Pakistan Journal of
Medical & Dental Sciences

ISSN 0000-333X
CODEN PJMDS

Volume 1 Issue 1 January - June 2024

# PJMDS

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**Editorial Correspondence:** editor@pjmds.online & editorial_office@pjmds.online
**Website:** www.pjmds.online
**Publisher:** SCORM Services (Rgd)
**Designed and Layout by:** Yasir Shaikh
Graphic Designer, SCORM Services

Pakistan Journal of
Medical & Dental Sciences

Volume 1 - Issue 1, January - June 2024

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MS No: PJMDS/Editorial/023/2024



# The Growth of Research Publications in Health Sciences in Pakistan over the Last Few Years

Nazeer Khan

The health sciences sector in Pakistan has experienced substantial growth in terms of research output. This increase, driven by a combination of institutional reforms, international collaborations, and a growing academic culture, reflects the nation's commitment to improving healthcare outcomes through research. Various factors, including governmental initiatives, increased funding, and academic partnerships, have contributed to this expansion. According to Scopus and Web of Science databases, the number of research articles published by Pakistani health science scholars has significantly increased since 2013. Universities, teaching hospitals, and research institutions have ramped up their focus on scientific inquiry, leading to a surge in publications on various topics, ranging from public health and epidemiology to clinical medicine and biomedical sciences.

Web of Science™ indicated three main factors for this fabulous growth of Pakistani publications:

- The number of publications by Pakistani authors increased by 300% in 2019 compared to 2010, as shown by the Web of Science Core Collection.
- From 2010 to 2019, more than half of Pakistan's research was published in Impact Factor journals. As more Pakistanis publish in top-quality journals, Pakistan's publications are increasing its global influence.
- The Category Normalized Citation Impact of Pakistan's publications (which measures publications' impact against their peers worldwide) has risen from 0.67 to 1.03.[1]

Elsevier-Scopus reported in 2021 that Pakistan contributed 201,807 documents in all the fields of knowledge from 2001 to 2020. The proportion of medical sciences covers more than one-fourth (n=54,717; 27%), with an average of 2735.85 documents per year.[2]

One of the driving forces behind this growth is the Higher Education Commission (HEC) of Pakistan, which has made concerted efforts to enhance research capacity. The HEC's research funding programs and initiatives, such as the National Research Program for Universities (NRPU) and the establishment of the Pakistan Research Repository, have been critical in supporting scholars and fostering a research culture.

In addition to national efforts, international collaborations have been pivotal. Pakistani researchers have increasingly partnered with scholars from developed countries, particularly the United States, the United Kingdom, and China, leading to joint research ventures and co-authored publications. Hasan and Zafar[3] showed that the international collaborative percentage for publications was 64.9% during the COVID period and ranked 5th in the list. These collaborations have not only improved the quality of research but also boosted visibility in high-impact journals.

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***Submitted:*** *September 20, 2024*
***Accepted:*** *September 23, 2024*

## Key Areas of Growth in Pakistan's Health Sciences Research

Several areas within health sciences have seen remarkably rapid growth in Pakistan. Public health research, for instance, has flourished in response to pressing national challenges such as infectious diseases (e.g., tuberculosis, dengue, and, more recently, COVID-19), malnutrition, and maternal and child health. During the COVID-19 period, Pakistan's rate of publication growth was 34.9%, just behind Saudi Arabia and Egypt.[3]

In addition to clinical research, biomedical sciences have a marked increase in publication, contributing to advancements in molecular biology, genetics, and pharmacology. Furthermore, mental health research has also seen a marked upturn in publications, reflecting a growing recognition of the mental health crisis in Pakistan.

## Health Sciences Research: Pakistan vs. Other Countries

While Pakistan's growth in research publications is notable, comparing this progress with other nations provides valuable insights into its trajectory. Countries such as India and Iran-nations with similar socioeconomic conditions-offer relevant points of comparison.

It was pretty clear that India has outpaced Pakistan in the research output of the two countries. Scopus data shows more than 20,000 papers published in health sciences by Indian researchers in the year 2022 compared to over 3,000 in Pakistan. Nevertheless, comparatively, Pakistan's growth rate in health sciences research is higher. A decade ago, India produced more research than Pakistan-by a long way: strong growth is therefore to be expected from there; in relative terms, Pakistani gains are much larger.

Iran's publication in health sciences on Scopus exceeded 10,000 papers when compared with Pakistan in 2022. Iran has the tools to be a science superclass, including the very real idea of linking research to clinical practice and a mature pharmaceutical industry as well as substantial investments in biotechnology. Pakistan is well below Iran in the total research output; however, the Pakistani research environment was harsher to work due to political instability conditions and economic constraints as well as weaker healthcare infrastructure.

Although on the bright side, Pakistan has seen healthy growth in research publications -but it also poses significant challenges that can be a hindrance to its advance ahead. There is simply not enough funding to support an ever-growing need for health sciences research. The NRPU (National Research Program for Universities) by HEC, has not been funded, which used to be the main source of research funding in Pakistan and used to support R&D at Higher Education Institutions. The average spending in research and development (R&D) as a percentage of GDP is still negligibly small compared to neighbouring countries like India and Iran.

Some smaller universities and healthcare institutions lack

sufficient research infrastructure to conduct translational studies. The bigger organizations in urban areas are funded for better laboratories/research equipment, whereas those with small scale facilities and researchers working in rural/ small cities are short of funding which ultimately constraints them from getting into the high-quality research work.

## CONCLUSION

The progress that Pakistan has made in the field of health sciences research isn't just a mark of dedication and resilience but also speaks volumes about the quality of medical knowledge it is capable of achieving. Although there are still obstacles, especially in term of funding and infrastructure, the future looks good if things go on like this. Investing in research infrastructure, international collaborations and translation of research into practice will be key if Pakistan hopes to become a regional leader in health sciences research. Pakistan may not yet stack up to output similar to those seen in India and Iran, but the increasing trend will hopefully continue and be a good sign for the future of global health research from this country.

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**How to cite:** Nazeer K. The Growth of Research Publications in Health Sciences in Pakistan over the Last Few Years. Pak J Med Dent Sci. 2024;1(1): 1-2.

MS No: PJMDS/OA/019/2024

Original Article

# Dexmedetomidine as an Additive to Spinal Anaesthesia in Orthopaedic Patients undergoing Lower Limb Surgeries: A Randomized Clinical Trial Comparing Two Different Doses of Dexmedetomidine

Waqar Hussain[1], Kelash Kumar[2], Aqsa Soomro[3], Arslan Baig[4], Pardeep Kumar[5]

## ABSTRACT

**Objective:** To compare the outcome of two different doses of dexmedetomidine (3 ?g and 5 ?g) given in combination with 0.5% hyperbaric bupivacaine via intrathecal route in patients undergoing lower limb orthopedic surgeries at LUMHS Jamshoro.

**Methodology:** A randomized controlled trial done at LUMHS, Jamshoro, from March 2023 to March 2024. 114 patients (ASA ?2) planned for lower limb orthopedic surgery were randomly allocated into two groups. Group A were given 12.5 mg of 0.5% hyperbaric bupivacaine plus dexmedetomidine (3 $\mu$g) intrathecally whereas group B received the same combination with 5 $\mu$g dexmedetomidine. The primary outcomes of this study were sensory and motor block assesment score, hemodynamic responses, and any complication associated during the perioperative period. The data was then statistically analyzed with SPSS version 26 and the level of significance (P <0.05).

**Results:** Group A had a mean age of 37.38 ± 22.57 years, and group B, 41.40 ± 22.36 years. Group A had 72% males and 28% females, while group B had 56% males and 44% females. No intergroup differences were detected while comparing results for TTHSB, TTBS4 and TDOS (p = 0.612, p = 0.230 and p = 0.602 respectively). However, significant differences were observed for time to sensory block initiation (TTSI) (p = 0.003) and time to first rescue analgesia (TTFRA) (p = 0.0001), indicating variations in sensory block initiation and the time to first rescue analgesia between the groups.

**Conclusion:** This study confirmed that supplementation of dexmedetomidine, usually at 5 $\mu$g, can be a useful adjuvant to hyperbaric bupivacaine for lower limb surgeries under spinal anesthesia. It is longer acting and has a prolonged time to first rescue with higher dose which makes it suitable for long duration procedures. Results of our study suggest that further investigations need to be carried out in order to detect a dose where these two parameters are a more balanced concomitant effect without causing hemodynamic instability.

**Keywords:** Anaesthesia , dexmedetomidine, orthopaedic, lower limb, surgery

## INTRODUCTION

Trauma continues to be a major contributor to mortality and morbidity, disability burden, economic costs[1]. Apart from the immediate traumatic physical suffering, there is often prolonged, pain and psychological morbidity and something we particularly see in orthopaedic trauma. Better pain control has facilitated early mobility and may result in fewer long-term sequelae[2], contributing to better overall outcomes. Good pain control can facilitate recovery from orthopedic surgeries, and this is particularly important for lower limb orthopedic procedures[3].

During recent years, dexmedetomidine (DEX), a selectively stimulating?- 2 adrenoceptor agonist, has emerged as an efficacious local anesthetic (LA) adjuvant in regional and spinal anesthesia. Originally clearanced for ICU sedation, it is now widely used as a surgical anesthetic given its properties of sedation, anxiolysis, and opioid-sparing effects with minimal respiratory depression[4,5]. When used as an intrathecal adjuvant, dexmedetomidine along with local anaesthetics such as 0.5% hyperbaric bupivicaine is proven to increase the duration of both sensory and motor blockade hence being beneficial in surgeries requiring longer analgesia[6,7].

Spinal anesthesia is the method chosen most frequently for lower limb surgery because of its high quality sensory block. Nonetheless, the duration of 0.5% hyperbaric bupivacaine by itself is relatively short and a prolonged surgery could be converted to general anesthesia,[8,9]. Dexmedetomidine inhibits the release of neurotransmitter in presynaptic C-fibers and postsynaptic dorsal horn neurons, thereby prolonging both sensory[10] and motor blockades at LA concentrations that do not completely block. Two to three studies have assessed different dexmedetomidine doses (2 > 10 $\mu$g), aiming for pain control without significant adverse effects[11].

