough J, Yu Y, Roy N, Sayegh R, Asbell P et al. Association Between Depression and Severity of Dry Eye Symptoms, Signs, and Inflammatory Markers in the DREAM Study. Journal of the American Medical Association Ophthalmology. 2022 Apr; 140(4): 392-9. doi: 10.1001/jamaophthalmol.2022.0140.

[24] Nuzzi R and Caselgrandi P. Sex Hormones and Their Effects on Ocular Disorders and Pathophysiology: Current Aspects and Our Experience. International Journal of Molecular Sciences. 2022 Mar; 23(6): 3269. doi: 10.3390/ijms23063269.

[25] Basilious A, Xu CY, Malvankar-Mehta MS. Dry Eye Disease and Psychiatric Disorders: A Systematic Review and Meta-Analysis. European Journal of Ophthalmology. 2022 Jul; 32(4): 1872-89. doi: 10.1177/11206721211060963.

[26] He Q, Chen Z, Xie C, Liu L, Wei R. The Association Between Dry Eye Disease with Depression, Anxiety and Sleep Disturbance During COVID-19. Frontiers in Psychiatry. 2022 Jan; 12: 802302. doi: 10.3389/fpsyt.2021.802302

[27] Magno MS, Utheim TP, Snieder H, Hammond CJ, Vehof J. The Relationship Between Dry Eye and Sleep Quality. The Ocular Surface. 2021 Apr; 20: 13-9. doi: 10.1016/j.jtos.2020.12.009.

[28] Ayaki M, Toda I, Tachi N, Negishi K, Tsubota K. Preliminary Report of Improved Sleep Quality in Patients with Dry Eye Disease After Initiation of Topical Therapy. Neuropsychiatric Disease and Treatment. 2016 Feb: 329-37.

DOI: https://doi.org/10.54393/pbmj.v8i7.1277

PAKISTAN BIOMEDICAL JOURNAL
https://www.pakistanbmj.com/journal/index.php/pbmj/index
ISSN (E): 2709-2798, (P): 2709-278X
Volume 8, Issue 07 (July 2025)

Original Article

OPEN ACCESS

Code Ready? Evaluating Basic Life Support Awareness in Nursing Students

Lal Khan Keerio[1], Khalida Naz Memon[2], Fatima Soomro[3*], Chhagan Lal[4], Roshan Ali[5], Janual Khatoon[6], Rubina Dean[3] and Nazish Nawaz Ali[3]

[1]Department of Nursing, Community Midwifery School, Hala, Pakistan
[2]Department of Community Health Sciences, Indus Medical College, The University of Modern Sciences, Tando Muhammad Khan, Pakistan
[3]Department of Nursing, Peoples Nursing School, Liaquat University of Medical and Health Sciences, Jamshoro, Pakistan
[4]Department of Nursing, Community Midwifery School, Umerkot, Pakistan
[5]Department of Nursing, Badin Institute of Nursing and Allied Health Sciences, Badin, Pakistan
[6]Department of Nursing, Liaquat College of Nursing (Female), Jamshoro, Pakistan

ARTICLE INFO

Keywords:
Basic Life Support, Code, Nursing, Awareness, Skills, Cardiopulmonary Resuscitation

How to Cite:
Keerio, L. K., Memon, K. N., Soomro, F., Lal, C., Ali, R., Khatoon, J., Dean, R., & Ali, N. N. (2025). Code Ready? Evaluating Basic Life Support Awareness in Nursing Students: Code Ready? Evaluating Basic Life Support Awareness . Pakistan BioMedical Journal, 8(7), 26-31. https://doi.org/10.54393/pbmj.v8i7.1277

***Corresponding Author:**
Fatima Soomro
Department of Nursing, Peoples Nursing School, Liaquat University of Medical and Health Sciences, Jamshoro, Pakistan
Fatima.soomro@lumhs.edu.pk

Received Date: 11th June, 2025
Revised Date: 22nd July, 2025
Acceptance Date: 28th July, 2025
Published Date: 31st July, 2025

ABSTRACT

Basic Life Support (BLS) is a critical skill for nurses, yet gaps remain in both awareness and technical proficiency among nursing students in low and middle-income countries. In Pakistan, limited simulation-based training may impact confidence and competence in cardiopulmonary resuscitation (CPR). **Objectives:** To assess BLS awareness, self-perceived competence, and associated demographic factors among post-RN BScN students in Sindh, Pakistan. **Methods:** A descriptive cross-sectional study was conducted between May and November 2022 across five nursing institutes, a structured questionnaire collected data on BLS awareness, CPR technique knowledge, attitudes, and self-perceived competence. A total of 378 students were recruited via convenience sampling. Descriptive statistics were calculated, and chi-square tests were used to examine associations between demographic variables and perceived BLS competence. **Results:** Most participants (86.2%) had heard of BLS and supported its inclusion in curricula (81%). However, correct responses on technical CPR skills such as the CAB sequence (51.9%), compression depth (56.3%), and 30:2 ratio (43.9%) were suboptimal. Statistically significant associations were found between self-perceived competence and gender, age, clinical experience, and academic year ($p<0.05$), with males and experienced students rating themselves more highly. **Conclusions:** The study found high BLS awareness but gaps in technical skills. Integrating simulation-based training, refresher sessions, and addressing gender confidence gaps is essential to improve patient care.

INTRODUCTION

Basic Life Support (BLS) refers to the immediate recognition of sudden cardiac arrest (SCA), rapid activation of emergency medical services (EMS), and the timely provision of high-quality cardiopulmonary resuscitation (CPR), including defibrillation where indicated. As a critical first step in the "chain of survival," BLS is pivotal in increasing survival rates following cardiac and respiratory emergencies worldwide [1, 2]. Globally, studies show that early and effective BLS can double or even triple the chances of survival in cardiac arrest victims, particularly when initiated within the first few minutes [3]. However, the impact of BLS is especially significant in low- and middle-income countries (LMICs), where limited healthcare resources and delayed access to advanced life support services exacerbate mortality rates [4]. In Pakistan, both out-of-hospital and in-hospital cardiac

DOI: https://doi.org/10.54393/pbmj.v8i7.1277

arrest survival rates remain dismally low [5, 6]. Research suggests that insufficient BLS knowledge and limited hands-on competency among healthcare professionals are major contributing factors [7]. Nurses, often the first responders during patient emergencies, play a critical role in initiating timely and effective BLS, and their knowledge, skills, and confidence directly influence patient outcomes [8]. Despite this responsibility, evidence indicates that nursing students and even practicing nurses in Pakistan frequently lack adequate understanding of BLS protocols and demonstrate low confidence in executing CPR techniques [9, 10]. Globally, multiple studies have underscored the importance of integrating structured BLS training into healthcare education. Simulation-based and hands-on programs have proven particularly effective in improving theoretical knowledge, practical skills, and long-term retention among healthcare learners [11, 12]. Periodic refresher courses and continuous professional development in resuscitation have further been shown to mitigate skill decay and promote emergency readiness [13, 14]. Despite these findings, BLS education in Pakistan's nursing institutions remains fragmented and inconsistently implemented, especially in Post-RN Bachelor of Science in Nursing (BScN) programs [15]. Understanding the current knowledge levels of nursing students and identifying factors that influence their competency are essential steps toward strengthening emergency preparedness in Pakistan's healthcare system. Examining demographic characteristics (e.g., age, gender, clinical experience) and institutional variables (e.g., public vs. private school) can highlight where targeted interventions are most needed. Basic Life Support (BLS) plays a critical role in improving survival from cardiac emergencies, yet significant deficiencies in practical competence are often reported among nursing students, particularly in resource-limited settings [16]. In Pakistan, Post-RN BScN students who frequently serve as frontline healthcare providers generally possess awareness of BLS, but their proficiency and confidence in executing technical skills vary considerably [17].

This study aimed to evaluate BLS knowledge, including recognition of cardiac arrest, CPR procedures, and AED awareness among post-RN BScN students enrolled in public and private nursing institutes across Sindh. It further examines associations between knowledge levels and demographic or institutional factors such as age, gender, clinical experience, and institution type.

METHODS

This descriptive cross-sectional study was conducted between May 16 and November 22, 2022, among Post-RN Bachelor of Science in Nursing (BScN) students enrolled in five public and private nursing institutions in the Hyderabad and Jamshoro districts of Sindh Province. Ethical approval was granted by the Research Ethics Committee of Liaquat University of Medical & Health Sciences with approval no. LUMHS/REC/35, and formal permissions were obtained from the institute authorities. "A validated, structured, self-administered questionnaire was developed by the principal investigator and used for data collection. The participating institutions included Jamshoro College of Nursing (n=139), Rising Star Institute of Nursing (n=150), Dua Institute of Nursing (n=144), Beachwood Institute of Nursing (n=147), and Jeejal Maau Institute of Nursing (n=137). The study included 378 post-RN BScN students, with 75–76 recruited from each institution through convenience sampling. This sample size was calculated based on a previously reported awareness prevalence of 66% [1]. Sample size calculation formula: $n = (Z^2 \times p \times q) / e^2$, where $Z = 1.96$ (95% CI), $p = 0.66$, $q = 0.34$, and $e = 0.05$ (margin of error). This produced a base sample size of 344, and an additional 10% was added to account for non-response and incomplete questionnaires, resulting in 378 participants. The instrument was pilot-tested and validated, showing acceptable internal reliability (Cronbach's alpha=0.75). The questionnaire comprised four sections: Demographic information, General awareness of Basic Life Support (BLS), perceived importance of Cardiopulmonary Resuscitation (CPR) in clinical practice, and Awareness of CPR indications and effectiveness. Awareness of Basic Life Support (BLS) was evaluated using a structured, self-administered questionnaire comprising multiple-choice and true/false items. The instrument was designed to assess participants' understanding of key BLS concepts, including the recognition of cardiac arrest, appropriate CPR steps, indications for intervention, and the effectiveness of timely response. Each correct response was awarded one point, while incorrect or unanswered items were scored as zero. The cumulative awareness score was calculated by summing the correct responses, with higher scores indicating greater awareness. Based on existing literature and commonly accepted standards in similar studies, a cut-off score of 14 out of 20 (70%) was used to categorize participants as having either adequate (≥70%) or inadequate (<70%) awareness of BLS principles [1,2]. Participation was voluntary with written informed consent. Data confidentiality was ensured through coded responses and secure storage. SPSS version 26.0 was used for analysis. Descriptive statistics summarized demographics and awareness levels, while Chi-square tests assessed associations between demographic variables and BLS awareness. A p-value < 0.05 indicated statistical significance.

DOI: https://doi.org/10.54393/pbmj.v8i7.1277

RESULTS

This section presents the findings of the descriptive cross-sectional study that evaluated the level of awareness regarding Basic Life Support (BLS) among Post-RN BScN students, along with the association between self-rated awareness and selected demographic variables. Awareness was assessed using a structured, self-administered questionnaire comprising multiple-choice questions and scenario-based items aligned with AHA guidelines, covering core components such as the BLS sequence, CPR technique, AED use, and choking management. The tool also measured attitudes and self-perceived competency. Both descriptive and inferential statistics are reported below. A total of 378 Post-RN BScN students participated (Table 1). The mean age was 33.0 years (SD ± 4.2); 40.2% were aged 22–27 years, another 40.2% were 28–32 years, and 19.6% were 33 years or older. In terms of professional experience, 50.3% had more than five years, 41.8% had 1–5 years, and 7.9% had less than one year. Over half the participants (53.4%) were in their first academic year (Table 1).

Table 1: Socio-demographic and Professional Characteristics of Post-RN BScN Students (N = 378)

Variables	Category	Frequency (%)
Age Range	22–27 years	152 (40.2%)
	28–32 years	152 (40.2%)
	≥33 years	74 (19.6%)
	Total	378 (100%)
	Mean ± SD	33.0 ± 4.2
Year of Study	First year	202 (53.4%)
	Second year	176 (46.6%)
	Total	378 (100%)
Experience	Less than 1 year	30 (7.9%)
	1–5 years	158 (41.8%)
	More than 5 years	190 (50.3%)
	Total	378 (100%)

Overall, 86.2% had previously heard of BLS, 81.0% supported its inclusion in the nursing curriculum, and 67.0% had received prior training. However, gaps were evident in technical knowledge. Only 47.0% correctly identified the CAB sequence (Compressions → Airway → Breathing), and 43.9% knew the recommended 30:2 compression-to-ventilation ratio. Correct identification of compression depth (5–6 cm) was reported by 47.3%, and 56.3% selected abdominal thrusts for conscious choking individuals. Additionally, 64.0% correctly defined AED (Figure 1).

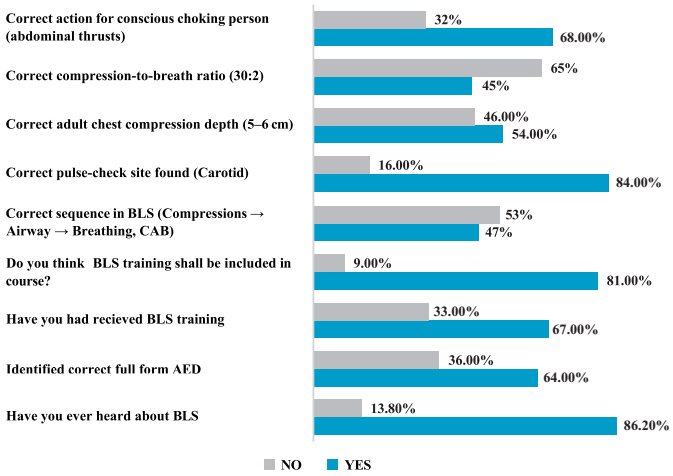


Figure 1: Participant Awareness Toward BLS (N = 378)

High proportions of participants expressed positive views: 83.0% believed CPR is significant in clinical training, and 97.0% agreed that accurate CPR technique is essential for healthcare professionals. Notably, 90.7% regarded CPR as a life-saving skill, and 75.1% supported mandatory CPR training for nursing students. Nonetheless, misconceptions persisted. For example, 40.2% incorrectly believed that simulated breaths should be given if the person has a pulse but is not breathing, contrary to updated CPR protocols. Similarly, 22.7% assumed CPR is always performed only inside clinics, and 31.2% believed strangers are more likely than family to perform CPR on a victim (Table 2).

Table 2: Participant Perceptions and Attitudes Toward CPR/BLS (N = 378)

Item / Statement	Response	Frequency (%)
Awareness of CPR significance in clinical training	Yes	314 (83.0%)
	No	27 (7.0%)
	Don't know	37 (10.0%)
Exact CPR technique is compulsory for all healthcare personnel	Yes	367 (97.0%)
	No	11 (3.0%)
Interest in joining BLS platforms to acquire lifesaving skills	Yes	314 (83.0%)
	No / Don't know	64 (17.0%)
CPR measures are challenging or morally insensitive	Yes	16 (4.2%)
	No	227 (60.0%)
	Don't know	135 (35.7%)
CPR is unsafe rather than helpful to patients	Yes	39 (10.3%)
	No	257 (67.9%)
	Don't know	82 (21.7%)
Directing CPR is a waste of workforce/time	Yes	29 (7.7%)
	No	274 (72.4%)
	Don't know	75 (19.8%)
CPR training should be mandatory for all nursing students	Yes	284 (75.1%)
	No	28 (7.4%)
	Don't know	66 (17.5%)

DOI: https://doi.org/10.54393/pbmj.v8i7.1277

CPR is a comprehensive life-saving skill in cardiac arrest	True	343 (90.7%)
	False	5 (1.3%)
	Don't know	30 (7.9%)
CPR is always performed inside clinics (belief)	True	86 (22.7%)
	False	234 (61.9%)
	Don't know	58 (15.3%)
BLS is useful within 6–7 minutes before cessation of blood flow	True	328 (86.7%)
	False	27 (7.2%)
	Don't know	23 (6.1%)
Simulated breaths are preferred when a person is not breathing but has a pulse	True	152 (40.2%)
	False	131 (34.6%)
	Don't know	95 (25.2%)
The majority of CPR recipients survive if conducted by skilled persons	True	321 (84.9%)
	False	50 (13.2%)
	Don't know	7 (1.8%)
Strangers are more likely than family to perform CPR on a victim	True	118 (31.2%)
	False	154 (40.7%)
	Don't know	106 (28.1%)
CPR should continue until recovery or a death declaration	True	339 (89.6%)
	False	30 (7.9%)
	Don't know	9 (2.3%)
A defibrillator is an electrical device to restore normal heart rhythm	True	285 (75.3%)
	False	42 (11.1%)
	Don't know	51 (13.5%)
The survival rate is high if CPR is prompt and followed by defibrillation	True	317 (83.8%)
	False	21 (5.5%)
	Don't know	40 (10.5%)

Awareness of BLS was objectively assessed using a structured questionnaire with a total score of 20 points. Applying the predefined cut-off score of ≥14 for adequate awareness, it was found that 232 participants (61.4%) demonstrated adequate awareness, while 146 participants (38.6%) fell below the threshold and were classified as having inadequate awareness. These results indicate that although the majority of participants possessed sufficient understanding of BLS principles, a considerable proportion still lacked essential awareness, underscoring the need for targeted educational interventions (Figure 2).

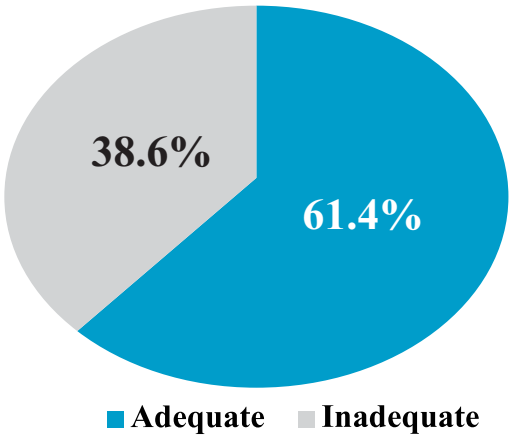


Figure 2: Awareness Level of BLS Among Participants (N = 378)

To explore whether participants objectively assessed Basic Life Support (BLS) awareness differed significantly across demographic groups, chi-square tests of independence were conducted. This analysis evaluated associations between awareness level (categorized as adequate or inadequate) and participant characteristics, including gender, age, clinical experience, and year of study. A p-value less than 0.05 was considered statistically significant (Table 3).

Table 3: Association between Demographic Variables and Awareness Level of BLS (N = 378)

Variable	Adequate Awareness	Inadequate Awareness	p-Value
Gender			
Male	62%	38%	0.001*
Female	39%	61%	
Age Group (years)			
20–30	35%	65%	0.04*
31–40	48%	52%	
41–50	64%	36%	
Clinical Experience			
<5 years	40%	60%	0.001*
>5 years	70%	30%	
Year of Study			
First-year	38%	62%	0.001*
Second-year	66%	34%	

DISCUSSION

This study assessed the awareness of Basic Life Support (BLS) among Post-RN BScN students across nursing institutes in Sindh and explored how awareness levels varied by demographic characteristics. Overall, 61.4% of the students demonstrated adequate BLS awareness, while 38.6% had inadequate awareness. Although the majority had heard of BLS (86.2%) and acknowledged its clinical significance, technical understanding, especially of the CAB sequence, compression-to-ventilation ratio, and compression depth, was notably lacking. These findings are consistent with research from similar low- and middle-income contexts, where nursing students often display limited retention of key BLS protocols despite positive attitudes and prior exposure [7, 8]. Misconceptions observed in our study, such as the incorrect belief that simulated breaths are always necessary or that CPR is limited to hospital settings, underline the gap between theoretical knowledge and practical application. Significant associations were found between BLS awareness and demographic variables. Male students were more likely to demonstrate adequate awareness (p=0.001), while students aged 41–50 years and those with more than five years of clinical experience also

DOI: https://doi.org/10.54393/pbmj.v8i7.1277

had better awareness scores (p=0.04 and p=0.001, respectively). Additionally, second-year students outperformed first-year students, suggesting the cumulative impact of clinical exposure and academic progression. These results align with Benner's "novice to expert" theory, where increasing clinical experience enhances decision-making and procedural confidence [9, 10]. Moreover, the observed gender difference may reflect a confidence gap, where male students tend to rate their competence higher despite comparable performance, an effect widely noted in health sciences education [11, 12]. Encouragingly, student attitudes toward BLS were overwhelmingly positive. A majority (97.0%) supported mandatory BLS inclusion in the curriculum, and 75.1% believed CPR training should be compulsory. These findings indicate strong learner motivation and receptivity, providing a favorable foundation for curricular interventions. In addition to these findings, global literature reinforces the importance of structured, simulation-based, and recurring BLS training. Studies from Saudi Arabia, India, and Malaysia have shown that team-based simulation combined with debriefing and skill assessments significantly improves both knowledge retention and emergency responsiveness among nursing students [9, 13]. Recurring refresher courses, particularly those delivered every six months, have been shown to reduce skill degradation, especially in CPR techniques like compression depth and rhythm [14]. Research also confirms that simulation-based training improves students' confidence and self-efficacy, enabling them to act more decisively in high-stress scenarios [18]. Institutional support plays a pivotal role. Evidence suggests that policy-driven mandates for BLS certification and its integration into inter-professional education (IPE) platforms can promote collaborative preparedness, especially in resource-constrained settings [19-21]. A recent meta-analysis concluded that structured BLS training leads to significantly better patient outcomes both pre-hospital and in-hospital, particularly when supported by adequate infrastructure and ongoing mentorship [18]. Taken together, these findings emphasize that while foundational awareness exists, true competence in BLS requires recurrent hands-on training, institutional commitment, and modern pedagogical strategies. As such, this study contributes to the growing call for curriculum redesign, simulation integration, and continuous professional development in emergency care education for nurses. Convenience sampling and self-reported data may limit generalizability and accuracy. The absence of hands-on skills testing restricts assessment of actual proficiency, and the cross-sectional design prevents evaluation of long-term retention.

CONCLUSIONS

Post-RN BScN students in Sindh demonstrated good foundational awareness and positive attitudes toward BLS, yet lacked adequate technical proficiency in key CPR components like CAB sequence, compression depth, and the 30:2 ratio. Higher self-rated competence was linked to factors such as gender, age, experience, and academic progression. Persistent misconceptions and confidence gaps highlight the need for practical, simulation-based BLS training and regular refreshers to improve clinical preparedness. Curricula should integrate simulation-based BLS training with periodic assessments. Gender-specific confidence-building, policy-level mandates for certification, and longitudinal studies on skill retention are essential to strengthen nursing education and improve emergency outcomes.

Authors Contribution

Conceptualization: LKK, KNM, FS
Methodology: KNM
Formal analysis: FS
Writing review and editing: CL, RA, JK, RD, NNA

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Irfan B, Zahid I, Khan MS, Khan OA, Zaidi S, Awan S, Bilal S, *et al.* Current State of Knowledge of Basic Life Support in Health Professionals of the Largest City in Pakistan: A Cross-Sectional Study. BMC Health Services Research. 2019 Nov; 19(1): 865. doi: 10.1186/s12913-019-4676-y.

[2] Bdiri Gabbouj S, Zedini C, Naija W. Effect of Simulation-Based Education of Adult BLS-CPR on Nursing Students' Skills and Knowledge Acquisition. Advances in Medical Education and Practice. 2025 Dec; 663–73. doi: 10.2147/AMEP.S500156.

[3] Imran M, Kumar J, Mukhtar T. Effectiveness of Basic Life Support Training Workshop among Nurses: A Quasi-Experimental Study: Effectiveness of Basic Life Support Training. Pakistan Journal of Health Sciences. 2023 May; 58–62. doi: 10.54393/pjhs.v4i05.745.

[4] Habibli T, Ghezeljeh TN, Haghani S. The Effect of Simulation-Based Education on Nursing Students'

DOI: https://doi.org/10.54393/pbmj.v8i7.1277

Knowledge and Performance of Adult Basic Cardiopulmonary Resuscitation: A Randomized Clinical Trial. Nursing Practice Today. 2020 Apr. doi: 10.18502/npt.v7i2.2730.

[5] Fahajan Y, Emad OJ, Albelbeisi AH, Albelbeisi A, Shnena YA, Khader A, Kakemam E, *et al.* The Effect of a Simulation-Based Training Program in Basic Life Support on the Knowledge of Palestinian Nurses: A Quasi-Experimental Study in Governmental Hospitals. BMC Nursing. 2023 Oct;22(1): 398. doi: 10.1186/s12912-023-01552-x.

[6] Iyeke L, Moss R, Hall R, Wang J, Sandhu L, Appold B, Kalontar E, *et al.* Reducing Unnecessary 'Admission' Chest X-Rays: An Initiative to Minimize Low-Value Care. Cureus. 2022 Oct; 14(10): doi: 10.7759/cureus.29817.

[7] Lee YS, Komar J, Chia MY. Physical Activity Measurement Methodologies: A Systematic Review in the Association of South East Asian Nations (ASEAN). Sports. 2021 May;9: 69. doi: 10.3390/sports9050069.

[8] Berz K, Rhine T, Pomerantz WJ, Zhang Y, Loftus K, Lyons S, Logan K, *et al.* An Intervention to Improve Knowledge and Increase Comfort of Concussion Management among School Medical Staff. Nurse Education Today. 2022 Feb; 109: 105247. doi: 10.1016/j.nedt.2021.105247.

[9] Hernández-Padilla JM, Suthers F, Granero-Molina J, Fernández-Sola C. Effects of Two Retraining Strategies on Nursing Students' Acquisition and Retention of BLS/AED Skills: A Cluster Randomized Trial. Resuscitation. 2015 Aug; 93: 27–34. doi: 10.1016/j.resuscitation.2015.05.008.

[10] Li Q, Lin J, Fang LQ, Ma EL, Liang P, Shi TW, Xiao H, *et al.* Learning Impacts of Pretraining Video-Assisted Debriefing with Simulated Errors or Trainees' Errors in Medical Students in Basic Life Support Training: A Randomized Controlled Trial. Simulation in Healthcare. 2019 Dec; 14(6): 372–7. doi: 10.1097/SIH.0000000000000391.

[11] Knott JC, Taylor DM, Simon EL. Conference Presentations: A Research Primer for Low- and Middle-Income Countries. African Journal of Emergency Medicine. 2020 Jan;10: S158–60. doi: 10.1016/j.afjem.2020.05.002.

[12] Ko YC, Lin HY, Chiang WC, Yang CW, Hsieh MJ, Ma MH. Comparing the Effects of Blended Learning and Traditional Instruction on Basic Life Support for Laypersons: A Randomized Controlled Trial. Journal of the Formosan Medical Association. 2024 Jun; 123(6): 687–92. doi: 10.1016/j.jfma.2023.10.017.

[13] McCaw JM, Yelton SE, Tackett SA, Rapal RM, Gamalinda AN, Arellano-Reyles A, Tupas GD, *et al.* Effect of Repeat Refresher Courses on Neonatal Resuscitation Skill Decay: An Experimental Comparative Study of In-Person and Video-Based Simulation Training. Advances in Simulation. 2023 Feb; 8(1): 7. doi: 10.1186/s41077-023-00252-5.

[14] Al-Worafi YM, Siddique A, Ming LC, Dhabali AA. Nursing Education, Practice, and Research in India. In: Handbook of Medical and Health Sciences in Developing Countries: Education, Practice, and Research. Cham: Springer International Publishing; 2024 Mar; 1–32. doi: 10.1007/978-3-030-74786-2_503-1.

[15] Saidu A. Factors Associated with Basic Life Support Knowledge Among Resource-Limited Hospital Nurses: A Cross-Sectional Study in North-Western Nigeria. South Asian Research Journal of Nursing and Health Care. 2024; 6(5): 138–45. doi: 10.36346/sarjnhc.2024.v06i05.013.

[16] Bajwa HS, Afzal M, Yaqoob A. The Knowledge Among Nursing Students Regarding Basic Life Support at a Private School of Nursing in Lahore, Pakistan. Education. 2020; 52: 86–67.

[17] Morse JC, Brown CW, Morrison I, Wood C. Interprofessional Learning in Immediate Life Support Training Does Effect TEAM Performance During Simulated Resuscitation. BMJ Simulation and Technology Enhanced Learning. 2019 Sep; 5(4): 204. doi: 10.1136/bmjstel-2018-000394.

[18] Umuhoza C, Chen L, Unyuzumutima J, McCall N. Impact of Structured Basic Life-Support Course on Nurses' Cardiopulmonary Resuscitation Knowledge and Skills: Experience of a Paediatric Department in Low-Resource Country. African Journal of Emergency Medicine. 2021 Sep;11(3): 366–71. doi: 10.1016/j.afjem.2021.03.014.

[19] Amattayakong C, Klunklin A, Kunawiktikul W, Kuntaruksa K, Turale S. Wellness Among Nursing Students: A Qualitative Study. Nurse Education in Practice. 2020 Oct; 48: 102867. doi: 10.1016/j.nepr.2020.102867.

[20] Bajwa M, Najeeb F, Alnazzawi H, Ayub A, Bell JG, Sadiq F, *et al.* A Scoping Review of Pakistani Healthcare Simulation: Insights for Lower-Middle-Income Countries. Cureus. 2024 Dec; 16(12): doi: 10.7759/cureus.76485.

[21] Kithuci RK. A Model for Integrating Interprofessional Education in the Training of Health Professionals at Jomo Kenyatta University of Agriculture and Technology (Doctoral Dissertation, JKUAT-COHES). 2022.

DOI: https://doi.org/10.54393/pbmj.v8i7.1268

PAKISTAN BIOMEDICAL JOURNAL

https://www.pakistanbmj.com/journal/index.php/pbmj/index

ISSN (E): 2709-2798, (P): 2709-278X

Volume 8, Issue 07 (July 2025)

Original Article

Comparison of Upper Limb Weakness among Drivers and Non-Drivers

Fatima Mazhar[1*], Arbab Ali Bajwa[1], Badar Hamza[1], Muhammad Faizan Ibrar[1], Erum Ghaffar[1], Rimsha Tariq[1] and Aneeqa Aqdas[1]

[1]Faculty of Allied Health Sciences, Hajvery University, Lahore, Pakistan

ARTICLE INFO

Keywords:

Upper Extremity, Muscle Strength, Automobile Driving, Occupational Health, Range of Motion, Hand Strength, Comparative Study

How to Cite:

Mazhar, F., Bajwa, A. A., Hamza, B., Ibrar, M. F., Ghaffar, E., Tariq, R., & Aqdas, A. (2025). Comparison of Upper Limb Weakness among Drivers and Non-Drivers: Upper Limb Weakness among Drivers and Non-Drivers. Pakistan BioMedical Journal, 8(7), 32-36. https://doi.org/10.54393/pbmj.v8i7.1268

***Corresponding Author:**

Fatima Mazhar

Faculty of Allied Health Sciences, Hajvery University, Lahore, Pakistan

drfatimamazhar@gmail.com

Received Date: 6th June, 2025

Revised Date: 20th July, 2025

Acceptance Date: 24th July, 2025

Published Date: 31st July, 2025

ABSTRACT

The strength of the upper limbs is crucial for performing daily activities, and prolonged working hours, such as driving, can lead to muscle weakness. Muscle activity may be impacted by repetitive movements of the upper limb, posture, and vibrations to which the drivers are exposed. The evaluation of upper limb weakness in groups of drivers and non-drivers can be used to gain insight into the occupational effects of this condition and possible preventive measures. **Objective:** To compare upper limb weakness among drivers and non-drivers. **Methods:** This comparative cross-sectional study was conducted on 54 male respondents (27 drivers and 27 non-drivers) who were recruited by a convenience sampling method. MMT was applied to evaluate the upper limb strength. SPSS version 27.0 was used to analyze data. **Results:** A total of 54 participants were included, evenly divided between drivers (n=27) and non-drivers (n=27). The majority were middle-aged, with the largest proportion aged 46–55 years (29.6%), and most participants were right-handed (79.6%). There were no statistically significant differences in upper limb muscle strength between drivers and non-drivers across shoulder, elbow, and wrist movements ($p>0.05$). However, shoulder adduction showed a notable trend, with 48.1% of non-drivers exhibiting normal strength (Grade 5) compared to only 14.8% of drivers ($p=0.054$). Elbow flexion also favoured non-drivers (40.7% vs. 29.6% with Grade 5 strength), though the difference was not significant ($p=0.378$). Most strength grades across all movements fell within Grade 4 (against some resistance) for both groups. **Conclusion:** It was concluded that there were significant differences in upper limb strength between drivers and non-drivers.

INTRODUCTION

Upper Limb Musculoskeletal Disorders (ULMSDs) significantly affect daily function and occupational performance, commonly presenting as pain, weakness, or movement restrictions in the shoulders, arms, and hands [1]. Occupational driving, especially among bus and truck drivers, is closely linked with a high prevalence of musculoskeletal disorders due to prolonged sitting, repetitive tasks, and exposure to vibrations [2]. Handgrip strength (HGS) serves as a reliable indicator of muscle function and overall physical status [3, 4]. Research consistently shows that HGS correlates with anthropometric factors such as height, weight, BMI, and arm circumference. Additionally, gender and age influence grip strength, with males generally showing higher values and a noticeable decline with ageing. These findings are crucial for evaluating fitness, especially in elderly and athletic populations [5, 6]. Drivers are particularly prone to musculoskeletal issues in the upper body due to ergonomic stressors, poor road conditions, and limited rest, leading to conditions like neck, shoulder, and arm pain. Comparatively, non-drivers also report musculoskeletal complaints, though their risk factors may vary depending on occupation and lifestyle. Studies suggest that long-term drivers are significantly more likely to develop musculoskeletal issues compared to non-drivers, highlighting the cumulative risk of occupational exposure

DOI: https://doi.org/10.54393/pbmj.v8i7.1268

[7-9]. Ergonomic challenges such as awkward postures and environmental stressors further exacerbate upper limb discomfort in drivers. Understanding hand dominance also plays a role in muscle assessment, as dominant limbs typically exhibit greater strength. These insights underline the need for tailored intervention and prevention strategies in both driver and non-driver populations [10-12]. Ultimately, ULMSDs pose not only physical health risks but also broader social and economic impacts, including reduced work ability and increased absenteeism. Developing effective prevention programs that consider anthropometric, occupational, and ergonomic factors is essential for improving health outcomes and work performance across different populations [13]. Given the high prevalence of ULMSDs among drivers and non-drivers, this study aims to provide a comparative analysis of upper limb weakness in these two populations. This study aims to bridge this gap by analyzing and comparing the patterns of upper limb strength and the contributing factors in both groups, providing valuable insights for preventative and rehabilitative strategies specific to the population of Lahore [14-16].