Previous studies have shown that dexmedetomidine could improve block quality and decrease the number of rescue analgesia during orthopedic surgeries[12,13]. Nonetheless, no agreement exists regarding the optimal dosing regimen for achieving maximum analgesic effectiveness with minimal adverse events[14].

The present study aims to compare the effects of two different doses of dexmedetomidine (3 $\mu$g, 5 $\mu$g) by adding it with 0.5% hyperbaric bupivacaine in lower limb orthopedic surgeries. Possible dosing strategies to limit these unwanted effects in an effort to optimize patient comfort and surgical outcomes are being additionally assessed during this study using parameters such as sensory block duration, motor block properties and requirements for postoperative analgesia.

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***Submitted:*** *August 30, 2024*
***Revised:*** *September, 16, 2024*
***Accepted:*** *September 16, 2024*

## METHODOLOGY

A randomized controlled trial was conducted from March 2023 to March 2024 at Department of Anaesthesia, LUMHS, Jamshoro. This study was conducted to compare the efficacy of two doses of dexmedetomidine (3 $\mu$g and 5 $\mu$g) with intrathecal levobupivacaine in lower limb orthopedic surgery. This study included 114 patients, aged between 20 and 80 years, with ASA class I or II, scheduled for elective lower limb orthopedic surgery. A computer-generated random number sequence was used to randomly assign 57 patients each to two groups. Group A (received 12.5 mg bupivacaine 0.5% hyperbaric +3 $\mu$g dexmedetomidine) and Group B (received same dosage with 5 $\mu$g dexmedetomidine).

Patients aged 20-80 years with ASA class ? II were recruited for the study while those meeting any of exclusion criteria such as ASA III or above, allergy to study drugs, significant cardiovascular disease, hepatic disease, renal disorder pre-eclampsia that may require general anesthesia instead of spinal anesthesia and neurological diseases, pregnancy obesity (BMI > 35), and contraindication to spinal analgesia would be excluded. Patient was positioned in left lateral decubitus and standard subarachnoid anesthesia was given at the L3-L4 or L4-L5 interspace with 25-gauge Quincke needle. Standard monitoring, including ECG, heart rate, blood pressure and oxygen saturation was maintained throughout the procedure.

The primary outcomes assessed were the time to the highest sensory block (TTHSB), time to Bromage scale 4 (TTBS4), total duration of sensory block (TDOS), and time to first rescue analgesia. Statistical analyses were performed with SPSS v. 26. Continuous variables were presented as means ± standard deviation and categorical data in frequency including percentage. The independent t-test was used to independently compare groups; the significance level was set at 5%.

## RESULTS

Table I shows the demographic characteristics and clinical outcomes of patients in both groups (50 patients for each group). There was a small non-significant difference in mean age between Group A (37.38 ± 22.57 years) and Group B (41.40 ± 22.36 years) (p = 0.373). There was no significant difference in time to highest sensory block between the groups; group A required 3.46 ± 1.19 minutes and group B required 3.58 ± 1.16 min (p =0.612). No significant difference was found for time to Bromage scale 4 (TTBS4) which was also comparable between Group A: 5.22 ± 1.43 min and Group B: 4.88 ± 1.38 min (p =0.230). On the other hand, the time to sensory block initiation (TTSI) was significantly different: Group A = 22.14 ± 4.28 minutes and Group B = 24.92 ± 4.73 minutes, (p = 0.003). The total duration of sensory block (TDOS) was 152.10 ± 26.53 min in Group A and 149.30 ± 26.95 min in Group B with no difference among groups (p = 0.602). However, there was a significant difference in the time to first rescue analgesia (TTFRA) at 208.90 ± 43.16 minutes and 270.80 ± 50.12 minutes in Groups A and B, respectively (p = 0.0001). Analysis of the distribution of gender between groups revealed that there were no statistically significant group differences regarding this issue, with 72% of males and 28% of females in Group A and 56% of males and 44% of females in Group B (p = 0.096). The ASA status distribution was not significantly different among the groups: 74% of Group A classified as ASA I vs. 68% in Group B (p = 0.509). Time to sensory block initiation and time to first rescue analgesia are the two parameters in which statistically significant differences were observed with other parameters like age, sex, ASA status, TTHSB, TTBS4and TDOS did not show a statistically difference.

Measurement between mean heart rate of preoperative and intraoperative period for Group A compared with Group B was shown in Table II. Group A had a mean heart rate at preoperatively 88.10 ± 10.63 bpm, and group B was 86.68 ± 9.55 bpm (p = 0.484). At 2 minutes, the heart rates were 86.80 ± 10.63 bpm for Group A and 84.70 ± 12.06 bpm for Group B (p = 0.358), and at 4 minutes, the heart rates were 85.48 ± 11.24 bpm for Group A and 85.18 ± 11.31 bpm for Group B (p = 0.894). At 6 minutes, Group A had a mean heart rate of 82.86 ± 13.59 bpm and Group B had 83.98 ± 12.95 bpm (p = 0.674).

Table III Comparison of mean systolic blood pressure between two groups ( Group A and Group B) during pre-operative & intra operative period The mean pre-operative systolic blood pressure in group A was 129.12 ± 9.56 mmHg whereas in group B it was 133.72±10.95mmHg; which was statistically significant, (p =0.028). After 2 minutes, the systolic blood pressure was 126.16 ± 8.61 mmHg in group A vs. 128.46 ± 8.11 mmHg in Group B (p = 0.173).

Systolic blood pressures were comparable between groups at 4 min (P = 0.335), 6 min (P = 0.500), 8 min (P = 0.261) and 10 min (P = 0.626). There were no significant differences between the groups at 15 min (p = 0.570), 30 min (p = 0.899),45 minutes (p = 0.299) and 60 minutes (p = 0.631). At the end of surgery, systolic blood pressure (Group A: 120.86 ± 12.30 mmHg; Group B: 123.26 ± 11.92 mmHg) was similar and not statistically different between the two groups (p = 0.324).

Heart rates at 8, 10 and 15 min during the surgery were also similar among groups with P values of 0.436, 0.871 and 0.934 respectively. There were no differences in the heart rates among the two groups at 30, 45 and 60 minutes, p values =0.898, 0.670 and 0.930 respectively (Table-IV). By the end of surgery, Group A had a heart rate of 76.66 ± 10.66 bpm, and Group B had 77.50 ± 10.30 bpm, with no significant difference (p = 0.690).

Comparison of Mean Diastolic BP between Group A and Group B at different time intervals with the reference to Preoperative value and intraoperative state. The average diastolic BP preoperatively was 77.68 ± 11.44 mmHg in Group A and 79.18 ± 10.81 mmHg in Group B, (p =0.502). The diastolic blood pressure both in Group A and in Group B showed no significant difference (2 minutes: 78.26 ± 11.04 vs. 77.16 ± 11.43 mmHg, p = 0.626).

During the surgery, the diastolic blood pressures at 4, 6, 8 and 10 minutes were also no significantly different (p =0.498; p=0.697; p=0.699; p=0.798). Again, no statistically significant differences were seen between the groups at 15, 30, 45 and 60 minutes (P = 0.644, P =0.811, P =0.746 and P =0.667 respectively). By the end of surgery, mean diastolic blood pressure in Group A was 71.74 ± 11.61 mmHg and in Group B it was 73.28 ± 11.95 mmHg with no significant difference (p = 0.515).

Table V shows the comparison of Mean Arterial Pressure (MAP) between Group A and Group B at different time interval pre-operatively and during the intraoperative period. The MAP of both group patients had no significant difference pre-operatively (Group A: 97.70 ± 7.57 mmHg; Group B: 98.40 ± 7.31 mmHg; p = 0.639). MAP at 2 minutes for Group A was 96.10 ± 7.77 mmHg and in Group B it was 96.60 ± 8.04 mmHg, with no statistically significant difference (p =0.753). There was no significant between-group difference at 4 min (p = 0.471), 6 min (p = 0.590), 8 min (p = 0.218) and at 10 minutes of MAP

values change post-intervention ( p = 0.652).

There was no statistical significance in MAP for Group A and Group B at 15 minutes (p=0.647), 30 minutes (p=0.472), 45 minutes (p=0.547) and 60 minutes (p=0.632). There was no significant difference between two groups at the end of surgery; in group A MAP 90.70 ± 10.35 mmHg, as well as in group MAP 92.50 ± 10.41 mmHg, (p = 0.388).