There is limited research specifically comparing upper limb weakness among drivers and non-drivers, particularly in the context of Lahore. Most prior studies focus on lower back strain or posture, leaving a gap in understanding the occupational impact on upper limb musculature, especially in regional populations like Pakistan. This study aimed to compare upper limb weakness among drivers and non-drivers.

METHODS

A comparative cross-sectional study was conducted from March 2025- May 2025 in Lahore. A convenient sampling technique was used. A total of 54 participants from Lahore participated in this study. The sample size was calculated using "Raosoft". The target population for this study includes drivers and non-drivers in Lahore, Pakistan. A total of 54 male participants (27 drivers and 27 non-drivers) were assessed. Each participant underwent an evaluation of Manual Muscle Testing (MMT) to determine upper limb strength. Standardized procedures will be followed to ensure consistency. The assessments will be conducted at workplaces, transport hubs, and community settings. A self-administered structured questionnaire will be used to document participant details and assessment results, including: Demographic information included age and dominant hand (for drivers). Manual Muscle Testing (MMT): Assessed for key upper limb muscles (shoulder, elbow, wrist flexors/extensors), rated on a scale from 0 (no contraction) to 5 (normal strength). Shoulder (flexion, extension, abduction, adduction, internal and external rotation): Participants were seated or supine based on the specific movement tested. Each movement was tested separately using standard MMT grading (0–5 scale). Resistance was applied manually by the examiner:

Grade 5: Full range of motion (ROM) against maximum resistance,
Grade 4: Full ROM against moderate resistance,
Grade 3: Full ROM against gravity but without resistance,
Grade 2: Full ROM with gravity eliminated,
Grade 1: Flicker or trace contraction with no movement and
Grade 0: No visible or palpable contraction.

For elbow (Flexion and Extension) participants were tested in a seated position with the shoulder in neutral. Elbow flexion was tested with forearm supinated, and extension with the shoulder flexed to 90°. Resistance was applied at the distal forearm using the same grading scale (0–5).

Wrist (Flexion and Extension): Participants' forearms rested on a table with the hand over the edge. For flexion, the palm faced upward; for extension, downward. Manual resistance was applied over the metacarpals, and strength was graded using the MMT scale. All assessments were performed bilaterally, and the higher grade was recorded for analysis [17].

RESULTS

To evaluate upper limb strength differences between drivers and non-drivers, focusing on muscle strength and functional capacity across shoulder, elbow, and wrist movements. A total of 54 participants were included, with an equal distribution of drivers (50%, n=27) and non-drivers (50%, n=27). The sample predominantly comprised middle-aged individuals, with the largest age group being 46–55 years (29.6%, n=16), followed by 36–45 years (27.8%, n=15). Younger participants aged 18–25 years were the least represented (9.3%, n=5). Hand dominance skewed heavily toward right-handedness (79.6%, n=43), while left-handed participants constituted 20.4% (n=11). Driving experience varied significantly: half of the participants reported no driving experience (50%, n=27), whereas 20% (n=11) had 6–10 years of experience, and only 13% (n=7) fell into the 1–5 years category. This demographic distribution highlights a balanced sample for comparing occupational drivers and non-drivers, though further stratification by age or experience may be warranted in future studies (Table 1).

Table 1: Demographic Characteristics of Study Participants (n=54)

Variables	Category	Frequency (%)
Age Group (Years)	18–25	5 (9.3%)
	36–45	15 (27.8%)
	46–55	16 (29.6%)
	Other (Not Reported)	18 (33.3%)

DOI: https://doi.org/10.54393/pbmj.v8i7.1268

Hand Dominance	Right-Handed	43 (79.6%)
	Left-Handed	11 (20.4%)
Driving Experience	None	27 (50.0%)
	1–5 Years	7 (13.0%)
	6–10 Years	11 (20.4%)
	Other/Not Specified	9 (16.6%)

The chi-square analysis revealed no statistically significant differences in upper limb muscle strength between drivers and non-drivers across all tested movements ($p>0.05$). This suggests that occupational driving was not associated with measurable variations in manual muscle testing grades in this study population. However, some noteworthy trends emerged. Shoulder adduction exhibited the most marked difference, with 48.1% of non-drivers demonstrating normal strength (Grade 5) compared to only 14.8% of drivers. Although this finding did not reach statistical significance ($p=0.054$), it approached the conventional threshold and may indicate a potential area of functional asymmetry or strain among drivers, warranting further investigation. Similarly, elbow flexion showed a higher proportion of non-drivers with normal strength (40.7%) compared to drivers (29.6%), though the difference was not significant ($p=0.378$). In contrast, other shoulder and wrist movements demonstrated relatively balanced distributions between the two groups, with most participants exhibiting strength graded as "against some resistance" (Grade 4) (Table 2).

Table 2: Comparison of Upper Limb Strength by Group (Drivers vs. Non-Drivers)

Joint Movement	MMT Grade	Driver (n=27)	Non-Driver (n=27)	p-Value
Shoulder Flexion	5 – Normal	7 (25.9%)	10 (37.0%)	0.543
	4 – Against Resistance	12 (44.4%)	12 (44.4%)	
	3 – Against Gravity	8 (29.6%)	5 (18.5%)	
Shoulder Extension	5 – Normal	6 (22.2%)	9 (33.3%)	0.657
	4 – Against Resistance	12 (44.4%)	10 (37.0%)	
	3 – Against Gravity	9 (33.3%)	8 (29.6%)	
Shoulder Abduction	5 – Normal	7 (25.9%)	10 (37.0%)	0.120
	4 – Against Resistance	14 (51.9%)	16 (59.3%)	
	3 – Against Gravity	6 (22.2%)	1 (3.7%)	
Shoulder Adduction	5 – Normal	4 (14.8%)	13 (48.1%)	0.004
	4 – Against Resistance	10 (37.0%)	11 (40.7%)	
	3 – Against Gravity	13 (48.1%)	3 (11.1%)	
Shoulder External Rotation	5 – Normal	5 (18.5%)	7 (25.9%)	0.499
	4 – Against Resistance	11 (40.7%)	13 (48.1%)	
	3 – Against Gravity	11 (40.7%)	7 (25.9%)	
Shoulder Internal Rotation	5 – Normal	6 (22.2%)	10 (37.0%)	0.491
	4 – Against Resistance	15 (55.6%)	12 (44.4%)	
	3 – Against Gravity	6 (22.2%)	5 (18.5%)	
Elbow Flexion	5 – Normal	8 (29.6%)	11 (40.7%)	0.182
	4 – Against Resistance	12 (44.4%)	14 (51.9%)	
	3 – Against Gravity	7 (25.9%)	2 (7.4%)	
Elbow Extension	5 – Normal	6 (22.2%)	9 (33.3%)	0.598
	4 – Against Resistance	12 (44.4%)	9 (33.3%)	
	3 – Against Gravity	9 (33.3%)	9 (33.3%)	
Wrist Flexion	5 – Normal	8 (29.6%)	11 (40.7%)	0.603
	4 – Against Resistance	14 (51.9%)	13 (48.1%)	
	3 – Against Gravity	5 (18.5%)	3 (11.1%)	
Wrist Extension	5 – Normal	8 (29.6%)	10 (37.0%)	0.845
	4 – Against Resistance	11 (40.7%)	10 (37.0%)	
	3 – Against Gravity	8 (29.6%)	7 (25.9%)	
Radial Deviation	5 – Normal	8 (29.6%)	10 (37.0%)	0.845
	4 – Against Resistance	11 (40.7%)	10 (37.0%)	
	3 – Against Gravity	8 (29.6%)	7 (25.9%)	
Ulnar Deviation	5 – Normal	8 (29.6%)	11 (40.7%)	0.603
	4 – Against Resistance	14 (51.9%)	13 (48.1%)	
	3 – Against Gravity	5 (18.5%)	3 (11.1%)	

In summary, the results highlight variability in upper limb strength across joint-specific movements, with "some resistance" being the most frequent outcome. The balanced sample of drivers and non-drivers, coupled with detailed demographic and strength data, sets the stage for deeper investigations into occupational ergonomics and musculoskeletal health. These findings emphasize the need for longitudinal studies to assess causality and interventions targeting strength preservation in occupational groups.

DISCUSSION

Utilizing Manual Muscle Testing (MMT), we assessed the functional capacity of 54 participants, equally divided between drivers and non-drivers. The demographic distribution was predominantly middle-aged individuals, with a significant majority being right-handed. The findings indicated that most participants exhibited muscle strength categorized as "some resistance" across various joint movements. Notably, drivers demonstrated marginally higher resistance in shoulder and elbow motions, potentially linked to repetitive occupational demands, while non-drivers showed slightly better normative strength in wrist movements. These observations underscore the importance of ergonomic interventions for drivers to mitigate musculoskeletal strain. The use of MMT in this study aligns with its recognized utility in assessing muscle strength in clinical settings. Newnam *et al.* highlighted the diagnostic potential of MMT in upper limb disorders, emphasizing its inter-rater reliability when standardized protocols are followed. Their study found a significant association between reduced muscle strength and the presence of symptoms, reinforcing the relevance of MMT in evaluating musculoskeletal conditions [17]. Furthermore, the observed decline in muscle strength with increasing age in our study is consistent with findings from

DOI: https://doi.org/10.54393/pbmj.v8i7.1268

Cronin et al. who reported age-related decreases in muscle strength, particularly in the upper limbs. This correlation underscores the importance of considering age as a factor in musculoskeletal assessments [18]. The specific finding of reduced shoulder adduction strength among drivers resonates with the study by Dhara *et al.* which demonstrated that sudden steering maneuvers could load the rotator cuff muscles beyond their repair limits. This biomechanical stress may contribute to the observed muscle strength disparities in drivers [19]. The questionnaire employed in this study was designed to capture demographic information, driving experience, and self-reported musculoskeletal symptoms. This approach mirrors the methodology used by Dhananjaya *et al.* who emphasized the importance of integrating subjective assessments with objective measures like MMT to obtain a comprehensive understanding of a patient's functional status. Their study validated the use of questionnaires in conjunction with MMT to enhance the accuracy of musculoskeletal evaluations. By incorporating similar questions, our study ensured the collection of relevant data that could be directly compared with established research, thereby strengthening the validity of our findings [20]. This study contributes to the existing body of knowledge by highlighting the differences in upper limb muscle strength between drivers and non-drivers. The findings are consistent with previous research, reinforcing the impact of occupational activities on musculoskeletal health. The use of MMT, supported by validated questionnaires, provides a reliable framework for assessing muscle strength and identifying individuals at risk of musculoskeletal strain.

CONCLUSIONS

This study concluded that there were significant differences in upper limb strength between drivers and non-drivers. The use of MMT, supported by validated questionnaires, provides a reliable framework for assessing muscle strength and identifying individuals at risk of musculoskeletal strain.

Authors Contribution

Conceptualization: FM, AAB, BH, MFI
Methodology: FM, AAB
Formal analysis: FM, AAB, BN, MFI
Writing review and editing: FM, AAB, BH, MFI, EG, RT, AA

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Guerreiro MM. Upper Limb Musculoskeletal Symptoms in Assembly Line Workers (Doctoral dissertation, Universidade NOVA de Lisboa (Portugal)). 2021.

[2] Emkani M, Hashemi Nejad N, Jalilian H, Gholami M, Sadeghi N, Rahimimoghadam S. Exposure to Whole Body Vibration in Heavy Mine Vehicle Drivers and Its Association with Upper Limbs Musculoskeletal Disorders. Journal of Occupational Health and Epidemiology. 2016 Oct; 5(4): 226-34. doi: 10.18869/acadpub.johe.5.4.226.

[3] Vaishya R, Misra A, Vaish A, Ursino N, D'Ambrosi R. Hand Grip Strength as A Proposed New Vital Sign of Health: A Narrative Review of Evidences. Journal of Health, Population and Nutrition. 2024 Jan; 43(1): 7. doi: 10.1186/s41043-024-00500-y.

[4] Lee SY. Handgrip Strength: An Irreplaceable Indicator of Muscle Function. Annals of Rehabilitation Medicine. 2021 Jun; 45(3): 167-9. doi: 10.5535/arm.21106.

[5] Sh T, Haghighat F, Piroozi S, Karimi A, Khanali Nejad D. The Survey and Comparison of Musculoskeletal Disorders of Shoulder, Arm and Hand in Taxi and Bus Drivers in the City of Shiraz in 2016. Archives of Rehabilitation. 2018; 19(1): 64-75. doi: 10.21859/j rehab.19.1.64.

[6] Ahmadi Asour A, Mehri F, Fasih-Ramandi F, Karimi A. Prevalence of Musculoskeletal Disorders in Iranian Truck Drivers and Its Association with Road Accidents. Journal of Occupational Health and Epidemiology. 2022 Apr; 11(2): 106-13. doi: 10.52547/johe.11.2.106.

[7] Roman-Liu D and Tokarski T. Upper Limb Strength in Relation to Upper Limb Posture. International Journal of Industrial Ergonomics. 2005 Jan; 35(1): 19-31. doi: 10.1016/j.ergon.2004.07.002.

[8] Mungai G. Physiological Conditioning in Motorsports Athletes: A Systematic Review. 2025.

[9] Glenn TL, Mabry JE, Hickman JS. A Catalog of Health and Wellness Programs for Commercial Drivers. 2022.

[10] Van Harlinger W, Blalock L, Merritt JL. Upper Limb Strength: Study Providing Normative Data for A Clinical Handheld Dynamometer. Physical Medicine and Rehabilitation. 2015 Feb; 7(2): 135-40. doi: 10.1016/j.pmrj.2014.09.007.

[11] Stinchcombe A, Hopper S, Mullen N, Bedard M. Canadian Older Adults' Perceptions of Transitioning from Driver to Non-Driver. Occupational Therapy in

DOI: https://doi.org/10.54393/pbmj.v8i7.1268

Health Care. 2024 Jan; 38(1): 110-30. doi: 10.1080/07380577.2021.1936338.

[12] Unsworth C, Dickerson A, Gélinas I, Harries P, Margot-Cattin I, Mazer B *et al.* Linking People and Activities Through Community Mobility: An International Comparison of the Mobility Patterns of Older Drivers and Non-Drivers. Ageing &and Society. 2022 Aug; 42(8): 1938-63. doi: 10.1017/S0144686X20001968.

[13] Chae J, Yang G, Park BK, Labatia I. Muscle Weakness and Cocontraction in Upper Limb Hemiparesis: Relationship to Motor Impairment and Physical Disability. Neurorehabilitation and Neural Repair. 2002 Sep; 16(3): 241-8. doi: 10.1177/154596830201600303.

[14] Tahernejad S, Makki F, Bameri A, Zangiabadi Z, Rezaei E, Marzban H. Musculoskeletal Disorders Among Truck Drivers: A Systematic Review and Meta-Analysis. BioMed Central Public Health. 2024 Nov; 24(1): 3146. doi: 10.1186/s12889-024-20611-9.

[15] Altaf S, Malmir K, Mir SM, Olyaei GR, Aftab A, Rajput TA. Prevalence and Associated Risk Factors of Sarcopenia in Community-Dwelling Older Adults in Pakistan: A Cross-Sectional Study. BioMed Central Geriatrics. 2024 Jun; 24(1): 497. doi: 10.1186/s12877-024-05111-0.

[16] Ali H, Husnain A, Talib L, Nosheen I, Islam B, Mahmood H. Comparison of Mirror Therapy and Task-Specific Training on Upper Limb Function in Post-Stroke Patients with Shoulder Pain. Journal of Health, Wellness, and Community Research. 2025 Apr: e102-.

[17] Newnam S and Oxley J. A. Program in Safety Management for The Occupational Driver: Conceptual Development and Implementation Case Study. Safety Science. 2016 Apr; 84: 238-44. doi: 10.1016/j.ssci.2015.12.020.

[18] Cronin J, Lawton T, Harris N, Kilding A, McMaster DT. A Brief Review of Handgrip Strength and Sport Performance. the Journal of Strength and Conditioning Research. 2017 Nov; 31(11): 3187-217. doi: 10.1519/JSC.0000000000002149.

[19] Dhara PC, Sengupta P, De S. Hand Grip Strength of Older Persons in Relation to Body Dimensions and Nutritional Status. Journal of Indian Academy of Geriatrics. 2011 Dec.

[20] Dhananjaya JR, Veena HC, Mamatha BS, Sudarshan CR. Comparative Study of Body Mass Index, Hand Grip Strength, and Handgrip Endurance in Healthy Individuals. National Journal of Physiology, Pharmacy and Pharmacology. 2017 Feb; 7(6): 594-.

DOI: https://doi.org/10.54393/pbmj.v8i7.1270

PAKISTAN BIOMEDICAL JOURNAL

https://www.pakistanbmj.com/journal/index.php/pbmj/index

ISSN (E): 2709-2798, (P): 2709-278X

Volume 8, Issue 07 (July 2025)

Original Article

OPEN ACCESS

Prevalence and Molecular Docking-Based Drug Evaluation of Thyroiditis in Hyderabad, Pakistan

Beenish Khanzada[1*], Areesha Nisar[1], Hamna Saleem[1], Huma Hoor[1], Neha Saleem[1], Muhammad Kaif[1] and Laraib Khan[1]

[1]Department of Biochemistry, University of Sindh, Jamshoro, Sindh, Pakistan

ARTICLE INFO

Keywords:
Thyroiditis, Molecular Docking, Hypothyroidism, Hyperthyroidism

How to Cite:
Khanzada, B., Nisar, A., Saleem, H., Hoor, H., Saleem, N., Kaif, M., & Khan, L. (2025). Prevalence and Molecular Docking-Based Drug Evaluation of Thyroiditis in Hyderabad, Pakistan: Prevalence and Molecular Docking-Based Drug Evaluation . Pakistan BioMedical Journal, 8(7), 37–42. https://doi.org/10.54393/pbmj.v8i7.1270

***Corresponding Author:**
Beenish Khanzada
Department of Biochemistry, University of Sindh, Jamshoro, Sindh, Pakistan
beenish@usindh.edu.pk

Received Date: 21st May, 2025
Revised Date: 15th July, 2025
Acceptance Date: 20th July, 2025
Published Date: 31st July, 2025

ABSTRACT

Thyroiditis, an inflammation of the thyroid gland, is a globally significant health issue, with a prevalence of 5–10% worldwide. In Pakistan, the prevalence of clinical and subclinical hypothyroidism is estimated at 4–5%. **Objectives:** To determine the prevalence, clinical features, and risk factors of thyroiditis in Hyderabad, Pakistan, and to evaluate the drug-protein interactions of commonly used thyroid medications (levothyroxine, methimazole, and propranolol) with thyroid-stimulating hormone (TSH) using molecular docking analysis. **Methods:** This prospective, observational, cross-sectional study included 72 patients aged 18 to 65 years from Hyderabad. Demographic and clinical data were collected through structured questionnaires. Blood samples were analyzed using ELISA to assess biochemical markers (T3, T4, TSH). Molecular docking was performed using the PyRx virtual screening tool to evaluate drug interactions with TSH. Statistical analysis was conducted using SPSS version 26.0. **Results:** The majority of patients (68.05%) were between 21–40 years of age, with a predominance of females (81.9%) and rural residents (54.1%). Hypothyroidism was the most prevalent condition (47.2%). Significant risk factors included smoking and autoimmune disorders (P=0.045), whereas family history and iodized salt consumption were not significantly associated (P>0.05). Molecular docking revealed that propranolol had the highest binding affinity to TSH (Kd=-6.3), followed by levothyroxine (Kd=-5.3), while methimazole showed the lowest affinity (Kd=-3.7). **Conclusions:** The study concluded a high prevalence of thyroiditis (52.78%; 95% CI: 41.3%–64.3%) in females aged 21–40 from rural areas of Hyderabad. Propranolol exhibited the strongest interaction with TSH, suggesting potential therapeutic implications.

INTRODUCTION

Thyroiditis is defined as the inflammation of the thyroid gland, which can impair its ability to function properly, leading to changes in hormone production. Thyroiditis can result from various causes, including autoimmune disorders, infections, iodine imbalances, or certain medications. This inflammation can lead to either an overproduction (hyperthyroidism) or underproduction (hypothyroidism) of thyroid hormones, affecting the metabolic and hormonal balance of the body. Thyroiditis may cause symptoms such as pain or swelling in the neck, fatigue, weight changes, and changes in heart rate, among others. The most common forms of thyroiditis are Hashimoto's thyroiditis, Graves' disease, subacute thyroiditis, and postpartum thyroiditis [1]. Hashimoto's thyroiditis is an autoimmune condition that leads to hypothyroidism; women are 5 to 10 times more likely to be affected, with the highest incidence occurring between the ages of 50 and 60 [2] A family history of autoimmune diseases, iodine excess or deficiency, and environmental factors such as radiation exposure are significant risk factors of Hashimoto's thyroiditis. Graves' disease, another autoimmune disorder, is the leading cause of hyperthyroidism. Women between the ages of 30 and 50 and associated with genetic susceptibility, stress, and environmental triggers such as smoking are linked to higher risk [3]. Subacute thyroiditis (also known as De

DOI: https://doi.org/10.54393/pbmj.v8i7.1270

Quervain's thyroiditis) is a transient inflammatory condition often triggered by viral infections, such as those following upper respiratory tract infections. It is less common with a typical incidence rate of 1-2 per 100,000 people annually, and is most commonly seen in women aged 20-50 [4]. Postpartum thyroiditis is another autoimmune thyroid disorder that affects approximately 5-10% of women within the first year after childbirth. Women with a family history of thyroid disease or other autoimmune conditions are at higher risk for this condition [5, 6]. Through diet, lack of iodine consumption in developing countries is identified as a major risk factor for hypothyroidism [7] Experimenters have examined Women in their 60s and older, are more likely to have hypothyroidism [8] Later, it can be their periods, lactation, and housework [9]. The thyroiditis threat increases with seafood and iodized salt consumption [10]. To treat hypothyroidism, treatment with levothyroxine (LT4) is first-line [11]. Its start occurs from a low dose and increases gradually every 6-8 weeks [12]. To treat hyperthyroidism, antithyroid drugs like methimazole are the first line of treatment. Propylthiuracil (PTU) is often preferred for pregnant females in their first trimester [13]. In Hashimoto's thyroiditis, a person suffers from hypothyroidism, so standard treatment to normalize by levothyroxine is necessary to suppress TSH levels and tumor growth [14]. This study employs a dual approach combining clinical data with in silico molecular docking to assess thyroiditis burden and identify potential molecular targets. This integration strengthens the translational relevance by linking epidemiological findings with predicted therapeutic insights.

This study aims to conduct molecular docking of selected drugs (levothyroxine, methimazole, and propranolol) with thyroid-stimulating hormone (TSH) to assess their binding affinity and potential molecular interactions.

METHODS

This prospective, observational, cross-sectional study was conducted at Liaquat University Hospital (LUH), Hyderabad, from August 2024 to January 2025, to determine the prevalence, risk factors, and clinical characteristics of thyroiditis. In addition, an in silico molecular docking analysis was performed to evaluate drug interactions with thyroid-related proteins, aiming to identify potential therapeutic targets. Ethical approval was obtained from the Ethical Committee of the Institute of Biochemistry, University of Sindh, Jamshoro (Ref. No: IOB/264/2024). Written and verbal informed consent was obtained from all participants. A total of 72 patients aged 18–65 years with clinical signs of thyroid dysfunction were enrolled, primarily from the outpatient department (85–90%) and some from admitted wards. Exclusion criteria included individuals under 18 years of age, those with prior radiation exposure or thyroid surgery, and patients with severe chronic illnesses (excluding comorbid diabetes, autoimmune, or psychiatric conditions related to thyroid function). Each participant underwent a physical examination for common thyroid-related symptoms, including weight changes, neck swelling, tremors, arrhythmias, and heart rate abnormalities. Demographic and clinical data including menstrual irregularities, postpartum depression, family history of thyroid disorders, iodine intake, smoking habits, and comorbidities—were collected using a structured questionnaire. The sample size was calculated based on the expected prevalence of thyroiditis in the local population, ensuring adequate statistical power. Venous blood samples (5 mL) were collected from each participant to assess serum levels of TSH, FT3, and FT4 using ELISA kits. Based on hormone profiles, patients were categorized as hypothyroid, hyperthyroid, or euthyroid. For molecular docking, thyroid-stimulating hormone (TSH, PDB ID: 7XW5) was retrieved from the Protein Data Bank. Levothyroxine (CID: 5819), Methimazole (CID: 1349907), and Propranolol (CID: 4946) were obtained from PubChem in SDF format. Structures were prepared using Discovery Studio Visualizer by removing water molecules and heteroatoms, followed by conversion to PDBQT format. PyRx with AutoDock Vina was used to perform docking and calculate binding affinities using an empirical scoring function. Results (Kd values) were exported in CSV format, and 2D and 3D interaction images were generated using Discovery Studio. Data were analyzed using SPSS version 26.0. Frequencies and percentages were calculated for demographic and clinical variables. The Chi-square test was used to assess associations between risk factors and thyroid status. A p-value < 0.05 was considered statistically significant.

RESULTS

The socio-demographic analysis shows that the majority of patients (68.05%) were aged 21–40 years, and this age group had a significantly higher association with thyroiditis ($p = 0.000$). Based on thyroid function test results, the overall prevalence of thyroiditis among the study participants was 52.78%. The 95% confidence interval (CI) for this prevalence was calculated as 41.3% to 64.3%, indicating a moderately wide interval due to the sample size. Among specific conditions, hypothyroidism was the most prevalent form at 47.2% (95% CI: 35.3%–59.3%), followed by hyperthyroidism at 41.6% (95% CI: 29.9%–54.2%), and euthyroidism at 11.1% (95% CI: 4.9%–20.7%), table 1.

DOI: https://doi.org/10.54393/pbmj.v8i7.1270

Table 1: Demographic and Clinical Characteristics of Study Participants with Statistical Comparison Based on Thyroiditis Presentation

Demographics	Frequency (%)	p-Value
Age		
≤ 20	3 (4.2%)	0.000
21 – 40	49 (68.05%)	
41 – 60	16 (22.2%)	
≥ 61	4 (5.5%)	
Gender		
Male	13 (18.05%)	0.9
Female	59 (81.9%)	
Marital Status		
Single	13 (18%)	0.001
Married	59 (81.9%)	
Thyroid Status Distribution		
Hyperthyroidism	30 (41.6%)	0.001
Hypothyroidism	34 (47.2%)	
Euthyroidism	8 (11.11%)	

Subacute thyroiditis typically shows normal or slightly elevated T3/T4 levels with low or normal TSH, often due to viral infections. Postpartum thyroiditis involves fluctuating TSH levels, initially low (hyperthyroid phase) and later elevated (hypothyroid phase), with fluctuating or low T3/T4 during the hypothyroid phase. However, these types were not seen to be more prevalent as compared to hypo and hyper conditions of thyroid disease.

The different types of thyroiditis that compared the mean ± standard deviation of biochemical parameters TSH, T3, and T4. If ove rt hyperthyroid, TSH (12.3 ±4.997) levels were low, indicating the suppression of the pituitary gland. T3 (1.06 ± 0.1682) and T4 (7.53 ± 0.757) levels were relatively stable, showing the mild or controlled form of hyperthyroidism. In subacute hyperthyroid, TSH (5.58 ± 17.97) levels were low, and T3 (6.26 ± 8.938) and T4 (55.7 ± 116.86) levels were elevated, which shows the release of more thyroid hormone due to subacute, (Table 2).

Table 2: Biochemical Parameters of Thyroiditis

Para-meters	Over Hyperthyroid (Mean ± S.D)	Subacute Hyperthyroid (Mean ± S.D)	Primary Hypothyroid (Mean ± S.D)	Hashimoto's Hypothyroid (Mean ± S.D)
TSH	12.3 ± 4.997	5.58 ± 17.97	19.0 ± 15.70	29.5 ± 36.61
T3	1.06 ± 0.1682	6.26 ± 8.938	13.7 ± 27.08	5.057 ± 8.015
T4	7.53 ± 0.757	55.7 ± 116.86	5.011 ± 3.940	54.6 ± 71.33

Smoking has been identified as a significant environmental risk factor (p value=0.045) for autoimmune thyroid diseases (AITDs), particularly Graves' disease, due to its complex effects on immune regulation and thyroid function (Table 3).

Table 3: Risk Factors of Thyroiditis

Risk Factors	Group	Frequency	p-Value
Family History	Yes	9 (12.5%)	0.136
	No	63 (87.5%)	
Smoking Status	Smokers	4 (5.55%)	0.045*
	Non-Smokers	68 (94.4%)	
Iodized Salt	Consumers	29 (40.2%)	1
	Non-Consumers	43 (59.7%)	

A total of 72 patients participated in the study. Among hyperthyroid patients, 55.5% patients reported heat intolerance, 22.2% of them had moist skin and 22.3% experienced thyroid neck pain. For the hypothyroid patients, majority experienced dry skin (38%) and hair loss (32%). Among the Euthyroid patients, 62.5% experienced neck or throat discomfort, 12.5% had neck swelling, and 25% showed weight fluctuation (Table 4).

Table 4: Clinical Symptoms Observed Among Patients with Different Thyroid Conditions (n=72)

Thyroid Status	Symptom	No. of Patients (n)
Hyperthyroidism	Heat intolerance	10 (55.5%)
	Moist skin	4 (22.2%)
	Neck pain	4 (22.3%)
Hypothyroidism	Cold skin	20 (29.4%)
	Dry skin	26 (38.2%)
	Hair loss	22 (32.35%)
Euthyroidism	Neck or throat discomfort	5 (62.5%)
	Neck swelling	1 (12.5%)
	Weight fluctuation	2 (25%)

Distribution of therapeutic drugs prescribed to thyroiditis patients in Hyderabad hospitals, highlighting the frequent use of levothyroxine for hypothyroidism, methimazole for hyperthyroidism, and propranolol for symptom management (Figure 1).

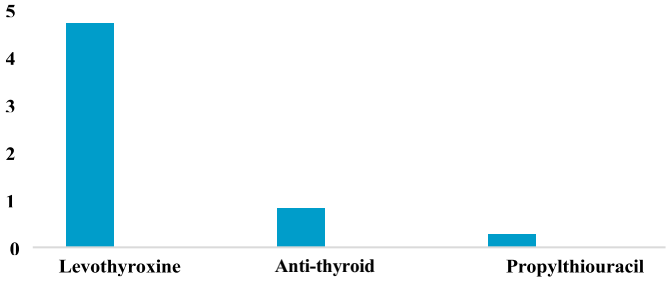


Figure 1: Therapeutic Drug Treatment Against Thyroiditis

As most of the patients in the study suffered from hypothyroidism, so majority received levothyroxine for thyroid treatment. Antithyroid drugs were found to be used as a treatment option for hyperthyroidism patients by decreasing hormone synthesis and secretion from the gland. On the other hand, propylthiouracil was seen to be specifically prescribed to pregnant women. Binding affinities of levothyroxine (CID: 5819), methimazole (CID: 1349907), and propranolol (CID: 4946) docked with Thyroid

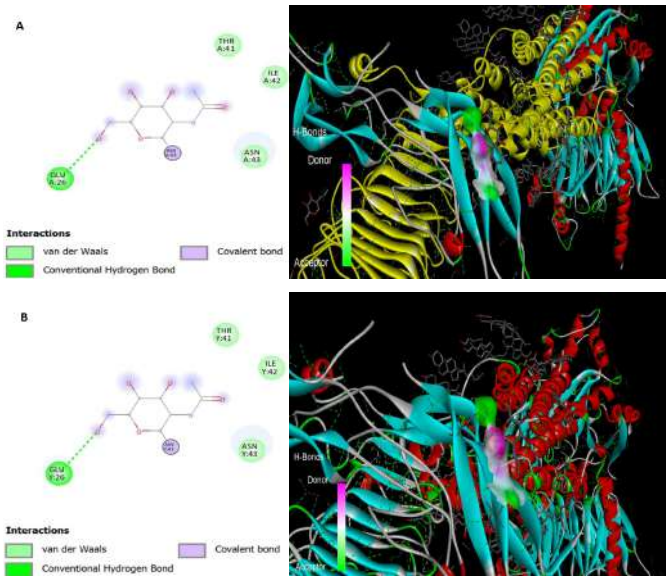
DOI: https://doi.org/10.54393/pbmj.v8i7.1270

Stimulating Hormone (TSH, PDB ID: 7XW5) (Table 5).

Table 5: Binding Affinities of Ligands (Drug) Interaction with Thyroiditis Protein (TSH)

Drug Used	Binding Affinity with TSH (Kd value)
Levothyroxine	-5.2
Methimazole	-3.7
Propranolol	-6.3

Binding affinities were measured in terms of Kd values, lower the Kd value better would be the binding affinity of target with its ligand. Propranolol showed highest binding affinity with TSH (Kd =-6.3), followed by levothyroxine (-5.2), and methimazole showed the least affinity with Kd value of -3.7, with mode "0" showing the best fit orientation when binding to TSH. "A" shows the representation of the 2D and 3D figure of TSH with levothyroxine showing glutamine at position 26 (GLU A:26) to interact by its amide group with levothyroxine, forming a hydrogen bond with hydrophobic interactions. "B" shows the 2D and 3D diagram of methimazole, which is prescribed to hyperthyroidism patients; it consists of a thiourea group that forms hydrogen bonds with the hydroxyl group of glutamic acid (GLU: Y:26). "C" shows the 2D and 3D diagrams of propranolol. The hydroxyl group of propranolol interacts with the amide side chain of asparagine (ASN R:170), stabilizing its hydrogen bonding position in its beta-adrenergic receptor binding site. The docking results reveal strong binding affinities and key molecular interactions, such as hydrogen bonding with critical active site residues, indicating potential inhibition of thyroid-related enzymes. These in silico findings support the clinical data, highlighting the strength of our dual approach. Integrating clinical prevalence analysis with molecular docking offers valuable insight into both disease burden and therapeutic potential (Figure 2).