**Table I: Demographic Characteristics of Study Participants (n=100)**

| Variables | | Group A (n=50) | Group B (n=50) | 95% C. I | P-Value |
|---|---|---|---|---|---|
| Age in years, Mean ± SD | | 37.38 ± 22.57 | 41.40 ± 22.36 | 34.94----43.84 | 0.373 |
| TTHSB in mins, Mean ± SD | | 3.46 ± 1.19 | 3.58 ± 1.16 | 3.29----3.75 | 0.612 |
| TTBS4 in mins, Mean ± SD | | 5.22 ± 1.43 | 4.88 ± 1.38 | 4.77----5.33 | 0.230 |
| TTSI in mins, Mean ± SD | | 22.14 ± 4.28 | 24.92 ± 4.73 | 22.60----24.46 | 0.003 |
| TDOS in mins, Mean ± SD | | 152.10 ± 26.53 | 149.30 ± 26.95 | 145.41----155.99 | 0.602 |
| TTFRA in mins, Mean ± SD | | 208.90 ± 43.16 | 270.80 ± 50.12 | 228.74----250.96 | 0.0001 |
| Gender | Male, *n* (%) | 36 (72.0) | 28 (56.0) | 0.879----4.645 | 0.096 |
| | Female, *n* (%) | 14 (28.0) | 22 (44.0) | | |
| ASA Status | I, *n* (%) | 37 (74.0) | 34 (68.0) | 0.563----3.189 | 0.509 |
| | II, *n* (%) | 13 (26.0) | 16 (32.0) | | |

**Table II: Comparison of Mean Heart Rate Between Two Groups (n=100)**

| Variables | Group A (n=50) | Group B (n=50) | 95% C. I | P-Value |
|---|---|---|---|---|
| Pre-Operative | 88.10 ± 10.63 | 86.68 ± 9.55 | 85.39----89.39 | 0.484 |
| At 2 min | 86.80 ± 10.63 | 84.70 ± 12.06 | 83.50----88.00 | 0.358 |
| At 4 min | 85.48 ± 11.24 | 85.18 ± 11.31 | 83.10----87.56 | 0.894 |
| At 6 min | 82.86 ± 13.59 | 83.98 ± 12.95 | 80.80----86.04 | 0.674 |
| At 8 min | 82.00 ± 11.29 | 80.16 ± 12.18 | 78.75----83.41 | 0.436 |
| At 10 min | 80.14 ± 12.10 | 79.74 ± 12.43 | 77.52----82.36 | 0.871 |
| At 15 min | 79.66 ± 12.18 | 79.46 ± 12.05 | 77.17----81.95 | 0.934 |
| At 30 min | 77.36 ± 11.59 | 77.66 ± 11.85 | 75.19----79.83 | 0.898 |
| At 45 min | 77.26 ± 11.23 | 78.20 ± 10.75 | 75.56----79.90 | 0.670 |
| At 60 min | 76.22 ± 11.46 | 76.02 ± 11.26 | 73.88----78.36 | 0.930 |
| End of Surgery | 76.66 ± 10.66 | 77.50 ± 10.30 | 75.01----79.15 | 0.690 |

| Table Ⅲ: Comparison of Mean Systolic Blood Pressure Between Two Groups (n=100) | | | | |
|---|---|---|---|---|
| **Variables** | **Group A (n=50)** | **Group B (n=50)** | **95% C. I** | **P-Value** |
| Pre-Operative | 129.12 ± 9.56 | 133.72 ± 10.95 | 129.34----133.50 | 0.028 |
| At 2 min | 126.16 ± 8.61 | 128.46 ± 8.11 | 125.64----128.98 | 0.173 |
| At 4 min | 122.98 ± 10.95 | 125.08 ± 10.70 | 121.88----126.18 | 0.335 |
| At 6 min | 120.70 ± 11.16 | 122.24 ± 11.60 | 119.22----123.72 | 0.500 |
| At 8 min | 116.76 ± 13.81 | 119.86 ± 13.59 | 115.59----121.03 | 0.261 |
| At 10 min | 115.76 ± 14.62 | 117.16 ± 14.01 | 113.63----119.29 | 0.626 |
| At 15 min | 111.80 ± 14.07 | 113.46 ± 15.05 | 109.75----115.51 | 0.570 |
| At 30 min | 112.40 ± 14.16 | 112.76 ± 13.99 | 109.80----115.36 | 0.899 |
| At 45 min | 109.50 ± 12.06 | 112.16 ± 13.36 | 108.30----113.36 | 0.299 |
| At 60 min | 110.30 ± 12.07 | 111.46 ± 11.99 | 108.50----113.26 | 0.631 |
| End of Surgery | 120.86 ± 12.30 | 123.26 ± 11.92 | 119.66----124.46 | 0.324 |

| Table Ⅳ: Comparison of Mean Diastolic Blood Pressure Between Two Groups (n=100) | | | | |
|---|---|---|---|---|
| **Variables** | **Group A (n=50)** | **Group B (n=50)** | **95% C. I** | **P-Value** |
| Pre-Operative | 77.68 ± 11.44 | 79.18 ± 10.81 | 76.23----80.63 | 0.502 |
| At 2 min | 78.26 ± 11.04 | 77.16 ± 11.43 | 75.49----79.93 | 0.626 |
| At 4 min | 74.52 ± 11.66 | 76.12 ± 11.83 | 72.99----77.65 | 0.498 |
| At 6 min | 73.36 ± 11.52 | 74.26 ± 11.51 | 71.53----76.09 | 0.697 |
| At 8 min | 69.30 ± 11.83 | 70.20 ± 11.34 | 67.46----72.04 | 0.699 |
| At 10 min | 71.24 ± 11.67 | 70.64 ± 11.68 | 68.63----73.25 | 0.798 |
| At 15 min | 68.80 ± 11.00 | 67.80 ± 10.56 | 66.17----70.43 | 0.644 |
| At 30 min | 68.70 ± 10.68 | 68.20 ± 10.14 | 66.39----70.51 | 0.811 |
| At 45 min | 68.10 ± 10.74 | 68.80 ± 10.81 | 66.32----70.58 | 0.746 |
| At 60 min | 66.84 ± 10.43 | 67.74 ± 10.40 | 65.23----69.35 | 0.667 |
| End of Surgery | 71.74 ± 11.61 | 73.28 ± 11.95 | 70.18----74.84 | 0.515 |

| Table V: Comparison of MAP Between Two Groups (n=100) | | | | |
|---|---|---|---|---|
| **Variables** | **Group A (n=50)** | **Group B (n=50)** | **95% C. I** | **P-Value** |
| Pre-Operative | 97.70 ±7.57 | 98.40 ± 7.31 | 96.58----99.52 | 0.639 |
| At 2 min | 96.10 ± 7.77 | 96.60 ± 8.04 | 94.79----97.91 | 0.753 |
| At 4 min | 92.10 ± 9.64 | 93.50 ±9.70 | 90.89----94.71 | 0.471 |
| At 6 min | 90.70 ± 10.35 | 91.80 ± 9.98 | 89.24----93.26 | 0.590 |
| At 8 min | 86.10 ± 9.56 | 88.50 ± 9.78 | 85.38----89.22 | 0.218 |
| At 10 min | 87.20 ± 9.66 | 88.06 ± 9.32 | 85.75----89.51 | 0.652 |
| At 15 min | 84.86 ± 9.87 | 85.76 ± 9.71 | 83.37----87.25 | 0.647 |
| At 30 min | 84.66 ± 9.65 | 83.26 ± 9.71 | 82.04----85.88 | 0.472 |
| At 45 min | 83.42 ± 9.77 | 84.56 ± 9.09 | 82.12----85.86 | 0.547 |
| At 60 min | 82.72 ± 9.92 | 83.66 ± 9.63 | 81.26----85.12 | 0.632 |
| End of Surgery | 90.70 ± 10.35 | 92.50 ± 10.41 | 89.54----93.66 | 0.388 |

## DISCUSSION

This study was done to evaluate the two different doses (3 $\mu$g and 5 $\mu$g) of dexmedetomidine when used along with 0.5% hyperbaric bupivacaine for spinal anesthesia in patients who underwent lower limb orthopedic surgeries. The results showed that both doses prolong sensory and motor block durations but the 5 $\mu$g dose is significantly more effective in duration parameters as well as TTFRA. These results confirmed that dexmedetomidine had dose-dependent effects, as previous studies have shown.

The main results in the form of time for sensory block initiation (TTSI) and first demand analgesia were found to be statistically significant when compared between the two groups with Group B (5ug.) showing delayed onset of sensory block and longer need of rescue analgesia. This is consistent with the results of Chakraborty et al. (2024) and Patel et al. Similarly higher dose of dexmedetomidine was associated with longer duration of spinal anesthesia and early post-operative analgesia as also observed by Prabhu et al. (2023). Additionally, Naik et al. The study by Sun (2020) found that the higher dose of intrathecal dexmedetomidine reduced the use of postoperative rescue analgesics, and this further confirmed our results.

Despite the sympatholytic characteristics of dexmedetomidine, that study also demonstrated a similar hemodynamic stability between both groups5. Consistent with Biradar et al, groups maintained stable heart rate and systolic and diastolic blood pressures throughout the procedure. (2024) and Alshawadfy et al. [2022]) who also found only insignificant side hemodynamic changes when dexmedetomidine was used in spinal anesthesia. It not only indicates that dexmedetomidine in 3 ?g and 5 ?g doses can be inculcated intrathecally but also it does no longer precis the hemodynamic balance.

Although it provide a longer duration of analgesia the time to sensory block (TTSI) was delayed in the 5 $\mu$g group, possibly making this formulation less suitable for short procedures where fast onset is required. This indeed reflects the findings reported by Karimi et al. (2021) showed that dexmedetomidine in higher doses results in prolonged analgesia, this may not be ideal for surgeries when a fast block onset is needed.

It is true that the study does have some limitations, but it highlights positive results from participation. The combinatory design and relatively small sample may limit the generalizability of the results. Additionally, we did not collect data on long-term follow-up in order to detect the duration that the effects of dexmedetomidine were delayed. This study needs to be validated in large-sample, multicenter trials. Additional research, should explore the dose response of dexmedetomidine that will produce an extended period of analgesia without rapidly delaying sensory block onset.

## CONCLUSION

This study proves that dexmedetomidine may be a better adjuvant to hyperbaric bupivacaine in spinal anesthesia for lower limb surgeries and dose of 5 $\mu$g was highly efficacious. Increased dose prolongs duration of analgesic action and onset of rescue analgesia, hence this is suitable for longer procedures. Future studies would be required to establish the ideal dose with effective analgesia but without a delay in onset of sensory block and hemodynamic stability.

**Conflict of Interest:** Authors declare there is no conflict of interest.

**Authors' Contributions:** **Waqar H:** Conceived and designed the study, supervised its implementation, and drafted the manuscript. **Kelash K:** developed the study protocol, performed statistical analyses, and interpretation of results. **Aqsa S:** managed data collection, conducted additional statistical analyses, and revised the manuscript. **Arslan B:** assisted with patient recruitment, contributed to data collection, and worked on the discussion. **Pardeep K:** supported data collection, performed additional statistical analysis, and reviewed and edited the manuscript.?

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**How to cite:** Waqar H, Kelash K, Aqsa S, Arslan B, Pardeep K. Dexmedetomidine as an Additive to Spinal Anaesthesia in Orthopaedic Patients undergoing Lower Limb Surgeries: A Randomized Clinical Trial Comparing Two Different Doses of Dexmedetomidine. Pak J Med Dent Sci. 2024;1(1): 3-8

MS No: PJMDS/OA/011/2024

Original Article

# Frequency of Measles and It's Complications in Malnourished Children

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## ABSTRACT

**Objective:** To determine the frequency of measles and its complications in malnourished children visiting a tertiary care hospital Larkana

**Introduction:** Measles, a highly contagious viral infection, remains a major global health issue, especially in low-income countries with poor healthcare systems. Despite the availability of a low-cost vaccine, measles causes significant morbidity and mortality, particularly in malnourished children. Complications include severe CNS infections and secondary issues like diarrhea and pneumonia.

**Methodology:** The Paediatric Medicine Department at Shaheed Mohtarma Benazir Bhutto Medical University (SMBBMU), Larkana conducted a six-month descriptive cross-sectional research which was conducted from January to June 2021. The research focused on children aged 6 months to 14 years who presented with measles. The patients were assessed for measles and related complications i.e. pneumonia, gastroenteritis, and encephalitis. The data was gathered using a standardized form and analyzed using the SPSS software, specifically version 26.0.

**Results:** A total of 142 children were enrolled in the study, with a mean age of 3.57 ± 2.62 years. The majority of the participants were male (54.2%), compared to 45.8% female. Measles was observed in 59.2% of children. Among the complications associated with measles, 26.2% of the children developed pneumonia, 8.3% experienced otitis media, 19% suffered from gastroenteritis, 16.7% presented with conjunctivitis, and 3.6% were diagnosed with encephalitis.

**Conclusion:** It is to be concluded that pneumonia emerged as the most common complication of measles, followed by conjunctivitis and gastroenteritis. These complications emphasize the need for vaccination and early intervention. Further research is crucial to understand contributing factors and improve public health strategies in pediatric care.


**Keywords:** Complications, malnourished, measles, vaccination

## INTRODUCTION

Measles, an exceedingly contagious viral infection induced by the measles virus, continues to pose a significant threat to the health of children worldwide. Measles is prevalent worldwide, and outbreaks often occur mostly during the spring and winter seasons[1]. Despite the presence of a low-cost vaccination, it remains a significant global health issue and continues to be a top cause of death in children[2].

The occurrence of the condition in youngsters ranges from 58% during epidemics to 10-15% during periods of endemicity. In 2010, the total number of fatalities worldwide amounted to 139,300, with over 95% occurring in low-income nations that had inadequate healthcare systems. Measles is far more severe in malnourished children, with a fatality rate up to 400 times greater compared to well-nourished children who get measles[3].

The widespread presence of confirmed measles infections in Pakistan rose from 24.6 per million cases during the period from 2000 to 2009 to 80.4 per million cases between 2010 and 2018. Roughly 30-40% of individuals diagnosed with measles encounter specific problems[4].

Measles infection may lead to many consequences, such as diarrhoea, otitis media, pneumonia, CNS infections and sequelae, blindness, and hearing impairments. The frequency of morbidity and mortality associated with measles is more severe in impoverished countries as a result of factors such as hunger, large populations, limited access to healthcare, and inadequate vaccine coverage[5-6]. The measles virus affects the central nervous system (CNS) both during the active phase of infection and after the sickness has entered a dormant state. The central nervous system (CNS) complications after measles infection include primary measles encephalitis, subacute sclerosing panencephalitis, measles inclusion body encephalitis, and acute post-infectious measles encephalomyelitis[7]. Approximately 40 million cases of measles are recorded annually on a global scale, resulting in 7.77 x $10^5$ deaths per year. Pakistan is responsible for 66% of these fatalities. In 2008, over 164,000 fatalities were recorded due to measles, mostly in South Asian and African countries with inadequate healthcare systems[8].

Measles may have severe consequences in a population with hu0nger, nevertheless, malnutrition is regarded a potential obstacle to measles immunisation, at least in theory[9]. Undernourished children are more vulnerable to severe symptoms of measles and are more likely to have serious consequences from the disease compared to children who are well-nourished. Early-onset acute measles infection is associated with significant morbidity and increased mortality[10].

In light of these considerations, the current study will be conducted among children admitted to the pediatric ward of a tertiary care teaching hospital who are diagnosed with malnutrition. This cohort will be further evaluated for measles to enable the implementation of timely and effective interventions, aiming to prevent life-threatening complications and curb the


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***Submitted:*** *June 03,2024*
***Revised:*** *July 28,2024*
***Accepted:*** *August 16,2024*

further spread of the infection.

## METHODOLOGY

The Paediatric Medicine Department at SMBBMU, Larkana, conducted this descriptive cross-sectional from January to June 2021. The study recruited a total of 142 children using a non-probability consecutive sampling approach.

The sample size was determined using the W.H.O. sample size calculator, based on a reported frequency of gastroenteritis (38.2%) in malnourished children [3], with a margin of error (d) set at 8% and a 95% confidence level. This calculation resulted in an estimated sample size of 142.

The study included malnourished children of either gender, aged 6 months to 14 years. Exclusion criteria were children with congenital heart disease, endocrinal and metabolic disorders (such as diabetes mellitus and hypo/hyperthyroidism), and those with conditions like chickenpox or herpes zoster. Additionally, children who had received antiviral therapy within 48 hours prior to enrollment, or were on immunosuppressive drugs, steroids, or hormonal therapy, were excluded.

Data collection was conducted through a standardized questionnaire specifically designed for this study. The mid-upper arm circumference (MUAC) of each child was measured at the midpoint between the acromion and olecranon, ensuring the arm was relaxed and hanging naturally. The tape measure was applied snugly but not too tightly, and the measurement was recorded.

Patient data were collected for age, weight, height, and BMI. Frequencies and percentages were calculated for variables such as gender, vaccination status, anemia, fever, and leukocytosis. All patients were assessed for the presence of measles and its complications, including pneumonia, gastroenteritis, and encephalitis.

Statistical analysis was performed using SPSS version 26.0. The Chi-Square or Fisher's Exact test was applied, with a p-value of ≤ 0.05 considered statistically significant.

## RESULTS

Table I summarizes the demographic characteristics of the study participants, comprising 142 children. The mean age of the participants was 3.57 ± 2.62 years. Age distribution showed that 28.2% were under 2 years old, 54.9% were between 2 and 5 years old, and 16.9% were over 5 years old. The average hospital stay was 3.84 ± 2.25 days, with 30.3% of participants hospitalized for less than 3 days, 57.0% for 3 to 7 days, and 12.7% for more than 7 days. Gender distribution revealed 54.2% males and 45.8% females. Regarding vaccination status, 47.2% of participants were vaccinated. Nutritional status showed that 20.4% were well-nourished, 46.5% were malnourished, and 33.1% were severely malnourished. Additionally, 64.8% of participants had a history of contact with measles, and 59.2% had contracted measles, while 40.8% had not. Complications from measles were observed in 43.6% of the cases (n=62), whereas 56.4% (n=22) did not experience any complications.

Table II details the complications of measles observed among the cohort of 84 children. Pneumonia was the most common complication, affecting 26.2% (n=22) of the children. Otitis media was present in 8.3% (n=7) of cases, gastroenteritis in 19.0% (n=16), and conjunctivitis in 16.7% (n=14). Encephalitis was the least frequent complication, occurring in 3.6% (n=3) of the cases.

Table III presents the gender distribution of measles complications among the 84 children. Pneumonia was experienced by 59.1% of males and 40.9% of females, with no significant gender difference (p = 0.962). Otitis media affected 57.1% of males and 42.9% of females, also showing no significant gender difference (p = 0.596). Gastroenteritis affected an equal proportion of males and females (50% each), with no significant gender difference (p = 0.388). However, conjunctivitis was significantly more common in females (64.3%) than in males (35.7%), with a statistically significant difference (p = 0.047). Encephalitis occurred in 33.3% of males and 66.7% of females, with no significant gender difference (p = 0.357).

**Table I: Demographic Characteristics of Study 142**

| Variable | n (%) |
|---|---|
| **Age (Mean ± SD) =** 3.57 ± 2.62 | |
| <2 years | 40 (28.2) |
| 2-5 years | 78 (54.9) |
| >5 years | 24 (16.9) |
| **Hospital Stay (Mean ± SD) =** 3.84 ± 2.25 | |
| <3 days | 43 (30.3) |
| 3-7 days | 81 (57.0) |
| >7 days | 18 (12.7) |
| **Gender** | |
| Male | 77 (54.2) |
| Female | 65 (45.8) |
| **Vaccination Status** | |
| Vaccinated | 67 (47.2) |
| Non-Vaccinated | 75 (52.8) |
| **Nutritional Status** | |
| Well nourished | 29 (20.4) |
| Malnourished | 66 (46.5) |
| Sever Malnourished | 47 (33.1) |
| **History of Contact** | |
| Yes | 92 (64.8) |
| No | 50 (35.2) |
| **Measles** | |
| Yes | 84 (59.2) |
| No | 58 (40.8) |
| **Frequency of Measles-Related Complications** | |
| Yes | 62 (43.6) |
| No | 22 (56.4) |

| Table II: Measles Complications in Children (n=84) | | | |
|---|---|---|---|
| **Variables** | | **Frequency *n* (%)** | |
| Pneumonia | Yes | 22 | 26.2% |
| | No | 62 | 73.8% |
| | | | |
| Otitis media | Yes | 7 | 8.3% |
| | No | 77 | 91.7% |
| | | | |
| Gastroenteritis | Yes | 16 | 19.0% |
| | No | 68 | 81.0% |
| | | | |
| Conjunctivitis | Yes | 14 | 16.7% |
| | No | 70 | 83.3% |
| | | | |
| Encephalitis | Yes | 3 | 3.6% |
| | No | 81 | 96.4% |

| Table III: Gender Distribution with Complications of Measles (n=84) | | | | | |
|---|---|---|---|---|---|
| **Variables**, n (%) | | **Gender** | | **95% C.I** | **P-Value** |
| | | **Male, *n* (%)** | **Female, *n* (%)** | | |
| **Pneumonia** | Yes | 13 (59.1%) | 9 (40.9%) | (0.363-----2.626) | 0.962 |
| | No | 37 (59.7%) | 25 (40.3%) | | |
| **Otitis media** | Yes | 4 (57.1%) | 3 (42.9%) | (0.188-----4.296) | 0.596 |
| | No | 46 (59.7%) | 31 (40.3%) | | |
| **Gastroenteritis** | Yes | 8 (50.0%) | 8 (50.0%) | (0.207-----1.851) | 0.388 |
| | No | 42 (61.8%) | 26 (38.2%) | | |
| **Conjunctivitis** | Yes | 5 (35.7%) | 9 (64.3%) | (0.093-----1.022) | 0.047* |
| | No | 45 (64.3%) | 25 (35.7%) | | |
| **Encephalitis** | Yes | 1 (33.3%) | 2 (66.7%) | (0.028-----3.752) | 0.357 |
| | No | 49 (60.5%) | 32 (39.5%) | | |

*p-value of ≤ 0.05 considered statistically significant.