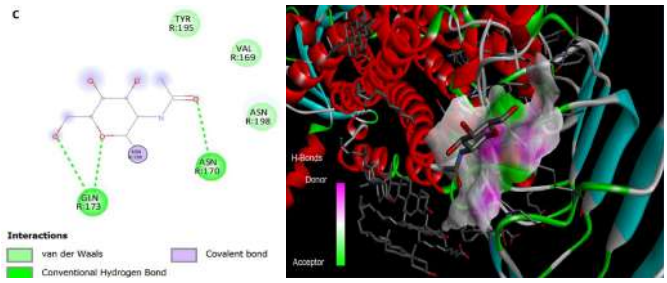


Figure 2: Graphical Representation of Binding modes ligands with Thyroiditis proteins A.TSH with Levothyroxine, B.TSH with Methimazole, C.TSH with Propranolol

DISCUSSIONS

The current study revealed that females (81.9%) were more affected by thyroiditis. It may be due to sex differences in thyroid hormone levels may be influenced by factors such as the menstrual cycle, pregnancy, and menopause, with estrogen playing a crucial role in modulating thyroid function [14,15]. In this study, no significant association was found between gender and thyroid diseases; this is in line with another study [13], which also showed no significant association between gender and thyroid diseases. Moreover, we also found the age group 21-40 years suffering more with thyroid disorders, and these results are in agreement with another study conducted at Hyderabad Sindh in 2021 [16]. In the case of primary hypothyroidism, a high level of TSH shows the thyroid gland is too underactive, and the pituitary gland tries to compensate. T3 and T4 levels were low, which are typical biochemical markers of hypothyroidism. In Hashimoto's hypothyroidism, TSH was high, which shows a severely damaged autoimmune thyroid gland. T3 and T4 levels showed significant variability that represent the chronic inflammation or disease progression [6]. Family history and iodine intake were not significantly associated with thyroiditis; however, smoking was found to be a major risk factor (p value=0.045) for both hyper and hypo conditions of the thyroid gland. Cigarette smoke contains toxic compounds that can modulate the immune system, promoting the production of thyroid-stimulating immunoglobulins (TSIs) and increasing the risk of hyperthyroidism. This mechanism highlights the detrimental role of smoking in thyroid autoimmunity [17]. Additionally, smoking induces oxidative stress, which damages thyroid cells and triggers autoimmune responses. It is also a major risk factor for exacerbating Graves' ophthalmopathy, likely due to its impact on orbital fibroblasts and cytokine production [18]. Prevalence was 52.78% during the study period in which females were with hypothyroidism due to their postpartum depression, menstrual cycle, and family history. However, mortality was very low as the thyroiditis is controlled state. In a previous Hyderabad based study goiter was observed to be 27%,

DOI: https://doi.org/10.54393/pbmj.v8i7.1270

Hashimotos to be 9%, Thyroid Cancer to be 10%, and Iodine Deficiency to be 88% [16]. Heat intolerance was found to be the most common symptom because BMR increases due to elevated T3 and T4 levels, which causes the release of heat as a byproduct, which results in environmental discomfort to the patient, and due to stimulation of sweat glands, blood flow increases, resulting in perspiration and moist skin [19]. While pain in the thyroid gland during hyperthyroidism is due to the inflammation or pressure of the enlarged thyroid gland, which later results in tenderness and throat discomfort. Dry skin was the most frequently observed symptom in hypothyroid cases. In hypothyroidism, due to the production of fewer T3 and T4 hormones, metabolism slows down, leading to decreased heat generation, causing the intolerant sensitivity to cold, and as sweat gland activity is reduced, blood flow also decreases, which causes the disturbance to the skin, like the skin becoming dehydrated, rough, dry, and scaly. Neck discomfort was the most prevalent sign in this group [20]. Throat pain and neck swelling are the most commonly reported symptoms during euthyroidism because of nodules or goiter formation, which causes throat pain and thyroid hormone imbalance. Levothyroxine is a proven and widely prescribed drug for treating thyroid disease in patients with hypothyroidism. However, higher-than-recommended dosages may lead to adverse effects [21]. Binding affinities were measured in terms of Kd values. The lower the Kd value, the better the binding affinity of the target with its ligand [22]. Through molecular docking, it was predicted that propranolol should be used as a choice of drug (as it showed the highest binding affinity) if a patient is suffering from hyperthyroidism complications like anxiety, stress, and arrhythmia. However, in case of hypothyroidism, levothyroxine should be prescribed, and if complications aren't severe, patients can take methimazole only.

The study had a small sample size, limiting statistical power. Thyroid antibody testing was not performed, restricting autoimmune confirmation. Lack of follow-up data and experimental validation of docking results also limit the findings' clinical relevance.

CONCLUSIONS

This study concluded a high prevalence of thyroiditis among adults in Hyderabad, with hypothyroidism being most common, especially in rural areas. Smoking and autoimmune disorders were key risk factors. Propranolol showed the strongest molecular binding with TSH, followed by levothyroxine and methimazole, indicating its potential therapeutic role. These findings highlight the need for early diagnosis and targeted treatment strategies.

Authors Contribution

Conceptualization: BK
Methodology: AN, MK,
Formal analysis: HS, HH, NS, MK, LK
Writing review and editing: BK, AN, HS, LK

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Naseem M, Ali S, Qadir S, Riaz A, Monawwer A, Tahir B, *et al.* Trends of Pathological Findings in Patients with Thyroid Diseases: A Single-Center, Retrospective Study. Clinical Medicine Insights: Endocrinology and Diabetes.2024Nov;17:117955142 41299709. doi: 10.1177/11795514241299709.

[2] Jiang Z, Huang L, Chen L, Cai H, Huang H. Follicular Helper T Cells in Graves' Disease: Pathogenic Mechanisms and Therapeutic Implications. American Journal of Physiology-Endocrinology and Metabolism.2025Jun;328(6):E952–61.doi:10.1152/ajpendo.00023.2025.

[3] Yahya NA, Nugraha KN, Hardyningrat BI, Kirana DC, Kadarisma S, Nurhaliza S, *et al.* A Complete Guide to Hyperthyroidism: What You Need to Know. Jurnal Biologi Tropis.2024 Dec; 24(1b): 115–20. doi: 10.29303/jbt.v24i1b.7930.

[4] Hennessey JV, Weir MR, Soni-Brahmbhatt S, Duan Y, Gossain VV. Effect of Levothyroxine on kidney Function in Chronic Kidney Disease with Subclinical Hypothyroidism in US Veterans: A Retrospective Observational Cohort Study. Advances in Therapy. 2021Feb; 38(2): 1185-201.

[5] Crnčić TB, Ćurko-Cofek B, Batičić L, Girotto N, Tomaš MI, Kršek A, *et al.* Autoimmune Thyroid Disease and Pregnancy: The Interaction Between Genetics, Epigenetics and Environmental Factors.Journal of Clinical Medicine.2024Dec;14(1):190.doi:10.3390/jcm14010190.

[6] Bujnis M, DeSalvo K, Neklason DW, Madsen MJ, Jorde LB. Familial Risk of Hashimoto's Thyroiditis in a Large Genealogical Database. The Journal of Clinical Endocrinology & Metabolism.2025Apr.doi:10.1210/clinem/dgaf251.

[7] Ergasheva G. Peculiarities When Accompanied by Hypothyroidism and Iodine Deficiency in Patients With Adrenal Gland Pathology. Modern Science and

DOI: https://doi.org/10.54393/pbmj.v8i7.1270

Research. 2025 Feb;4(2):1133–40.
[8] Ifthikhar MB, Dhamotharaswamy K. Correlation of Hypothyroidism with Age and Comorbidities Among Women: A Cross-Sectional Study. Journal of Pharmacology and Pharmacotherapeutics.2024 Sep; 15(3): 336–42. doi: 10.1177/0976500X241266077.
[9] Quintero BM, Yazbeck C, Sweeney LB. Thyroiditis: Evaluation and Treatment. American Family Physician. 2021 Dec; 104(6): 609–17.
[10] Gamboa MD, Saban M, Curriá MI. Treatment with Intramuscular Levothyroxine in Refractory Hypothyroidism. European Thyroid Journal. 2019 Dec; 8(6): 319–23. doi: 10.1159/000503324.
[11] Boucai L, Zafereo M, Cabanillas ME. Thyroid Cancer: A Review. JAMA.2024 Feb; 331(5): 425–35. doi: 10.1001/jama.2023.26348.
[12] Agu PC, Afiukwa CA, Orji OU, Ezeh EM, Ofoke IH, Ogbu CO, *et al*. Molecular Docking as a Tool for the Discovery of Molecular Targets of Nutraceuticals in Disease Management. Scientific Reports. 2023 Aug; 13(1): 13398. doi: 10.1038/s41598-023-40160-2.
[13] Atkinson M, Agrawal M, Muralidhara K, Abraham P, Vaidya B, Okosieme OE. British Thyroid Association Survey of Graves' Disease Management in the UK. Clinical Endocrinology.2025May.doi:10.1111/cen.15266.
[14] Brown ED, Obeng-Gyasi B, Hall JE, Shekhar S. The Thyroid Hormone Axis and Female Reproduction. International Journal of Molecular Sciences.2023 Jun; 24(12): 9815. doi: 10.3390/ijms24129815.
[15] Gopinathan P, Sopian MM, Das GV. Sociodemographic Patterns of Hyperthyroid Patients Undergoing Radioactive Iodine Therapy in Northern Malaysia: An Observational Study. Journal of Health and Translational Medicine (JUMMEC).2024Feb;27(1):162–70.
[16] Shah N, Ursani TJ, Shah NA, Raza HM. Prevalence and Manifestations of Hypothyroidism Among Population of Hyderabad, Sindh, Pakistan.Pure and Applied Biology (PAB).2021Jul;10(3):668–75.doi:10.19045/bspab.2021-100069.
[17] Umar MA, Baig MN, Jawad A, Mushwani M, Iftikhar S, Arshad N. Microbial Incidence in Acute Pharyngitis Using Throat Swab Analysis. Journal of Rawalpindi Medical College. 2025 Mar; 29(1).
[18] Muñoz-Ortiz J, Sierra-Cote MC, Zapata-Bravo E, Valenzuela-Vallejo L, Marin-Noriega MA, Uribe-Reina P, *et al*. Prevalence of Hyperthyroidism, Hypothyroidism, and Euthyroidism in Thyroid Eye Disease: A Systematic Review of the Literature. Systematic Reviews.2020Jul;9(1):201.doi:10.1186/s13643-020-01459-7.
[19] Gavriilidou M, Chorti A, Psomiadou A, Koidou E, Papaioannou M, Papavramidis T. Thyroid Gland Disorders and Physical Activity: Can They Affect Each Other? Cureus.2025 Mar; 17(3). doi: 10.7759/cureus .81489.
[20] Cohen B, Cadesky A, Jaggi S. Dermatologic Manifestations of Thyroid Disease: A Literature Review. Frontiers in Endocrinology. 2023 May; 14: 1167890. doi: 10.3389/fendo.2023.1167890.
[21] Ochani S, Siddiqui A, Adnan A. Adverse Effects of Long-Term Levothyroxine Therapy in Subclinical Hypothyroidism. Annals of Medicine and Surgery. 2022 Apr; 76. doi: 10.1016/j.amsu.2022.103503.
[22] Khanzada B, Akhtar N, Okla MK, Alamri SA, Al-Hashimi A, Baig MW, *et al*. Profiling of Antifungal Activities and In Silico Studies of Natural Polyphenols from Some Plants.Molecules.2021Nov;26(23):7164.doi:10.3390/molecules26237164.

DOI: https://doi.org/10.54393/pbmj.v8i7.1246

PAKISTAN BIOMEDICAL JOURNAL
https://www.pakistanbmj.com/journal/index.php/pbmj/index
ISSN (E): 2709-2798, (P): 2709-278X
Volume 8, Issue 07 (July 2025)

Original Article

OPEN ACCESS

Factors Affecting Job Satisfaction among Healthcare Professionals at Public and Private Tertiary Care Hospitals in Pakistan

Behram Ahmad[1], Ahmad Hasan Khan[2], Mamoona Farhat[3], Huzaifa Qadir[3], Muhammad Burhan[3], Zarghuna Akbar[3], Maria Iqbal[3] and Salman Zahir[1*]

[1]Department of Pharmacology and Therapeutics, Northwest School of Medicine, Peshawar, Pakistan
[2]Department of Pharmacology and Therapeutics, Khyber Girls Medical College, Peshawar, Pakistan
[3]Department of Medicine and Surgery, Northwest School of Medicine, Peshawar, Pakistan

ARTICLE INFO

Keywords:
Job Satisfaction, Working Hours, Job Security, Work Experience, Tertiary Care Hospitals

How to Cite:
Ahmad, B., Khan, A. H., Farhat, M., Qadir, H., Burhan, M., Akbar, Z., Iqbal, M., & Zahir, S. (2025). Factors Affecting Job Satisfaction among Healthcare Professionals at Public and Private Tertiary Care Hospitals in Pakistan: Factors Affecting Job Satisfaction among Healthcare Professionals. Pakistan BioMedical Journal, 8(7), 43-48. https://doi.org/10.54393/pbmj.v8i7.1246

***Corresponding Author:**
Salman Zahir
Department of Pharmacology and Therapeutics, Northwest School of Medicine, Peshawar, Pakistan
salmanzahir01@gmail.com

Received Date: 26th May, 2025
Revised Date: 11th July, 2025
Acceptance Date: 17th July, 2025
Published Date: 31st July, 2025

ABSTRACT

Job satisfaction plays a critical role in the performance, motivation, and retention of healthcare professionals. In Pakistan, contrasting work environments between public and private hospitals may affect satisfaction levels, yet limited comparative data are available. **Objectives:** To assess job satisfaction among healthcare professionals in public and private tertiary care hospitals in Pakistan and identify key demographic and institutional factors associated with satisfaction. **Methods:** A descriptive cross-sectional study was conducted from 1st July 2023 to 26th February 2024 among 400 healthcare professionals in four tertiary care hospitals. Data were collected using a structured, self-administered questionnaire comprising demographic items and 30 Likert-scale job satisfaction statements. Descriptive statistics and Chi-square tests were applied using SPSS version 26.0. A p-value<0.05 was considered statistically significant. **Results:** Among the 400 participants, 57% reported being satisfied with their jobs. Job satisfaction was significantly higher among those working ≤12 hours/day (98.1%) compared to >12 hours/day (86.8%) (p<0.001). Satisfaction was also greater among professionals with >5 years of experience (p<0.001), permanent employment status (p=0.021), higher income brackets (p=0.026), and those working in the private sector (p=0.003). No significant associations were found with gender, marital status, or socioeconomic background. **Conclusions:** Job satisfaction is significantly influenced by institutional and structural factors. Policymakers and healthcare administrators should focus on strategies that ensure optimal working conditions, equitable compensation, and job security to foster a satisfied and stable healthcare workforce in Pakistan.

INTRODUCTION

Job satisfaction is vital in the healthcare industry because it directly affects workers' performance, retention, and quality of patient care [1–4]. Dissatisfaction, on the other hand, leads to burnout, absenteeism, and decreased healthcare system performance [5–7]. Though critical, the determinants of job satisfaction are inadequately explored in developing nations such as Pakistan. Pakistan's health system has a dual structure, with both public and private components, each with varying organizational arrangements and conditions of work [8, 9]. Public hospitals tend to experience resource constraints, over-burdening, and bureaucratic delays [10–11], whereas private hospitals, with better funding, might expect higher performance and insecure employment [12, 13]. These different environments affect job satisfaction differently, with implications for the delivery of healthcare. Health practitioners, that is, clinicians, nurses, trainees, and administrative personnel, are faced with a broad spectrum

DOI: https://doi.org/10.54393/pbmj.v8i7.1246

of organizational and interpersonal issues shaping satisfaction, e.g., pay, working hours, management style, and prospects for advancement. Newly emerging issues such as gender inequalities, workload pressures, and in-workplace harassment add to the intricacies of the job satisfaction situation [14, 15]. While international research has touched upon such dynamics [16–19], localized, sector-specific comparative Pakistan data remain scarce. Existing studies tend to concentrate on narrow occupational groups, are bereft of inclusive frameworks, or have small sample sizes, thereby restricting such research. This leaves a gap in the research that circumscribes context-based analysis of drivers of satisfaction among Pakistani health professionals. In producing comparative evidence-based evidence, this study fills a fundamental knowledge gap and provides actionable recommendations for enhancing workforce stability and the delivery of healthcare in Pakistan.

This study aims to measure the job satisfaction of healthcare professionals in public and private tertiary care hospitals in Pakistan. Also, to determine major demographic and occupational determinants like working hours, salary, sector, and employment status of satisfaction.

METHODS

This descriptive cross-sectional study was conducted from 1st July 2023 to 26th February 2024 in four tertiary care hospitals in Peshawar, Pakistan. Two of these were public sector hospitals, and two were private sector hospitals. Non-probability convenience sampling was employed in inviting participants to fill out the questionnaire. The sample size of 384 was calculated using Open Epi with a 95% confidence interval and 5% margin of error, using the formula; sample size (n) = [DEFF*Np(1-p)] / [d2/Z21-a/2*(N-1) + p*(1-p)]. Extra participants were enrolled to compensate for any loss of follow-up. Ethical approval was obtained from the Institutional Review Board of Northwest School of Medicine, Peshawar (IRB & EC/2023-SM/069). Written informed consent was obtained from all participants before data collection. Participation was voluntary, and confidentiality of responses was assured. The study population included a diverse range of healthcare professionals, such as house officers, medical officers, postgraduate trainees, clinicians, administrators, basic medical sciences faculty, demonstrators, and nurses. Eligibility criteria included currently working in either public or private tertiary care hospitals in Pakistan and having a minimum of six months of work experience. Participants on extended leave or not actively working in hospital settings were excluded. Data were collected using a structured, self-administered questionnaire. The tool was developed in English and consisted of two main sections. The first section captured demographic and professional details such as age, gender, occupation, employment sector (public/private), employment type (contract/permanent), work experience, marital status, number of children, monthly income, working hours, and perceived socioeconomic status. The second section assessed job satisfaction using a 30-item Likert scale, with responses ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The job satisfaction scale was divided into the following subscales: Interpersonal Relationships, Work Environment, Compensation and Benefits, Growth and Recognition, Job Security, Autonomy and Participation and Institutional Support. Respect and Social Value. Current study found three variables out of all the test variables that had a statistically significant relationship with job satisfaction, including income per month, working hours and job sectors. The questionnaire was pilot tested on 30 healthcare professionals from institutions not included in the final sample to ensure clarity, reliability, and validity. Minor linguistic adjustments were made based on feedback. The overall Cronbach's alpha for the scale was 0.89, indicating high internal consistency. Data were analyzed using IBM SPSS version 26.0. Descriptive statistics such as frequencies, percentages, means, and standard deviations were calculated. Inferential statistics, including the Chi-square test, were used to assess associations between job satisfaction and categorical variables such as gender, profession, income, and sector. A p-value of <0.05 was considered statistically significant.