## DISCUSSION

Measles remains a critical global health issue, particularly in regions with limited resources. The disease is infrequently seen in infants under 3-4 months and usually presents with mild symptoms for the first six months of life. However, it is notably prevalent among children aged 1-5 years in less developed areas. Despite the widespread availability of vaccines, measles continues to challenge healthcare systems worldwide, especially in low-income countries. Each year, about 40 million measles cases are reported, with Africa and Asia accounting for 70% of these instances. Measles leads to approximately 777,000 deaths annually in 11 countries, with Pakistan alone responsible for 66% of these fatalities[11].

Children who are malnourished experience more severe complications and prolonged hospital stays[12]. A significant proportion of measles-related deaths in young children globally can be linked to being underweight for their age[13].

This highly contagious viral disease can be effectively prevented through vaccination. The measles vaccine is given via subcutaneous injections at 9 and 15 months of age. Additionally, passive immunization with immunoglobulin can prevent the disease if administered within six days of exposure. Vaccination is also recommended for children aged 6-12 months who are at greater risk. The major reason for the ongoing burden of measles is inadequate vaccine coverage, including insufficient administration of the initial dose and a lack

of follow-up opportunities[14]. It is crucial to support strategies that maintain high levels of global immunity against measles through regular and supplementary vaccination campaigns to enhance coverage[15].

Characterized by its rapid onset and brief duration, measles is a highly infectious viral condition [16]. Its prevalence among children ranges from 10-15% in endemic settings to 58% during outbreaks [17]. Worldwide, around 40 million cases are reported annually, with Africa and South Asia contributing to 70% of these cases. Out of the 777,000 measles-related deaths each year, 66% occur in 11 countries, including Pakistan[18]. In poorer nations, the case fatality rate is often between 1-5% [19], representing about 50-60% of the estimated one million deaths from vaccine-preventable diseases in children [18]. The complications associated with measles are compounded by its ability to induce immunosuppression[20]. Among children with measles, 5% develop pneumonia and 0.1% develop encephalitis. Of those with encephalitis, 15% may not survive, and 25-35% experience long-term neurological complications[16]. Additionally, children are at an increased risk of death within a year of infection due to impaired cellular immunity, and subacute sclerosing panencephalitis may result in death approximately 12 years after the initial measles infection[20].

In our study, measles was found in 59.2% of children. Studies reported its prevalence from 3%–34% [21-23]. Our study noted complications of measles as 26.2% experienced pneumonia, 8.3% had otitis media, 19% suffered from gastroenteritis, 16.7% exhibited conjunctivitis, and 3.6% faced encephalitis. A different research found that the most common consequence seen in patients was pneumonia, affecting 53 individuals (48.2%). This was followed by encephalitis, which affected 16 patients (14.5%), and otitis media, which affected 4 patients (3.6%)[24]. Ullah F, et al stated various complications like pneumonia (31.13%), gastroenteritis (19.33%), conjunctivitis (17.45%), otitis media (7.07%), and encephalitis (2.35%)[25]. The study of Asghar RM, et al[3] documented that 52 (43.3%) of patients had pneumonia, 53 (44.2%) had diarrhea and 26 (21.7%) had encephalitis.

The findings of our study align with previous research, reinforcing the significant burden of measles and its complications, particularly in malnourished pediatric populations. The high prevalence of pneumonia and other severe complications such as gastroenteritis, conjunctivitis, and encephalitis highlights the urgent need for vigilant monitoring, early diagnosis, and timely intervention. These measures are essential to reduce the morbidity and mortality associated with measles, especially in resource-limited settings where the disease remains a substantial public health challenge. Further studies are necessary to explore the underlying factors contributing to the variability in complication rates and to develop targeted strategies for mitigating the impact of measles in vulnerable populations.

## CONCLUSION

It is to be concluded that pneumonia emerged as the most common complication of measles, followed by conjunctivitis and gastroenteritis. These complications emphasize the need for vaccination and early intervention. Further research is crucial to understand contributing factors and improve public health strategies in pediatric care.

**Conflict of Interest:** Authors declare that there is no conflict of interest.

**Authors' Contributions:** The successful completion of the research was the result of the collaborative efforts of all authors. **Rehman A;** led the study design and manuscript preparation. **Shaikh AS;** was responsible for data analysis and statistical evaluation. **Bhojwani SL;** managed patient recruitment and data collection. **Lal S;** worked on the discussion section, contributing to the interpretation of results. **Altaf T;** provided feedback and contributed to the revision of the manuscript. Each author played a crucial role in advancing the study and its findings.

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**How to cite:** Rahman A, Shaikh AH, Bhojwani SL, Lal S, Altaf T. Frequency of Measles and It's Complications in Malnourished Children. Pak J Med Dent Sci. 2024;1(1): 9-13

MS No: PJMDS/OA/006/2024

Original Article

# Prevalence of Hyperuricemia in Smoker Population with Type 2 Diabetes Mellitus

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## ABSTRACT

**Objective:** To determine the prevalence of hyperuricemia in smoker population with type 2 diabetes mellitus.

**Methodology:** A descriptive cross-sectional study was undertaken in the Department of Medicine at Liaquat University of Medical and Health Science (LUMHS) Jamshoro, Pakistan, from June 2021 to December 2021. The study was conducted involving smoking populated individuals diagnosed with type 2 diabetes mellitus. The diagnosed cases who fulfilled the inclusion criteria were included in the study. The participants' blood samples were taken to assess the uric acid to confirm hyperuricemia. The data was analyzed in SPSS version 26.0.

**Results:** In this study, a total of 576 diabetic patients diagnosed with type II were enrolled. The mean age was 51.31±13.76 an age range of 18 and 85 years. Males were dominant i.e. 66.7% v/s 33.3% females. Hyperuricemia was prevalent in 28.125% of patients.

**Conclusion:** It is to be concluded that hyperuricemia is prevalent in type II diabetic smoker patients. Since the study was conducted on a limited sample size from a single hospital, the findings may not accurately represent the situation across the entire country, and in order to generalise the results of our research, it must be assessed further in a broader sample of patients at other hospitals throughout the nation.

**Keywords:** Hyperuricemia, Prevalence, Smokers, Type II Diabetes Mellitus

## INTRODUCTION

Diabetes is causing a sharp rise in morbidity and mortality in Pakistan; its prevalence has reached 17.1%[1]. Type II diabetes mellitus has been found to have a substantial correlation with both blood uric acid levels and smokers[2]. Insulin resistance is closely linked to metabolic syndrome (MS) and diabetes mellitus. The main components of metabolic syndrome are hypertension, hyperglycemia, hyperinsulinemia, and hyperlipidemia[3]. This has been shown to have independent risk factors, to be a lethal component of coronary heart disease (CHD), and to synergistically accelerate type II diabetes mellitus and non-diabetic atherscoleropathy as well as MS-related atherscoleropathy[3,4]. Similarly, a study[5] found that four parameters—highly sensitive C-reactive protein, reactive oxygen species, hyperuricemia, and hyperhomocysteinemia are critical to the development of syndrome expansion.

Therefore, as a recommended screening strategy for type II diabetes mellitus, the population's greater risk of atherosclerosis needs to be determined[6]. Levels of serum uric acid and risk factors of cardiovascular disease have been shown to be strongly correlated[7]. Globally, there is rise in diabetes mellitus type II and its increasing comorbidities, which greatly raises morbidity and death rates[8]. Hyperuricemia is the state in which one's serum uric acid level is unusually increased. Purine metabolism and breakdown under normal metabolic circumstances produce uric acid as a byproduct[9]. Purine metabolism involves two final processes, which are catalyzed by xanthine oxidoreductase. First, xanthine is converted from hypoxanthine to uric acid[10]. Urate, the monoanion of uric acid, is eliminated by urination and is thought to have minimal physiological significance at physiological pH levels[11]. But purine metabolism can be disturbed for a variety of reasons, some of which may be hereditary and others of which may be acquired, leading to an aberrant elevation in blood uric acid level (hyperuricemia)[12]. There is a hypothesis that links the risk of type 2 diabetes to the amount of serum uric acid (SUA). Uric acid (UA) reduces the availability of nitric oxide, which is essential for insulin-stimulated glucose absorption. This reduction in availability leads to the physiologic worsening of insulin resistance in animal models[13].

Moreover, there has been little research on the occurrence of hyperuricemia and its related variables in emerging nations, particularly in Asian areas. As far as we know, there have been just a few research conducted on this subject in Pakistan. Hence, the objective of this research was to ascertain the frequency of hyperuricemia among individuals who smoke and have type 2 diabetes mellitus. The study's results are expected to provide valuable insights for both physicians and researchers. Moreover, they may be beneficial for implementing strategies to mitigate metabolic problems linked to hyperuricemia.

## METHODOLOGY

This descriptive cross-sectional study was conducted at the Department of Medicine at Liaquat University of Medical and Health Science (LUMHS) Jamshoro, from June 2021 to December 2021. A total of 576 participants were recruited using a non-probability consecutive sampling method. The study included patients of either gender, aged 20 to 70 years, who had been diagnosed with type II diabetes mellitus for more than 5 years. Participants who were smokers and presented with complaints related to type II diabetes mellitus were included in the study.

Exclusion criteria comprised individuals with major comorbidities, recent urological surgeries, immunodeficiency, or a history of alcohol consumption. Additionally, individuals with a history of chronic liver diseases, chronic renal failure, histologically diagnosed malignancies, cardiovascular diseases, or hypertension were also excluded from the study.

Approval for the study was granted by the institutional ethical review committee. All participants provided written informed

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***Submitted:*** *May 27,2024*
***Revised:*** *June 16,2024*
***Accepted:*** *August 16,2024*

consent, and confidentiality was maintained throughout the study. Demographic data were collected using a preset proforma after obtaining informed consent. Sociodemographic information such as age, sex, family history of diabetes mellitus, duration of diabetes, and smoking history was gathered. A physical examination was conducted, and quantitative characteristics, including weight, height, waist-to-hip ratio (WHR), and body mass index (BMI), were recorded. Clinical measurements such as systolic blood pressure, diastolic blood pressure, and heart rate were also documented.

A 10 ml blood sample was collected from each participant for laboratory analysis. Postprandial blood sugar levels were estimated using the glucosoxidase-peroxidase method. Lipid profiles and blood urea levels were determined using the diacetyl monoxime method, while serum creatinine levels were measured using the alkaline picrate methodology.

Continuous data were reported as the number of cases with corresponding percentages and were compared using the Chi-square test. The Chi-square test was also used to compare categorical variables, with significance set at a p-value of less than 0.05. Statistical analysis was performed using SPSS version 26.0

## RESULTS

Table I presents the demographic characteristics of type II diabetes smoker patients (n=576). Most of the patients were male (66.7%), having a mean age of 51.31 ± 13.76 years. Age distribution showed that 50.5% were between 18-50 years, and 49.5% were above 60 years old. BMI mean was 30.99 ± 5.20 kg/m$^2$, with 9.2% categorized as normal, 38.0% as overweight, and 52.8% as obese. Mean DM duration was 6.53 ± 6.18 years, 58.9% having diabetes for 0-5 years and 41.1% for more than 5 years. Distribution of marital status was 29.2% were unmarried, 61.8% married and 9.0% separated, widowed, or divorced. Educational status distribution included 33.5% with primary education, 53.3% with secondary education, and 13.2% with higher education. In terms of residential status, 76.0% lived in urban areas, while 24.0% resided in rural areas. Occupational status indicated that 73.1% were employed, and 26.9% were unemployed.

Table II outlines the clinical characteristics of Type II diabetes smoker patients with or without hyperuricemia (n=576). The comparison with hyperuricemia revealed no significant differences in fasting blood glucose (p=0.637), random blood glucose (p=0.988), total cholesterol (p=0.229), triglyceride levels (p=0.997), HDL (p=0.114), LDL (p=0.482), SBP (p=0.871), and DBP (p=0.355). However, a significant difference was noted in uric acid levels, with those with hyperuricemia having a higher mean of 8.85 ± 0.66 compared to 6.03 ± 1.07 in the non-hyperuricemia group (p=0.000).

Table III presents factors associated with or without hyperuricemia among Type II diabetes smoker patients (n=576). The analysis includes age group, gender, BMI, hypertension, dyslipidemia, smoking status, waist circumference, total cholesterol, triglyceride, family history of hyperuricemia, HDL, and LDL. Among these factors, the odds ratios (OR) with 95% confidence intervals (C.I.) and p-values are provided. Notable findings include a significant association between hyperuricemia and smoking status (OR=1.6, p=0.672). Additionally, there is a trend toward association with hypertension (OR=1.42, p=0.058) and HDL levels (OR=1.88, p=0.132). No other variables showed significant correlations with hyperuricemia.

**Table I: Demographic Characteristics of the Type II Diabetes Smoker Patients (n=576)**

| Variable | Frequency% |
|---|---|
| **Gender** | |
| Male | 384 (66.7) |
| Female | 192 (33.3) |
| **Age, Mean ± SD=** 51.31 ± 13.76 Years | |
| 18-50 Years | 291 (50.5) |
| >60 Years | 285 (49.5) |
| **Body Mass Index, Mean ± SD=** 30.99 ± 5.20 kg/m$^2$ | |
| Normal | 53 (9.2) |
| Overweight | 219 (38.0) |
| Obese | 304 (52.8) |
| **Duration of Diabetes, Mean ± SD=** 6.53 ± 6.18 Years | |
| 0-5 Years | 339 (58.9) |
| >5 Years | 237 (41.1) |
| **Marital Status** | |
| Unmarried | 168 (29.2) |
| Married | 356 (61.8) |
| Separated/Widowed/Divorced | 52 (9.0) |
| **Educational Status** | |
| Primary | 193 (33.5) |
| Secondary | 307 (53.3) |
| Higher | 76 (13.2) |
| **Residential Status** | |
| Urban | 438 (76.0) |
| Rural | 138 (24.0) |
| **Occupational Status** | |
| Employed | 421 (73.1) |
| Unemployed | 155 (26.9) |

| Table II: Clinical Characteristics of Type II Diabetes Smoker Patients with or without Hyperuricemia (n=576) | | | |
|---|---|---|---|
| **Variables** | **Hyperuricemia** | | **P-Value** |
| | **Yes**, (n=162) | **No**, (n=414) | |
| Fasting Blood Glucose | 128.91 ± 24.75 | 129.96 ± 23.52 | 0.637 |
| Random Blood Glucose | 162.95 ± 55.49 | 163.02 ± 51.65 | 0.988 |
| Total Cholesterol | 175.81 ± 42.80 | 180.70 ± 44.10 | 0229 |
| Triglyceride | 185.45 ± 136.25 | 185.40 ± 141.31 | 0.997 |
| HDL | 44.54 ± 14.34 | 42.55 ± 13.30 | 0.114 |
| LDL | 110.63 ± 38.30 | 113.26 ± 41.19 | 0.482 |
| SBP | 136.07 ± 17.63 | 135.80 ± 18.12 | 0.871 |
| DBP | 84.46 ± 9.61 | 83.51 ± 11.57 | 0.355 |
| Uric Acid | 8.85 ± 0.66 | 6.03 ± 1.07 | 0.000 |

| Table III: Factors Associated with or without Hyperuricemia among Type II Diabetes Smoker Patients (n=576) | | | | | |
|---|---|---|---|---|---|
| **Factors**, n (%) | | **Hyperuricemia** | | **OR (95% C.I.)** | **P-Value** |
| | | **Yes** (n=162) | **No** (n=414) | | |
| **Age Group** | 18 – 50 Years | 74(25.4%) | 217(74.6%) | 1.31 (0.91 ---- 1.88) | 0.146 |
| | >50 Years | 88(30.9%) | 197(69.1%) | 0.76 (0.53 ---- 1.09) | |
| **Gender** | Male | 104(27.1%) | 280(72.9%) | 1.16 (0.796 ---- 1.70) | 0.432 |
| | Female | 58(30.2%) | 134(69.8%) | 0.85 (0.58 ---- 1.25) | |
| **BMI** | Normal | 11(20.8%) | 42(79.2%) | 0.75 (0.37 ---- 1.54) | 0.071 |
| | Overweight | 73(33.3%) | 146(66.7%) | 1.90 (0.92 ---- 3.92) | |
| | Obese | 78(25.7%) | 226(74.3%) | 1.31 (0.64 ---- 2.68) | |
| **Hypertension** | Yes | 79(24.9%) | 238(75.1%) | 1.42 (0.98 ---- 2.04) | 0.058 |
| | No | 83(32.0%) | 176(058%) | 0.70 (0.48 ---- 1.01) | |
| **Dyslipidemia** | Yes | 31(28.2%) | 79(71.8%) | 0.99 (0.62 ---- 1.58) | 0.988 |
| | No | 131(28.1%) | 335(71.9%) | 1.00 (0.63 ---- 1.59) | |
| **Smoking Status** | Yes | 33(26.6%) | 91(73.4%) | 1.6 (12.32 ---- 12.33) | 0.672 |
| | No | 129(28.5%) | 323(71.5%) | 1.6 (12.32 ---- 12.33) | |
| **Waist Circumference** | Yes | 35(31.5%) | 76(68.5%) | 0.81 (0.52 ---- 1.27) | 0.374 |
| | No | 127(27.3%) | 338(72.7%) | 1.22 (0.78 ---- 1.92) | |
| **Total Cholesterol** | Normal | 115(27.8%) | 298(72.2%) | 1.05 (0.70 ---- 1.56) | 0.812 |
| | High | 47(28.8%) | 116(71.2%) | 0.95 (0.63 ---- 1.42) | |

| | | | | | |
|---|---|---|---|---|---|
| **Triglyceride** | Normal | 76(28.1%) | 194(71.9%) | 0.99 (0.69 ---- 1.43) | 0.991 |
| | High | 86(28.1%) | 220(71.9%) | 1.00 (0.69 ---- 1.44) | |
| **Family History of Hyperuricemia** | Yes | 10(22.7%) | 34(77.3%) | 1.36 (0.65 ---- 2.82) | 0.407 |
| | No | 152(28.6%) | 380(71.4%) | 0.73 (0.35 ---- 1.52) | |
| **HDL** | Yes | 152(27.5%) | 400(72.5%) | 1.88 (0.81 ---- 4.32) | 0.132 |
| | No | 10(41.7%) | 14(58.3%) | 0.53 (0.23 ---- 1.22) | |
| **LDL** | Yes | 111(28.5%) | 279(71.5%) | 0.95 (0.64 ---- 1.40) | 0.795 |
| | No | 51(27.4%) | 135(72.6%) | 1.05 (0.71 ---- 1.55) | |

## DISCUSSION

Diabetes mellitus (DM), also known as "sugar", is a chronic noncommunicable disease (NCD) that has emerged as a major global health concern. The condition is attributed to pancreatic insufficiency in insulin production, leading to elevated blood sugar levels known as hyperglycemia. Type 2 diabetes mellitus is associated with insulin resistance and inadequate compensatory insulin secretion[14].