RESULTS

A total of 400 healthcare workers from four tertiary care institutions in Peshawar, Pakistan. Respondents belonged to various categories such as house officers, medical officers, postgraduate trainees, clinicians, administrators, nurses, and faculty members. The respondents' gender was almost balanced, and the participants belonged to early-career groups with less than five years of experience. Most of them worked on contract and identified themselves as middle socioeconomic class individuals. In general, 57% of participants indicated job satisfaction. Job satisfaction rates were examined in terms of income, working time, and employment sector, which had statistically significant correlations (Table 1).

Table 1: Demographic Characteristics of Respondents (n=400)

Variables	Frequency (%)
Gender	
Male	206 (51.5%)
Female	194 (48.5%)

DOI: https://doi.org/10.54393/pbmj.v8i7.1246

Sector	
Public	160 (40%)
Private	237 (59.3%)
Profession	
House Officer	100 (25%)
Medical Officer	24 (6%)
Post Graduate Trainee	87 (21.8%)
Clinician	34 (8.5%)
Administrator	20 (5%)
Basic Sciences Faculty	18 (4.5%)
Demonstrator	30 (7.5%)
Nurse	87 (21.8%)
Work Experience	
<5 Years	292 (73%)
>5 Years	108 (27%)
Marital Status	
Married	153 (38.3%)
Un-Married	247 (61.7%)
Income/Month	
<50k	92 (23%)
50k-1 Lac	229 (57.3%)
1-2 Lac	30 (7.5%)
>2 Lac	49 (12.3%)
Working Hours/Day	
12 Hours Or Less	264 (66%)
>12hours	136 (34%)
Socioeconomic Status	
Lower Class	19 (4.8%)
Middle Class	362 (90.5%)
Upper Class	19 (4.8%)
Nature of Job	
Contract	306 (76.5%)
Permanent	94 (23.5%)

Higher earners reported higher levels of job satisfaction. Among the earners above PKR 200,000 per month, 100% reported satisfaction. Satisfaction decreased marginally for the income levels falling below the above-mentioned threshold. The link between income and job satisfaction was statistically significant ($\chi^2 = 9.299$, df = 3, p=0.026), signalling that payment continues to be a strong predictor of satisfaction (Table 2).

Table 2: Association Between Salary Per Month and Job Satisfaction (n=400)

Income Per Month	Satisfied (n)	Not Satisfied (n)	Total (n)	χ^2	df	p-Value
<50k	90	2	92	9.299	3	0.026
50k-1 Lac	209	20	229			
1-2 Lac	29	1	30			
>2 Lac	49	0	49			

Working hours also demonstrated a highly correlated relationship with job satisfaction. Workers with 12 hours or fewer of work per day had significantly higher levels of satisfaction (98.1%) than workers with more than 12 hours of daily work (86.8%). The statistical difference was significant ($\chi^2 = 16.471$, df = 1, p<0.001), indicating the destructive effect of longer working hours on the morale of healthcare workers (Table 3).

Table 3: Association Between Working Hours per Day and Job Satisfaction (n=400)

Working Hours /Day	Satisfied (n)	Not Satisfied (n)	Total (n)	χ^2	df	p-Value
≤12 Hours	259	5	164	16.471	1	<0.001
>12 Hours	118	18	136			

Differences by sector were also observed for job satisfaction. Hospital workers in the private sector reported greater satisfaction (97.5%) than those in public hospitals (89.4%). This correlation was statistically significant ($\chi^2 = 8.955$, df=1, p=0.003), indicating better work environments in the private sector (Table 4).

Table 4: Association Between Job Sector and Job Satisfaction (n=400)

Sector	Satisfied (n)	Not Satisfied (n)	Total (n)	χ^2	df	p-Value
Public	143	17	160	8.955	1	0.003
Private	234	6	240			

While the variables of supervisor relations, teamwork, availability of resources, safety, recognition, autonomy in decision-making, and communication within the institution were included in the measurement instrument, their respective contributions to job satisfaction were not separately examined or reported in the findings. As a result, additional interpretation and statistical subdivision of these subscale domains should be undertaken in subsequent studies to provide more specific recommendations for interventions.

DISCUSSION

This study provides a complete assessment of job satisfaction among public and private sector tertiary care hospital healthcare practitioners in Pakistan. The results indicate that overall job satisfaction is influenced by some interrelated variables, such as working hours, remuneration, job security, and the type of healthcare organization. These findings are consistent with an emerging evidence base from both the national and international literature and offer real-world advice for healthcare administrators and policymakers who want to improve staff well-being and retention. There was a negative relationship between the number of working hours and job satisfaction. Employees who worked 12 hours or fewer per day reported much higher satisfaction than employees who worked longer days. This aligns with earlier research conducted by Ibe, in which they discovered that working long hours is one of the reasons for physical and

DOI: https://doi.org/10.54393/pbmj.v8i7.1246

emotional burnout among Pakistani healthcare professionals, and therefore, it lowers their job satisfaction and productivity [20]. Comparable Chinese research reports much higher levels of job satisfaction, lower stress levels, and more job commitment compared to those employed under unlimited or long shifts [21]. The implications are imperative, as these demonstrate graphically how reorganization of shift work and adequate provision for rest breaks can positively impact healthcare workers' morale and output [22, 23]. Income was also a prime predictor of satisfaction in this study. Higher-income professionals, particularly those whose monthly income was over PKR 200,000, reported nearly universal satisfaction. Income by itself is not the sole cause of job satisfaction, but it is a main one, particularly where inflation and rising living costs are concerned. This finding is echoed by the study by Baqi and Indradewa, where the researchers identified that adequate monetary rewards are always placed among the top drivers of job satisfaction [24]. However, there is literature that cautions that financial incentives yield diminishing returns if not accompanied by training for professionals, good leadership, and a spirit of goodwill. Wilczyńska *et al.* described that despite there being competitive remuneration in certain sectors in Ghana, there existed dissatisfaction where problems of workload and interpersonal conflicts were not being resolved [25]. The status of employment also considerably influenced the degree of satisfaction. Permanent employees were much happier than contract workers, a pattern that is also reflective of broader complaints about the lack of job security in the healthcare sector. The sense of stability, access to benefits, and clear career development prospects of permanent employment create greater professional contentment. Various studies found the same that permanent staff reported better psychological health and organizational commitment [26, 27]. Global research harmonizes with this finding that job security is a global determinant of employee retention and job satisfaction, especially in stressful occupations like healthcare [28]. A study by Yaseen, found that there was higher intrinsic satisfaction expressed by some of the public sector workers who dealt with disadvantaged groups and participated in academic and training activities not provided in some private setups [29]. These divergent findings suggest job satisfaction is not just motivated by material reward, but also by professional values, organizational culture, and perceived function. The composite satisfaction rate of 57% in this study means that while most healthcare workers are content with what they do, there is a notable number of dissatisfied ones. Addressing these workers is crucial, particularly in the case of Pakistan, where the health system has an ongoing problem of chronic understaffing, resource deficiencies, and continuous migration of the workforce. This study underscores the importance of developing focused human resource policies based on the management of workload, fair remuneration, secure terms of employment, and industry-tailored interventions as per the demands of each healthcare setup. It is also noteworthy to state that gender, marital status, and socioeconomic status had no discernible effect on job satisfaction in this study. The null relationship, in this case, might reflect a change in perspective among healthcare professionals, where work issues now overwhelm personal demographics in determining work satisfaction.

CONCLUSIONS

It was concluded that job satisfaction among healthcare professionals in tertiary care hospitals in Pakistan is significantly influenced by modifiable factors, particularly monthly income, daily working hours, and sector of employment. Higher satisfaction was observed among professionals earning greater incomes, working shorter shifts, and employed in private sector institutions. These findings underscore the need for targeted institutional and policy reforms, such as improving compensation structures, regulating duty hours, and enhancing workplace environments, particularly in the public healthcare sector. Addressing these factors can play a critical role in improving workforce morale, retention, and overall healthcare service delivery in Pakistan.

Authors Contribution

Conceptualization: BA, AHK, MF, HQ, MB, ZA, MI, SZ
Methodology: BA, AHK, MF, HQ, MB, ZA, MI, SZ
Formal analysis: BA, AHK
Writing review and editing: SZ

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Gkliati A, Saiti A. Job Satisfaction and Support in the Medical Profession: The Foundations of Efficient Organizational Healthcare Performance. International Journal of Workplace Health Management. 2022 Mar; 15(2): 131-53. doi: 10.1108/IJWHM-10-2020-0172.

[2] Meeusen V, Gatt SP, Barach P, Van Zundert A. Occupational Well-Being, Resilience, Burnout, and Job Satisfaction of Surgical Teams. In Handbook of

DOI: https://doi.org/10.54393/pbmj.v8i7.1246

Perioperative and Procedural Patient Safety. 2024 Jan: 205-229. doi: 10.1016/B978-0-323-66179-9.00016-6.

[3] Aman-Ullah A, Aziz A, Ibrahim H, Mehmood W, Abdullah Abbas Y. The Impact of Job Security, Job Satisfaction and Job Embeddedness on Employee Retention: An Empirical Investigation of Pakistan's Health-Care Industry. Journal of Asia Business Studies. 2022 Nov; 16(6): 904-22. doi: 10.1108/JABS-12-2020-0480.

[4] Huhtala M, Geurts S, Mauno S, Feldt T. Intensified Job Demands in Healthcare and Their Consequences for Employee Well-Being and Patient Satisfaction: A Multilevel Approach. Journal of Advanced Nursing. 2021 Sep; 77(9): 3718-32. doi: 10.1111/jan.14861.

[5] Mat Rifin H and Danaee M. Association Between Burnout, Job Dissatisfaction and Intention to Leave Among Medical Researchers in A Research Organization in Malaysia During the COVID-19 Pandemic. International Journal of Environmental Research and Public Health. 2022 Aug; 19(16): 10017. doi: 10.3390/ijerph191610017.

[6] Yao H, Wang P, Tang YL, Liu Y, Liu T, Liu H *et al.* Burnout and Job Satisfaction of Psychiatrists in China: A Nationwide Survey. BioMed Central Psychiatry. 2021 Nov; 21(1): 593. doi: 10.1186/s12888-021-03568-6.

[7] Hsieh CM, Chen S, Peng TT, Chen PH, Chen A, Chen CJ. Relationships among Burnout, Job Dissatisfaction, Psychosocial Work Conditions and Minor Mental Disorders of Precarious Employment in Taiwan. Men's Health. 2022 Jul; 18(7): 1-8. doi: 10.3108 3/j.jomh1807146.

[8] Siddiqi S, Aftab W, Raman AV, Soucat A, Alwan A. The Role of the Private Sector in Delivering Essential Packages of Health Services: Lessons from Country Experiences. British Medical Journal Global Health. 2023 Jan; 8(Suppl 1): e010742. doi: 10.1136/bmjgh-2022-010742.

[9] Ullah Z, Sulaiman MA, Ali SB, Ahmad N, Scholz M, Han H. The Effect of Work Safety on Organizational Social Sustainability Improvement in the Healthcare Sector: The Case of a Public Sector Hospital in Pakistan. International Journal of Environmental Research and Public Health. 2021 Jun; 18(12): 6672. doi: 10.3390/ijerph18126672.

[10] Bashir S, Nasir M, Grasic K, Moulin M, Ali S. Association Between Efficiency and Quality of Care of Public Healthcare Facilities: Evidence from Pakistan. The International Journal of Health Planning and Management. 2022 Jul; 37(4): 2240-55. doi: 10.1002/hpm.3465.

[11] Oweidat I, Abu Shosha G, Al-Harazneh R, Al-Mugheed K, Alzoubi M, Saeed Alabdullah AA *et al.* Nurses' Perceptions of Job Security and Performance: A Comparative Study Between Governmental and Private Hospitals. PLOS ONE. 2025 Mar; 20(3): e0318412. doi: 10.1371/journal.pone.0318412.

[12] Wang X, Li C, Chen Y, Zheng C, Zhang F, Huang Y *et al.* Relationships Between Job Satisfaction, Organizational Commitment, Burnout and Job Performance of Healthcare Professionals in A District-Level Health Care System of Shenzhen, China. Frontiers in Psychology. 2022 Nov; 13: 992258. doi: 10.3389/fpsyg.2022.992258.

[13] Tenaw Z, Siyoum M, Tsegaye B, Werba TB, Bitew ZW. Health Professionals Job Satisfaction and Associated Factors in Ethiopia: A Systematic Review and Meta-Analysis. Health Services Research and Managerial Epidemiology. 2021 Nov; 8: 23333928211046484. doi: 10.1177/233339282110464 84.

[14] Rostami F, Babaei-Pouya A, Teimori-Boghsani G, Jahangirimehr A, Mehri Z, Feiz-Arefi M. Mental Workload and Job Satisfaction in Healthcare Workers: The Moderating Role of Job Control. Frontiers in Public Health. 2021 Sep; 9: 683388. doi: 10.3389/fpubh.2021.683388.

[15] Ng LP, Choong YO, Kuar LS, Tan CE, Teoh SY. Job Satisfaction and Organizational Citizenship Behaviour Amongst Health Professionals: The Mediating Role of Work Engagement. International Journal of Healthcare Management. 2021 Jul; 14(3): 797-804. doi: 10.1080/20479700.2019.1698850.

[16] Curado C and Santos R. Transformational Leadership and Work Performance in Health Care: The Mediating Role of Job Satisfaction. Leadership in Health Services. 2022 Apr; 35(2): 160-73. doi: 10.1108/LHS-06-2021-0051.

[17] Abate HK and Mekonnen CK. Job Satisfaction and Associated Factors among Health Care Professionals Working in Public Health Facilities in Ethiopia: A Systematic Review. Journal of Multidisciplinary Healthcare. 2021 Apr: 821-30. doi: 10.2147/JMDH.S300118.

[18] Sarwar F, Panatik SA, Sukor MS, Rusbadrol N. A Job Demand-Resource Model of Satisfaction with Work-Family Balance among Academic Faculty: Mediating Roles of Psychological Capital, Work-to-Family Conflict, And Enrichment. Sage Open. 2021 Apr; 11(2): 21582440211006142. doi: 10.1177/21582440 211006142.

[19] Zheng H, Vatsa P, Ma W, Zhou X. Working Hours and Job Satisfaction in China: A Threshold Analysis. China Economic Review. 2023 Feb; 77: 101902. doi: 10.1016/j.chieco.2022.101902.

[20] Ibe CU. The Impact of Workplace Stress on Employee

DOI: https://doi.org/10.54393/pbmj.v8i7.1246

Productivity among Healthcare Professionals: A Qualitative Exploratory Case Study (Doctoral dissertation, Northcentral University). 2022.

[21] George C. Shift Schedule Justice and Clinician Outcomes: A Quasi-Experimental Approach (Doctoral dissertation, Clemson University). 2024.

[22] Kumari K, Ali SB, Abbas J. Examining the Role of Motivation and Reward in Employees' Job Performance through Mediating Effect of Job Satisfaction: An Empirical Evidence. International Journal of Organizational Leadership. 2021 Oct; 10(4). doi: 10.33844/ijol.2021.60606.

[23] Jahan S, Kusi GA, Zisa TA, Quarcoo FH. The Role of Job Dissatisfaction on Low Productivity in Ghanaian Sectors: Finding the Way Forward. Journal of Business and Management Studies. 2023; 5(1): 139. doi: 10.32996/jbms.2023.5.1.13.

[24] Baqi FA and Indradewa R. The Effect of Compensation on Job Satisfaction of Permanent Employees and Contract Employees. American International Journal of Business Management. 2021; 4(8): 144-51.

[25] Wilczyńska A, Batorski D, Sellens JT. Employment Flexibility and Job Security as Determinants of Job Satisfaction: The Case of Polish Knowledge Workers. Social Indicators Research. 2016 Mar; 126(2): 633-56. doi: 10.1007/s11205-015-0909-6.

[26] Dhanpat N, Manakana T, Mbacaza J, Mokone D, Mtongana B. Exploring Retention Factors and Job Security of Nurses in Gauteng Public Hospitals in South Africa. African Journal of Economic and Management Studies. 2019 Mar;10(1): 57-71. doi: 10.1108/AJEMS-10-2018-0311.