Both young and elderly suffer from type 2 diabetes, which is closely linked to high rates of morbidity and death as well as significant medical expenses for affected individuals, their families, and nations[15].

According to the International Diabetes Federation (IDF), there are 352 million persons worldwide who have impaired glucose tolerance, which raises their chances of developing diabetes by 2045. The burden of diabetes is rising, but there is a lack of epidemiological data and inadequate therapies[16].

The incidence of hyperuricemia has been increasing quickly in recent years among people worldwide[15]. Recent data indicates that hyperuricemia is becoming more common not only in wealthy nations, but also frequently occurring in low- and middle-income nations. Obesity, a diet high in purines, and alcohol intake have all been shown as separate risk factors for the development of hyperuricemia[17].

Hyperuricemia is very common in people with metabolic syndrome and has been linked to incident insulin resistance. Hyperuricemia is well recognised as a causative factor in the progression of diabetes, hypertension, atherosclerosis, cardiovascular disease, and chronic renal disease.

As per our study findings, hyperuricemia was prevalent in 28.125% of patients. Several investigations were undertaken to determine the frequency of hyperuricemia in individuals with type 2 diabetes mellitus (T2DM). The proportion of hyperuricemia between the cases of diabetes was 12.13% in Pakistan[14], the incidence of Chinese cases was 32.6% with Type II diabetes mellitus[15], prevalence rates of 33.6% and 25.3% have been seen in Indian individuals[16,17,] Ethiopian cases 33.8% [18], and Nigerian cases 25.3%[19]. In terms of clinical practice, clinicians are becoming increasingly concerned about the prevalence of hyperuricemia with metabolic syndrome (MS). Moreover, hyperuricemia may not show symptoms until much later and may only be discovered in conjunction with other problems like uremia[20].

Most people agree that smoking cigarettes increases the chance of developing several well-known chronic illnesses including diabetes, cardiovascular disease, and cancer. Additionally, some chronic musculoskeletal conditions such degenerative disc disease, rheumatoid arthritis, and low back pain are thought to be linked to it.

Hyperuricemia has lately gained attention due to research indicating its association with cardiovascular risk factors and its considerable contribution to the development of metabolic diseases.

The non-probability consecutive sampling limits the generalizability of the findings to the broader diabetic smoker population. The cross-sectional design prevents causal inferences between hyperuricemia and type 2 diabetes in smokers. Potential reporting biases may affect data accuracy, and the single-center setting restricts the applicability of the results to other populations or settings. Additionally, the sample may not fully represent the broader diabetic population with complex health conditions.

## CONCLUSION

It is to be concluded that hyperuricemia is prevalent in type II diabetic smoker patients. Since the study was conducted on a limited sample size from a single hospital, the findings may not accurately represent the situation across the entire country, and in order to generalize the results of our research, it must be assessed further in a broader sample of patients at other hospitals throughout the nation.

**Conflict of Interest:** Authors declare that there is no conflict of interest.

**Authors' Contributions:** **Kumar S;** led the study and was responsible for its overall design. **Lata;** conducted the literature review and was involved in manuscript writing. **Memon T;** handled data analysis and interpretation of results. **Naveed;** managed study logistics, supported data collection, and provided critical review. Each author played a crucial role in the successful completion of the research.

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**How to cite:** Kumar S, Lata, Memon TA, Naveed. Prevalence of Hyperuricemia in Smoker Population with Type 2 Diabetes Mellitus. Pak J Med Dent Sci. 2024;1(1): 12-16

MS No: PJMDS/OA/006/2024

Original Article

# Efficacy of Balloon Blowing Activity in Reducing Stress Levels among Female Adolescents Aged 17-18

Khushbakht Baloch[1], Bilal Aheed[2], Arham Memon[3], Muhammad Salman[4], Maryam Khalid[5]

## ABSTRACT

**Objective:** To evaluate the efficacy of balloon-blowing activity as a stress reliever among female adolescents aged 17 to 18.

**Methodology:** A pre-test post-test Quasi-experimental study was conducted in a private college Bahria College Karsaz. 225 participants met the inclusion criteria and were subjected to the study intervention which involved a balloon blowing activity. Participants filled the Pre-test and Post-test questionnaires. Collected data was entered SPSS version 22.0. Paired sample t-tests was applied at 5% level of significance.

**Result:** The mean age of the participants was 17.52 ± 0.501 years. A significant reduction in stress levels was observed, with a mean difference of 2.422 between pre-test and post-test measurements (95% CI: 2.270 to 2.573, $p < 0.001$).

**Conclusion:** This study concludes that simple, engaging stress management interventions like balloon blowing activity can positively impact the mental health of adolescents and can act as significant stress relievers in this critical stage of their lives. Further research is required to analyse the long-term impact and sustainability of this research.

**Keywords:** Stress, depression anxiety stress scales, adolescent girls, stress management intervention.

## INTRODUCTION

Adolescence (ages 13-18) is a period of significant growth and physical development that includes changes in body composition, metabolic and hormonal fluctuations,[1]. Although, adolescents make up about 20 percent of the world's population (of whom 85 percent live in developing countries).[2] Stress is defined as "the nonspecific result of any demand upon the body, be the effect mental or somatic"[3]. Family conflicts and academic pressures were the main triggers for increased stress. Issues around peer relationships, and social position were also important contributors.? Thus, adolescence is a difficult time, both physically and emotionally. Rapid growth coupled with physical changes in the background of high levels of activity can be overwhelming. Meanwhile, unfamiliar life stressors coupled with undeveloped compensatory mechanisms can lead to overwhelming anxiety and emotional distress.?

Adolescents with high levels of perceived stress were more likely to develop a mental disorder.? The heightened stress levels among adolescents cause adverse effects on the mental well-being of these individuals and result in the reduction of their capabilities to handle the challenges of life. Those who experience chronic stress in their adolescence turn out to be less efficient adults who cannot tackle their everyday tasks. These individuals are more prone to anxiety, depression, drug substance abuse, etc compared to the individuals with low stress levels. Thus, cultivating effective stress management strategies is extremely important in promoting adolescents' holistic well-being and resilience.

To achieve stress resilience among adolescents several stress management interventions have been introduced. Primary prevention programs targeting the definition of stress and improving coping strategies should be promoted.? These strategies have been identified to be valuable as efficient stress relievers. Stress management programs that range from relaxation to cognitive-behavioral and patient-centered therapy are of utmost significance when it comes to preventing and treating burnout.? Many complex interventions like cognitive behavior therapy help individuals to eliminate avoidant and safety-seeking behaviors that prevent self-correction of faulty beliefs, thereby facilitating stress management to reduce stress-related disorders and enhance mental health.? Similarly, another complex intervention for stress management is mindfulness stress management therapy which is not only efficient for stress management but also improves work engagement.[1]?

However, simple techniques like breathing exercises, group counseling sessions, etc have also provided a significant reduction in stress levels, yet these interventions are underexplored. A recent study conducted at Islamic International Medical College, Rawalpindi highlighted the positive impact of balloon-blowing activity in the stress reduction of 86 students. According to the study, blowing balloon exercise may be used as one of the stress-reducing strategies as it improves the pulmonary function tests and enhances the parasympathetic tone as indicated by indices of ventricular depolarization.[11]

This study aims to build upon these findings by further exploring the efficacy of blowing balloons as a stress reduction intervention among adolescents. The present experiment inspects the efficacy of balloon-blowing therapy as a stress management intervention using a pretest-posttest design augmented by self-report measures among adolescents. The results of the current research can be useful in contributing to the understanding of balloon-blowing activity in mitigating stress levels.

## METHODOLOGY

A quasi-experimental pre-test-post-test pattern analysis was used to assess the impact of a balloon-blowing activity on stress levels among female adolescents aged 17 to 18 through non-probability convenience sampling. The study was conducted at Bahria College Karsaz, with the approval of the Vice Principal under the supervision of a medical officer and the college psychologist. A private college was set up based on the convenience and ease of access. The study was conducted within the premises of the institute in the Girls Wing. The total period for the study was 5 hours. The tool for data source was a

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***Submitted:*** *June 30, 2024*
***Revised:*** *September 20 2024*
***Accepted:*** *September 20 2024*

validated structured questionnaire provided to the participants.

The study population was from 11th grade and 12th grade with their ages falling in brackets of 17 to 18. Initially, 400 students were provided with a Pre-test questionnaire with self-reporting of stress levels on a scale of 1-10. The values from 1-5 marked very low stress levels. Values from 6 to 10 marked moderate to extreme stress levels respectively. The answers to questions on the questionnaire and the self-reporting on a scale of each student were thoroughly observed and out of 400 students, 225 students were recruited for the study.

The inclusion criteria for participants involved in the study were being aged between 17 to 18 years, being a female, and scoring 6 or above on a validated stress questionnaire administered during the pre-test assessment. Exclusion criteria included individuals outside the specified age range, those scoring below 6 on the stress questionnaire, or those with physical or psychological conditions that could potentially impact their ability to participate or influence stress assessment outcomes. Prior to participation, individuals were briefed about the study's objectives, procedures, and potential risks and benefits. Consent forms were distributed and collected from willing participants.

The intervention consisted of a structured balloon-blowing activity conducted under the supervision of trained facilitators. Participants were instructed on proper balloon-blowing techniques. They were provided with the same size and same shaped commercially available balloons. Participants were asked to breathe in and then breathe out the maximum in the balloon mouth.10 minutes after the balloon-blowing activity, post-test questionnaires were provided to the participants, and they were asked to scale their stress levels again.