[27] Akpan CP. Job Security and Job Satisfaction as Determinants of Organizational Commitment among University Teachers in Cross River State, Nigeria. British Journal of Education. 2013 Dec; 1(2): 82-93.

[28] Heijde CM, Van Der Heijden BI. A competence-based and multidimensional operationalization and measurement of employability. Human Resource Management: Published in Cooperation with the School of Business Administration, The University of Michigan and in alliance with the Society of Human Resources Management. 2006 Sep; 45(3): 449-76. doi: 10.1002/hrm.20119.

[29] Yaseen A. Effect of Compensation Factors on Employee Satisfaction-A Study of Doctor's Dissatisfaction in Punjab. International Journal of Human Resource Studies. 2013 Jan; 3(1): 142-57. doi: 10.5296/ijhrs.v3i1.3351.

DOI: https://doi.org/10.54393/pbmj.v8i7.1314

PAKISTAN BIOMEDICAL JOURNAL
https://www.pakistanbmj.com/journal/index.php/pbmj/index
ISSN (E): 2709-2798, (P): 2709-278X
Volume 8, Issue 07 (July 2025)

Original Article

OPEN ACCESS

Microbial Contamination of Healthcare Personnel and Devices: A Critical Route for Pathogen Transmission

Hubza Ruatt Khan[1], Noor Muhammad[2,3]*, Aysha Tariq[2], Tehmina Bashir[4], Husna Jurrat[2], Mehvish Javeed[1] and Asghar Javaid[5]

[1]Department of Microbiology and Molecular Genetics, The Women University, Multan, Pakistan
[2]Department of Zoology, Government College University, Lahore, Pakistan
[3]Department of Microbiology, Shanghai Jiao Tong University, Shanghai, China
[4]Department of Botany, Government Graduate College, Lahore, Pakistan
[5]Department of Pathology, Nishtar Medical University, Multan, Pakistan

ARTICLE INFO

Keywords:
Antibiotic Resistance, Bacterial Isolation, Medical Staff, Microbial Interaction, Microbial Contamination

How to Cite:
Khan, H. R., Muhammad, N., Tariq, A., Bashir, T., Jurrat, H., Javeed, M., & Javaid, A. (2025). Microbial Contamination of Healthcare Personnel and Devices: A Critical Route for Pathogen Transmission: Microbial Contamination of Healthcare Personnel and Devices for Pathogen Transmission. Pakistan BioMedical Journal, 8(7), 49-55. https://doi.org/10.54393/pbmj.v8i7.1314

***Corresponding Author:**
Noor Muhammad
Department of Microbiology, Shanghai Jiao Tong University, Shanghai, China
noormhd@gcu.edu.pk

Received Date: 16th April, 2025
Revised Date: 15th July, 2025
Acceptance Date: 23rd July, 2025
Published Date: 31st July, 2025

ABSTRACT

Since healthcare workers are often exposed to pathogenic organisms, they can unintentionally transfer disease to patients, causing healthcare-associated infections (HAIs). **Objectives:** To isolate healthcare staff and their respective equipment to determine the level of contamination and the pattern of antibiotic resistance. **Methods:** A total of 153 samples were taken out of doctors (n=52), nurses (n=44), lab technicians (n=33), and ward boys (n=24) in Nishtar Hospital, Multan, in this cross-sectional study that was based on laboratory procedures. Hands, stethoscopes, and mobile phones were taken, cultured on selective medium, and identified to the level of genus. Antibiotic susceptibility was evaluated using the Kirby–Bauer disc diffusion method against piperacillin (100 µg), ciprofloxacin (5 µg), levofloxacin (5 µg), gentamicin (10 µg), and imipenem (10 µg). Data were analyzed using ANOVA at a 95% confidence level. **Results:** Out of 153 samples, 93 (60.13%) yielded positive bacterial cultures. The highest number of positive cultures was recorded among lab technicians (63.64%), followed by ward boys (62.50%), doctors (57.69%), and nursing staff (56.82%) ($p<0.05$). The most frequently isolated bacteria were Bacillus sp. (22.58%), Enterococcus sp. (19.35%), and Escherichia sp. (17.20%). Mobile phones (45.16%) showed the highest contamination, followed by hands (37.63%) and stethoscopes (35.48%). All Enterococcus isolates were 100% resistant to Piperacillin, while all Staphylococcus and Klebsiella isolates showed complete resistance to multiple antibiotics. **Conclusions:** Healthcare personnel and their commonly used devices act as reservoirs for multidrug-resistant bacteria. Strict adherence to infection control protocols and specialized training for healthcare staff are essential to minimize cross-contamination and prevent HAIs.

INTRODUCTION

Healthcare-associated infections are increasing mortality rates in hospitals [1]. One of the most important infections is the nosocomial infection. They affect patients admitted to hospitals for non-infectious conditions. These nosocomial infections are the main cause of high mortality rates in hospitals and sometimes lead to costly treatments in healthcare facilities [2, 3]. The pathogens of this disease are resistant to most of the commercial antibiotics, so known as multidrug-resistant bacteria (MDR). These MDR pathogens affect the overall healthcare institutions around the globe and impose a burden on the world economy. In the intensive care unit (ICU) the nosocomial infections are considered one of the most important infections that cause morbidity and mortality. Their main targets are immunocompromised patients admitted to the ICU [4, 5]. Contaminated inanimate surfaces in ICUs contribute to outbreaks and bacterial cross-transmission between patients. Contamination may originate from healthcare

DOI: https://doi.org/10.54393/pbmj.v8i7.1314

workers or the surrounding patient environment. The pathogenic MDR bacterial strains have been reported to colonies different surfaces in healthcare facilities, medical equipment, and devices like mobile phones, stethoscopes, etc., associated with medical staff [6]. Microbial contamination of the medical facility is one of the major causes leading to the high prevalence of ICU-associated infection, which results in an elevated occurrence of nosocomial infections, accounting for 40% of ICU admittance [7]. Cross-transmission and dissemination, occupancy density, as well as the utilization of healthcare equipment for multiple patients, such as stethoscopes, gowns, and clothing, all contribute to contamination [8]. Noncompliance with routine hand-washing procedures by health care workers contributes to pathogen dissemination and cross-transmission during interaction with patients or contaminated surroundings [9]. Colonized and infected healthcare workers and patients are also sources of contamination, alongside infectious agents recovered from the patient's immediate environment. The dispersions are dependent on the type of microbe, origin, and contaminants, with surface area, humidity threshold, and size of the suspension [10]. The failures in these basic procedures tend to contribute to the spread of these pathogens, such as Staphylococcus aureus, coagulase-negative staphylococci, Enterococci, and Enterobacteriaceae within the units and hospital location. The emergence of antimicrobial-resistant strains of bacterial organisms also contributes to the increase in nosocomial infections, making it significantly more deadly and morbid, along with the cost of healthcare, not to mention the cost of healthcare [11]. Cell phones are a part of our everyday life. They have a much higher population per capita than a country often [12]. Mobile phones in hospitals can enhance the quality of healthcare, especially regarding faster contact in case of any emergency within the hospital departments. Nevertheless, even considering all the positive features the mobile phones offer, their role in spreading microorganisms should also be mentioned [13]. When dealing with patients and handling their phones, healthcare personnel can easily transmit microbes to their mobile phones. Mobile phones may provide a breeding ground for a wide range of microorganisms due to the combination of constant handling and the heat generated by mobile phones [14]. The scientists found different forms of single microbes that were on the surface of the mobile phones. These microbes are considered natural flora of the skin in certain cases, although researchers have also identified and researched microorganisms that may lead to nosocomial infections [15]. The multiple roles of patients are threatened who report in intensive care as they are linked to multiple tubes, and the introduction of pathogens is very acute and simply facilitated. These patients prove to be highly susceptible to infection by any microorganism that can be spread not only in any of the items that are attached to the patient but also in the mobile phone of HCWs [11]. There is a need to examine whether the HCWs in the ICU clean their mobile phones or not. HCWs in the intensive care unit are supposed to maintain hand hygiene before and after handling mobile phones [16].

This study aims to isolate and identify bacteria from healthcare workers and their associated devices and to check their antibiotic susceptibility patterns and hospital-acquired complications in Nishtar Medical Hospital, Multan.

METHODS

This was a cross-sectional laboratory-based study conducted to assess bacterial contamination among healthcare personnel and their devices. This research investigation was conducted at Nishtar Hospital in Multan from October 2023 to March 2024. Ethical approval was obtained from Nishtar Hospital, and informed consent was taken from all participants before sampling. In the present study, 52 samples were collected from doctors, 44 from nurses, 33 from lab technicians, and 24 samples were collected from ward boys. A purposive sampling technique was employed to recruit healthcare staff working in the Intensive Care Units (ICUs) of Nishtar Hospital. The sample size of 153 was determined based on the total population of healthcare workers in the ICU departments during the study period. Using an expected contamination rate of 50% (the most conservative estimate), a 95% confidence level, and a 5% margin of error, the required sample size was calculated to be approximately 150 participants, which aligns with our collected sample of 153. A modified sterile swab technique was used for sample collection from the hands, stethoscopes, and mobile phones of healthcare workers [14]. A total of 153 swab samples of hands, mobile phones, and stethoscopes were collected from nurses, medical technicians, and doctors during this study. Sterile cotton swabs moistened with sterile normal saline were rolled over the region of the mobile phone's outer surfaces (including buttons, lateral and rear side of the phone, and areas that are frequently in touch with fingers). Using the same technique, samples from the hands of nurses, technicians, and doctors' stethoscopes were taken. Samples were obtained from healthcare workers who were working in Intensive Care Units (ICUs). Fewer samples were collected from ward boys due to their limited number and restricted access to ICU zones. Despite this, their high contamination rate (62.5%) still indicates their potential role in pathogen transmission. For continuous variables (such as zone of inhibition measurements), one-way

DOI: https://doi.org/10.54393/pbmj.v8i7.1314

analysis of variance (ANOVA) followed by a post hoc Tukey test was performed to find the significant differences between groups. For categorical data (including contamination rates and frequency distributions), chi-square tests or Fisher's exact tests were used as appropriate. Inclusion criteria were Healthcare staff including doctors, nurses, lab technicians, and ward boys who: (1) were actively working in the ICU during the study period, (2) regularly used stethoscopes and mobile phones during patient care duties, (3) provided written informed consent, and (4) had direct or indirect patient contact as part of their routine responsibilities. Exclusion criteria: Staff members who: (1) were on leave or not actively working during the data collection period, (2) declined to participate in the study, (3) had no direct patient care responsibilities, or (4) were temporary or visiting staff not permanently assigned to the ICU units. Swabs were streaked onto MacConkey agar and nutrient agar petri dishes, and 24-48 hours of incubation at 37°C was performed. Morphologically different colonies were then isolated and purified after incubation by quadrant streaking and re-streaking. The morphological and biochemical characterization and identification of all the isolated bacterial colonies were done to the genus level as per the Bergey Manual of Systematic Bacteriology [17, 18]. Testing of the antibiotic sensitivity was done using the Kirby-Bauer disc diffusion technique. The plates of Muller-Hinton Agar were prepared in sterile conditions [14]. The new cultures of the isolated bacterial strains that had been acclimatized to a 0.5 McFarland turbidity standard were then spread uniformly on the media plates. The plates were labeled, and discs of commercially available antibiotics (piperacillin (100 µg), ciprofloxacin (5 µg), levofloxacin (5 µg), gentamicin (10 µg), imipenem (10 µg)) were added to the inoculated media plates. Incubation of the plates was done at 37 o C overnight. The zone of inhibition (ZOI) was taken after incubation in mm, and the diameters were taken with a digital vernier caliper to avoid errors. Results interpretation was done based on Clinical and Laboratory Standards Institute (CLSI) guidelines, 2023. ANOVA was used and a post hoc Tukey test to identify the significant differences between and among the groups at the level of 95 confidences. The analysis of all the data was done using SPSS software version 21.0 and the graphs were done using SigmaPlot version 15.0 software.

RESULTS

Out of 153, 93 (60.13%) samples showed positive culture. Among them, 63.64% positive cultures were obtained from lab technicians and 62.5% from ward staff. The least positive cultures, about 56.82% as compared to negative cultures (43.18%), were observed among nursing staff. The one-way ANOVA revealed statistically significant differences in contamination rates among healthcare staff categories ($F(3, 149) = 8.45$, $p<0.001$) (Figure 1).

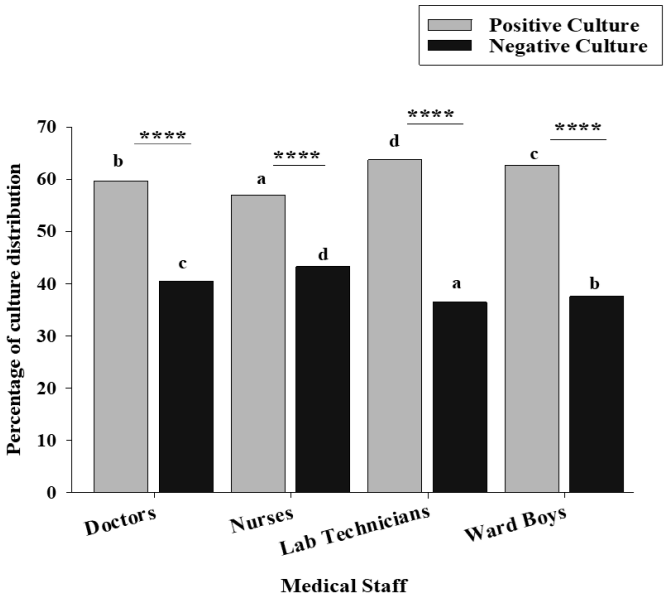


Figure 1: The Occurrence of Positive and Negative Cultures Among the Medical Staff

**** indicate p≤0.0001

The distribution of bacterial isolates among positive cultures was represented. Escherichia sp., Enterococcus sp., and Bacillus sp. were found in the highest frequency, about 17.20%, 19.35%, and 22.58%, respectively. While Staphylococcus sp. had the lowest frequency of about 12.90% (Table 1).

Table 1: Distribution of Bacterial Isolates from Positive Cultures (n=93)

Staff Category	Total Samples	Positive Cultures n (%)	Negative Cultures n (%)
Doctors	52	30 (57.7%)	22 (42.3%)
Nurses	44	25 (56.8%)	19 (43.2%)
Lab Technicians	33	21 (63.6%)	12 (36.4%)
Ward Boys	24	15 (62.5%)	9 (37.5%)
Total	153	91 (59.5%)	62 (40.5%)

Mobile phone showed the highest level of contamination (up 45%) except Escherichia sp. for all the bacterial isolates. Mobile phones were the most contaminated surfaces (45%), followed by hands (37.6%) and stethoscopes (35.4%) ($p\leq0.001$). The Escherichia sp. was equally distributed (31.82%) between hands and the stethoscope. The statistical analysis revealed that the distribution of all bacterial isolates was highly significant ($p\leq0.01$ to ≤0.000) among hands, stethoscopes, and mobile phone surfaces (Figure 2).

DOI: https://doi.org/10.54393/pbmj.v8i7.1314

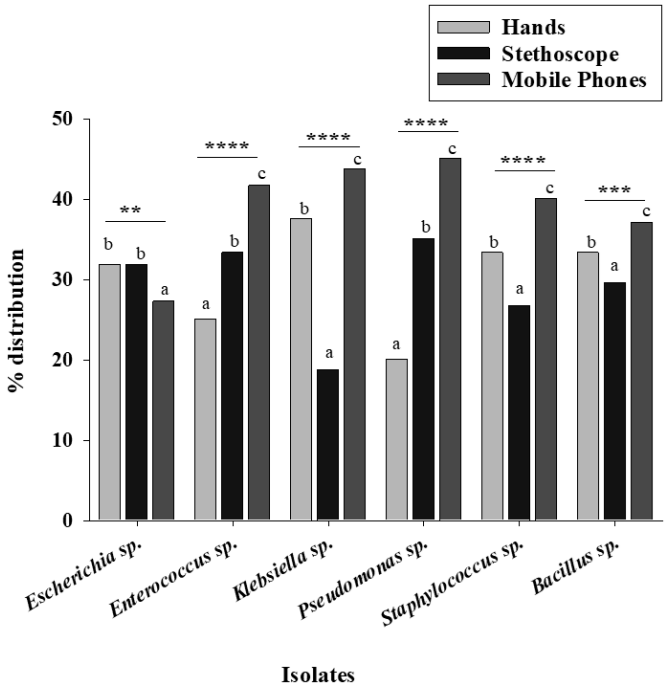


Figure 2: Percentage Distribution of Bacterial Isolates

(Escherichia sp., Enterococcus sp., Klebsiella sp., Pseudomonas sp., Staphylococcus sp., and Bacillus sp.) Across Hands, Stethoscopes, and Mobile Phones. ** represent p≤0.01, *** represent p≤0.001 while **** represent p≤0.0001

Among all the bacterial isolates, all the strains of Enterococcus sp. were 100.00% resistant against Piperacillin antibiotic, Staphylococcus sp. against Ciprofloxacin, Imipenem, and Levofloxacin, and all the strains of Klebsiella sp. were 100% resistant against Levofloxacin and Gentamycin. No isolated bacterial strain showed 100% sensitivity against any tested antibiotic. Maximum of the isolates were resistant to almost all the tested antibiotics in this study. The one-way ANOVA followed by post hoc Tukey test indicated that the number of resistant bacterial strains as compared to sensitive strains was statistically significant (p≤0.000)(Figure 3).

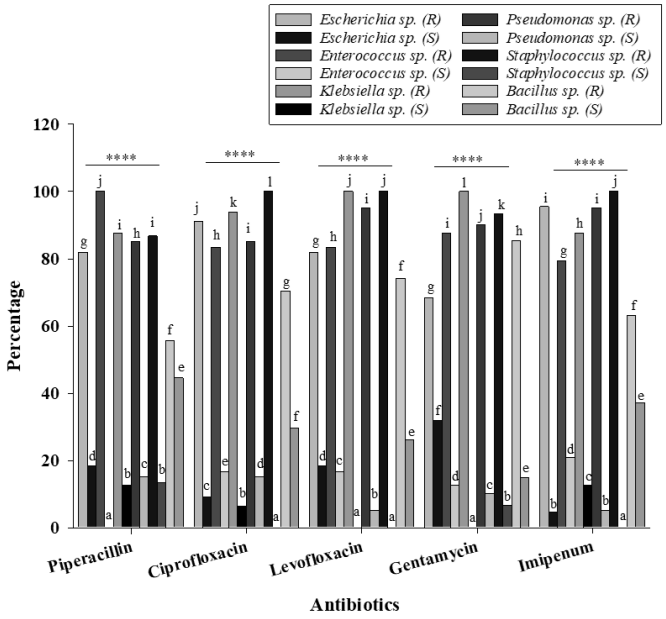


Figure 2: The percentage of Resistance (R) and Sensitivity (S) of Isolated Bacterial Strains Against Antibiotics

**** indicate p≤0.0001

DISCUSSION

Healthcare professionals have hands as one of the major routes through which microorganisms causing healthcare-associated infections are transmissible. Healthcare-associated infections (HAIs) represent a challenge that healthcare institutions face and may cause severe mortality and morbidity outcomes [19]. Correct hand hygiene practices are very important in reducing the transmission of pathogens and avoiding healthcare-associated infections. Healthcare professionals typically use various medical equipment (including stethoscopes) and personal electronic gadgets (including mobile phones) in healthcare settings. In recent research, there have been suggestions of the possibility of transmission of pathogenic bacteria through the use of mobile phones by medical practitioners [20]. Our research findings revealed that microbial contamination of the objects used by health care practitioners was very prevalent, and 60.13 percent were positive in cultures. Nevertheless, it should be remembered that the present study was limited to the ICU employees alone, and this might influence the extrapolation of our results to other hospital units or healthcare facilities having different workflow patterns and infection control behaviors. Further, 63.64% of lab technicians, 62.5% of ward boys, and 56.82% of the nursing staff were the highest contaminators. The results of this paper accentuate the great role of accessories as potential sources of spreading pathogens in the healthcare setting. The findings of the present study align with the recent

DOI: https://doi.org/10.54393/pbmj.v8i7.1314

research that highlights the dangers associated with the usage of personal accessories by healthcare workers. One of the studies established that nursing professionals often put on jewelry when attending to patients, which can undermine biosafety by acting as reservoirs of bacterial contamination [21]. A survey carried out in Karachi revealed that the micro-organisms, like methicillin-resistant strains, were found to contaminate 33.3 per cent of stethoscopes in the private hospitals and 51.6 per cent in the government hospitals. The fact that only 18 percent of the healthcare workers wash their stethoscopes is of great concern, which highlights the non-conformity to infection control measures [22]. We found Bacillus sp. (21.77%), Enterococcus sp. (19.35%), and Escherichia sp. (17.74%) as the most prevalent bacterial isolates on the accessories of healthcare workers, with Staphylococcus sp. (12.09%) being the least common. The results suggested that the wearings of healthcare employees serve as the reservoir of numerous species of bacteria. Our samples indicate that Bacillus sp. thrives, which agrees with the literature that shows how these spore-forming bacteria survive on inanimate surfaces and equipment, hence posing a potential source of contamination in medical facilities [23]. Similarly, the significant appearance of Enterococcus sp and Escherichia sp conforms to results in which the organisms are highlighted as common ones on accessories of the healthcare workers. One study that was conducted in Northwest Ethiopia has found that Escherichia coli is a major isolate of inanimate objects used by healthcare providers and the importance of such objects in harboring potential pathogens [23]. We have found that Staphylococcus sp., and S. aureus, in particular, were the least common, with 12.093 in contrast to the investigations that have found such organisms to be common contaminants on the accessories of healthcare workers. As a case study, S. aureus, and especially those resistant to methicillin (MRSA), have been well documented as a universal contaminant on stethoscopes and mobile phones in hospital settings, with this being a significant hazard in terms of transmission [24]. That Bacillus sp., Enterococcus sp., and Escherichia sp. have different prevalences than Staphylococcus sp. may mean hygiene practice, environmental, or material differences in the accessories. The same tendencies are found in research carried out in Africa, which shows that the degree of contamination depended on the functions of healthcare employees and their adherence to the disinfection procedures [25]. Our study results also revealed that the contamination of mobile phones was the highest among the whole bacterial isolates, with the lowest level of 45% and the highest of 60, respectively, and the contamination of the stethoscopes and hands was found to be 18.75-35.00% and 20.00-37.50% respectively. The findings are consistent with the current studies that highlight the role of mobile phones as the primary sources of bacterial contamination in healthcare settings [11]. In a research conducted in Saudi Arabia, contamination of mobile phones by bacteria was found in 72.11 percent of mobile phones used in central hospitals and 81.13 percent in peripheral hospitals, which indicates the importance of mobile devices as potential reservoirs of pathogens [26]. It has been found that worrying rates of antibiotic resistance exist in bacterial isolates sampled in healthcare-associated environments. The findings are consistent with the current research in the world, which highlights the emerging trend of antimicrobial resistance (AMR) in health care settings. According to a study on the bacterial distribution and drug resistance in 2018-2022 intensive care units, the resistance rates of Klebsiella pneumoniae to imipenem and meropenem were 14.0% and 14.4%, respectively, which indicates that the problem of resistance to this pathogen remains unsolved [27]. The overall resistance of Enterococcus sp. to topiperacillin observed in our experiment is similar to the natural resistance mechanisms that exist in enterococci. Naturally, enterococci tend to be less sensitive to penicillins, including piperacillin, due to the presence of low-affinity penicillin-binding proteins, rendering the treatment with such antibiotics less effective [28]. Strong resistance to ciprofloxacin, imipenem, and levofloxacin is a cause of major concern, as these antibiotics can often be utilized in the management of Staphylococcus infections. The identified resistance may be attributed to overuse and inappropriate utilization of the fluoroquinolones and carbapenems, which have led to the rise of resistance strains. There have been minimal decreases in the resistance rates of K. pneumoniae to the key antibiotics over the past years, meaning that persistent monitoring and stringent infection control measures are needed to prevent the spread of resistant strains [29].

CONCLUSIONS

The conclusion was made that cross-contamination is caused by the medical personnel and their devices. The results, even though important, can be applied mostly to the ICU setting and cannot be generalized to other healthcare settings. Consequently, the present research paper indicates that the medical personnel should adhere to the precautionary steps to minimize the bacterial infection. Further research could be undertaken to verify the number of people who contracted bacterial infections

DOI: https://doi.org/10.54393/pbmj.v8i7.1314

by the staff. This paper goes further to propose that the medical staff must be given personalized training by the healthcare department, and the medical staff should not be a contamination source to other patients, including non-diseased patients.

Authors Contribution

Conceptualization: NM
Methodology: HRK, MJ, AJ
Formal analysis: NM
Writing review and editing: HRK, NM, AT, TB, HJ, MJ

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Nepomuceno DB, Lima DV, Silva MO, Porto JC, Mobin M. Evaluation of Disinfectants to Eliminate Fungal Contamination in Computer Keyboards of an Integrated Health Center in Piauí, Brazil. Environmental Monitoring and Assessment. 2018 Oct; 190(10): 608. doi: 10.1007/s10661-018-6987-6.

[2] Qasemi M, Shams M, Sajjadi SA, Farhang M, Erfanpoor S, Yousefi M *et al.* Cadmium in Groundwater Consumed in the Rural Areas of Gonabad and Bajestan, Iran: Occurrence and Health Risk Assessment. Biological Trace Element Research. 2019 Dec; 192(2): 106-15. doi: 10.1007/s12011-019-1660-7.

[3] Ghaderpoori M, Paydar M, Zarei A, Alidadi H, Najafpoor AA, Gohary AH *et al.* Health Risk Assessment of Fluoride in Water Distribution Network of Mashhad, Iran. Human and Ecological Risk Assessment: An International Journal. 2019 May; 25(4): 851-62. doi: 10.1080/10807039.2018.1453297.

[4] Saleh HN, Kavosi A, Pakdel M, Yousefi M, Asghari FB, Mohammadi AA. Assessment Health Status of ICU Medical Equipment Levels at Neyshabur Hospitals Using ICNA and ACC Indices. MethodsX. 2018 Jan; 5: 1364-72. doi: 10.1016/j.mex.2018.10.016.

[5] Yousefi M, Saleh HN, Yaseri M, Mahvi AH, Soleimani H, Saeedi Z *et al.* Data on Microbiological Quality Assessment of Rural Drinking Water Supplies in Poldasht County. Data in Brief. 2018 Apr; 17: 763-9. doi: 10.1016/j.dib.2018.02.003.

[6] Russotto V, Cortegiani A, Raineri SM, Giarratano A. Bacterial Contamination of Inanimate Surfaces and Equipment in the Intensive Care Unit. Journal of Intensive Care. 2015 Dec; 3(1): 54. doi: 10.1186/s40560-015-0120-5.

[7] Sebola DC, Oguttu JW, Kock MM, Qekwana DN. Hospital-Acquired and Zoonotic Bacteria from A Veterinary Hospital and Their Associated Antimicrobial-Susceptibility Profiles: A Systematic Review. Frontiers In Veterinary Science. 2023 Jan; 9: 1087052. doi: 10.3389/fvets.2022.1087052.

[8] Okey-kalu EU and Nwankwo EO. Bacterial Contamination of Intensive Care Units at a Federal Medical Centre in Abia State, Nigeria. Suan Sunandha Science and Technology Journal. 2022 Nov; 9(1): 25-35.

[9] Blot S, Ruppé E, Harbarth S, Asehnoune K, Poulakou G, Luyt CE *et al.* Healthcare-Associated Infections in Adult Intensive Care Unit Patients: Changes in Epidemiology, Diagnosis, Prevention and Contributions of New Technologies. Intensive and Critical Care Nursing. 2022 Jun; 70: 103227. doi: 10.1016/j.iccn.2022.103227.

[10] Ababneh Q, Abulaila S, Jaradat Z. Isolation of Extensively Drug Resistant Acinetobacter Baumannii from Environmental Surfaces Inside Intensive Care Units. American Journal of Infection Control. 2022 Feb; 50(2): 159-65. doi: 10.1016/j.ajic.2021.09.001.

[11] Tusabe F, Kesande M, Amir A, Iannone O, Ayebare RR, Nanyondo J. Bacterial Contamination of Healthcare Worker's Mobile Phones: A Case Study at Two Referral Hospitals in Uganda. Global Security: Health, Science and Policy. 2022 Dec; 7(1): 1-6. doi: 10.1080/23779497.2021.2023321.

[12] Wei C, Li CZ, Löschel A, Managi S, Lundgren T. Digital Technology and Energy Sustainability: Recent Advances, Challenges, and Opportunities. Resources, Conservation and Recycling. 2023 Mar; 190: 106803. doi: 10.1016/j.resconrec.2022.106803.

[13] Jaber AS, Juma HA, Aliwi AA. Isolation of Pathogenic Bacteria from Equipment of the Care Units, Hands and Mobile Devices for Medical Staff in Educational Al-Hussein Hospital. Pakistan Journal of Medical and Health Sciences. 2023 Feb; 17: 484–. doi: 10.53350/pjmhs2023172484.

[14] Liaqat I, Muhammad N, Mubin M, Arshad N, Iftikhar T, Sajjad S *et al.* Antibacterial and Larvicidal Activity of Ethyl Acetate Extract of Actinomycetes from Soil Samples. Pakistan Journal of Zoology. 2023 Oct; 55(6): 2065-74. doi: 10.17582/journal.pjz/20200526130518.

[15] Bodena D, Teklemariam Z, Balakrishnan S, Tesfa T. Bacterial Contamination of Mobile Phones of Health Professionals in Eastern Ethiopia: Antimicrobial Susceptibility and Associated Factors. Tropical

DOI: https://doi.org/10.54393/pbmj.v8i7.1314

Medicine And Health. 2019 Feb; 47(1): 15. doi: 10.1186/s41182-019-0144-y.

[16] Araya S, Desta K, Woldeamanuel Y. Extended-Spectrum Beta-Lactamase-Producing Gram-Negative Bacteria on Healthcare Workers' Mobile Phones: Evidence from Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia. Risk Management and Healthcare Policy. 2021 Jan: 283-91. doi: 10.2147/RMHP.S291876.

[17] Abid S, Farid A, Abid R, Rehman MU, Alsanie WF, Alhomrani M *et al.* Identification, Biochemical Characterization, and Safety Attributes of Locally Isolated Lactobacillus Fermentum from Bubalus Bubalis (Buffalo) Milk as A Probiotic. Microorganisms. 2022 Apr; 10(5): 954. doi: 10.3390/microorganisms10050954.

[18] Liaqat I, Muhammad N, Ara C, Hanif U, Andleeb S, Arshad M *et al.* Bioremediation of Heavy Metals Polluted Environment and Decolourization of Black Liquor Using Microbial Biofilms. Molecular Biology Reports. 2023 May; 50(5): 3985-97. doi: 10.1007/s11033-023-08334-3.

[19] Dalton KR, Rock C, Carroll KC, Davis MF. One Health in Hospitals: How Understanding the Dynamics of People, Animals, and the Hospital Built-Environment Can Be Used to Better Inform Interventions for Antimicrobial-Resistant Gram-Positive Infections. Antimicrobial Resistance and Infection Control. 2020 Jun; 9(1): 78. doi: 10.1186/s13756-020-00737-2.

[20] Pace MC, Corrente A, Passavanti MB, Sansone P, Petrou S, Leone S *et al.* Burden of Severe Infections Due to Carbapenem-Resistant Pathogens in Intensive Care Unit. World Journal of Clinical Cases. 2023 May; 11(13): 2874. doi: 10.12998/wjcc.v11.i13.2874.

[21] Fracarolli IF, Watanabe E, Oliveira VD, Machado MB, Bim FL, Bim LL *et al.* The Implications of Healthcare Professionals Wearing Jewelry on Patient Care Biosafety: Observational Insights and Experimental Approaches. Scientific Reports. 2024 Aug; 14(1): 18601. doi: 10.1038/s41598-024-69711-x.

[22] Rao DA, Aman A, Muhammad Mubeen S, Shah A. Bacterial Contamination and Stethoscope Disinfection Practices: A Cross-Sectional Survey of Healthcare Workers in Karachi, Pakistan. Tropical Doctor. 2017 Jul; 47(3): 226-30. doi: 10.1177/0049475516686543.

[23] Kindie S, Mengistu G, Kassahun M, Admasu A, Dilnessa T. Bacterial Profile and Antimicrobial Susceptibility Patterns of Isolates from Inanimate Objects Used by Healthcare Professionals at Debre Markos Comprehensive Specialized Hospital, Northwest Ethiopia. PLOS One. 2024 Nov; 19(11): e0313474. doi: 10.1371/journal.pone.0313474.

[24] Mushabati NA, Samutela MT, Yamba K, Ngulube J, Nakazwe R, Nkhoma P *et al.* Bacterial Contamination of Mobile Phones of Healthcare Workers at the University Teaching Hospital, Lusaka, Zambia. Infection Prevention in Practice. 2021 Jun; 3(2): 100126. doi: 10.1016/j.infpip.2021.100126.

[25] Mshelia MB, Zenoh DA, Fasogbon IV, Micheal NY, Obi C, Adam M *et al.* Antibacterial Resistance Genes Frequently Detected in Nigeria. African Journal of Biomedical Research. 2024 Sep; 27(2): 225-41.

[26] Dhayhi N, Kameli N, Salawi M, Shajri A, Basode VK, Algaissi A *et al.* Bacterial Contamination of Mobile Phones Used by Healthcare Workers in Critical Care Units: A Cross-Sectional Study from Saudi Arabia. Microorganisms. 2023 Aug; 11(8): 1986. doi: 10.3390/microorganisms11081986.

[27] Chang F, Wang X, Huang X, Liu X, Huang L. Analysis on Bacterial Distribution and Change of Drug Resistance Rate in ICUs Across Southwest China from 2018 to 2022. Infection and Drug Resistance. 2023 Dec: 5685-96. doi: 10.2147/IDR.S421357.

[28] Khan A, Miller WR, Axell-House D, Munita JM, Arias CA. Antimicrobial Susceptibility Testing for Enterococci. Journal of Clinical Microbiology. 2022 Sep; 60(9): e00843-21. doi: 10.1128/jcm.00843-21.

[29] Pulingam T, Parumasivam T, Gazzali AM, Sulaiman AM, Chee JY, Lakshmanan M *et al.* Antimicrobial Resistance: Prevalence, Economic Burden, Mechanisms of Resistance and Strategies to Overcome. European Journal of Pharmaceutical Sciences. 2022 Mar; 170: 106103. doi: 10.1016/j.ejps.2021.106103.