Statistical analysis was conducted to assess the effectiveness of the intervention in reducing stress levels among participants. Descriptive statistics summarized participant characteristics and stress levels, while inferential statistics, including the T-test, were employed to compare pre-test and post-test stress levels and determine the intervention's efficacy. The T-test result showed a highly significant value of 0.0001, indicating a substantial difference in stress levels pre and post-intervention.

## RESULTS

A total of 225 female adolescents, the Mean age of the participants was noted as 17.52 ± 0.501 years with 95% C.I (17.46 -17.59) participated in the study. The results indicated that the balloon-blowing activity was effective in reducing stress levels among the participants. A paired samples t-test revealed a statistically significant decrease in stress levels after the activity, with a mean difference of 2.422 (95% C.I: 2.270 to 2.573, $p < 0.001$). This demonstrates that the balloon-blowing activity had a notable impact on lowering stress levels in this adolescent group.

Furthermore, confidence intervals were calculated to estimate the range within which the true population mean difference lies. The narrow confidence interval (95% CI: 2.270 to 2.573) around the mean difference in stress levels provides additional support for the precision of the estimated effect size. This interval indicates a high degree of certainty that the observed reduction in stress levels post-activity is consistent and reliable Additionally, the standard error of difference was calculated to be 0.076, further supporting the reliability of the observed effect as mentioned in Table 1.

| Variable | COMPARISON between PRE- AND POST-TEST STRESS LEVELS (n=225) | | | | P-Value |
|---|---|---|---|---|---|
| | Mean | ±SD | Std. Error Mean | Mean difference 95% C*. I | |
| Pre-Stress Level | 8.11 | 1.23 | 0.076 | 2.422 (2.270----2.573) | 0.0001* |
| Post-Stress Level | 5.69 | 1.67 | | | |

## DISCUSSION

Adolescent stress has become a major problem with implications for mental health and well-being. The purpose of this article is to analyze if simple interventions could help reduce stress levels specifically the role of balloon-blowing therapy has been identified as an essential simple intervention for stress reduction in young people. In addition, it examines the potential of exercise-based interventions, including aerobic exercise and stretching, to reduce stress in university students and workplace workers.

This quasi-experimental research which involved the balloon blowing activity as a stress intervention has proven to be an effective stress relieving strategy among adolescents. This study highlights the potential of simple interventions in mitigating stress levels. The mean difference of 2.422 in stress levels between the pre-test and post-test assessments indicates a substantial reduction in stress experienced by participants following the balloon-blowing activity. This finding aligns with previous research suggesting that physical activities, such as balloon blowing, can serve as effective stress management strategies by providing a means for releasing tension and pent-up emotions.

The highly significant p-value of 0.0001 further validates the robustness of the observed effect, indicating that the reduction in stress levels post-activity is unlikely to have occurred by chance alone. The narrow confidence interval (95% CI: 2.270 to 2.573) around the mean difference in stress levels provides additional confidence in the precision of the estimated effect size. This interval suggests that the true population mean difference in stress levels lies within this range with a high degree of certainty.

Along with that, this study proves that small interventions could be effectively used to replace pharmacological therapies to reduce stress to some extent. Many such interventions have been introduced like laughter therapy etc. A multitude of techniques for relaxation and stress reduction are described, e.g. flotation-REST[12], meditation[13] and yoga[14], and Tai Chi Chuan[15]. Even certain toys like fidget spinners have been introduced as miniature tools to manage stress. Similarly, a research article suggests that exercise and physical activity have beneficial effects on depression symptoms that are comparable to those of antidepressant treatments.[16]

However simple interventions like laughter therapy can physiologically lessen the pro-stress factors and increase the mood-elevating anti-stress factors to reduce anxiety and depression. Physiologically, laughter therapy reduces stress factors and increases mood-enhancing anti-stress factors that reduce anxiety and depression.[1?]The implementation of such interventions highlights the potential of nonmedical approaches to reduce stress. Thus, it is evident that some simple interventions involving physical activity can be taken as the right approach to alleviate stress.

The results from the studies conducted within the research project so far which are briefly summarized in this manuscript suggest that physical activity, mental health, and well-being are positively related, also in university students as an important group of emerging adults. The results further suggest that exercise interventions comprising aerobic exercises of low- to moderate intensity may work best to improve mental health (alleviate depressive symptoms and perceived stress) among university students after a few weeks of intervention according to another study, The implementation of a short program of stretching exercises in the workplace was effective for reducing levels of anxiety, bodily pain, and exhaustion, and for raising levels of vitality, mental health, general health, and flexibility. [1?] These findings

suggest that incorporating physical activity into daily routines can be an effective tool for stress management and overall well-being

The underlying mechanism for the reduced stress level could be engaging in an exercise of blowing a balloon as such physical activities promote the release of endorphins and other neurotransmitters associated with the feeling of relaxation. Along with that, the interactive nature of activity created a sense of support thus helping in alleviating stress levels.

The limitations of this study include being conducted within a specific institutional setting, as it limits the generalizability of the findings to other populations. Moreover, only the female gender was subjected to the study. Additionally, the study's reliance on self-reported stress levels by the scaling method on questionnaires introduces the potential for response bias. Future research should explore the long-term effects and sustainability of the intervention beyond immediate post-activity assessments.

## CONCLUSION

This study concludes that simple, engaging stress management interventions like balloon blowing activity can positively impact the mental health of adolescents and can act as significant stress relievers in this critical stage of their lives. This study highlights the importance of stress management among adolescents and delivers an efficient, easy, and cost-effective method to reduce their stress by the use of a simple balloon. Further research is required to analyse the long-term impact and sustainability of this research.

**Conflict of Interest:** Authors declare that there is no conflict of interest.

**Author's contributions:** **Khushbakht B:** Contributed to the study's conceptualization and data analysis. **Bilal A:** supervised the Study process and assisted in data collection and literature review. **Maryam K:** handled data validation and manuscript revisions. **Arham M:** helped with data collection and visualizations, while **Muhammad S:** managed project administration and drafting the manuscript.

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**How to cite:** Khushbakht B, Bilal A, Arham M, Muhammad S, Maryam K. Efficacy of Balloon Blowing Activity in Reducing Stress Levels among Female Adolescents Aged 17-18. Pak J Med Dent Sci. 2024;1(1): 17-20

MS No: PJMDS/OA/010/2024

Original Article

# Frequency of Meningitis in Neonatal Late Onset Sepsis

Tasmeena Altaf[1], Shanti Lal Bhojwani[2], Altaf Rahman[3], Shankar Lal[4]

## ABSTRACT

**Objective:** To determine the frequency of bacterial meningitis in neonate presenting with late onset sepsis at children hospital Larkana.

**Methodology:** A cross-sectional study was carried out in the Paediatrics Department of Shaheed Mohtarma Benazir Bhutto Medical University (SMBBMU), Larkana from January 2022 to July 2022. In this study, lumbar puncture under aseptic measures was done and sent for CSF analysis in microbiology and biochemistry lab for cytology, protein, and glucose to assess the outcome variable i.e. bacterial meningitis. All the data was evaluated and interpreted using SPSS version 26.0.

**Results:** A total of 250 participants diagnosed with neonatal sepsis were included. The mean age was 16.48 days with an age range of 7 to 27 days. Males were 58.4% and females were 41.6%. Meningitis was noted in 16% of patients.

**Conclusion:** In conclusion, the significant occurrence of bacterial meningitis in neonates with late-onset sepsis highlights the need for routine screening and prompt treatment. Early lumbar punctures and standardized protocols for diagnosis and management should be prioritized to improve outcomes in this vulnerable population.

**Keywords:** Bacterial meningitis, neonates, prevalence, sepsis

## INTRODUCTION

Meningitis poses substantial risks, especially for infants. Several causes can trigger meningitis, with viruses and bacteria being chief among them. Roughly a quarter of cases have unknown origins[1]. Bacterial meningitis in newborns, occurring within the first 28 days of life with proof of bacteria in the cerebrospinal fluid, is an inflammation of the protective membranes surrounding the brain and spinal cord[2]. Incidence varies between 0.25 and 1 case per 1000 live births and impacts 25% of infants with bacteria in the bloodstream[3]. Regrettably, approximately 10% of affected babies die and 20-50% of survivors live with seizures, hearing or vision problems, cognitive difficulties, and motor impairments[4]. Prenatal factors risking neonatal bacterial meningitis include premature rupture of membranes, vaginal infections in the mother, untreated bladder bacteria, preterm birth, low birth weight, and lack of oxygen during delivery. Bacterial meningitis is commonly the complication arising from neonatal sepsis[5].

Sepsis is responsible for around 30 to 50 percent of total neonatal deaths in developing nations such as India and Pakistan, according to various reports[6]. Early and late onset sepsis have been documented as occurring either before or after 48 hours of age, 72 hours of age, or 96 hours of age[7]. Late Onset Sepsis (LOS) was characterized as an infection arising after 7 days of age up until 28 days of age with two or more clinical signs of sepsis like reluctance to feed, letharginess, unstable temperature, axillary temperature below 36 C or above 38 C, feeding intolerance, apnea, respiratory distress, capillary filling time exceeding 3 seconds on the forehead or sternum, vomiting, diarrhea, abdominal distension, rapid rise in serum bilirubin over 15mg% in the absence of a blood group incompatibility, petechiae or bleeding diathesis, mottling, bulging fontanelle and convulsions and so on were present [8]. Laboratory markers of complete blood count and C-reactive protein level were deemed abnormal if - total white blood cell count under 5000/ cm or over 25000/cm, absolute neutrophil count below 1500/ cm, immature total neutrophil ratio over 0.2 and peripheral blood film showed nucleated red blood cells with the presence of toxic granules and bands and thrombocytopenia (platelet count under 1500000/cm[9]. Any newborn with bacterial sepsis is also at risk for meningitis. As such, the incidence of meningitis in neonatal sepsis has varied from 0.3-3% in various studies, but late onset septicemia has been reported to be fairly associated with meningitis; with percentages ranging from 3 to 30%[10]. In cases of LOS, a lumbar puncture should be performed on all infants prior to starting antibiotics.

Studies have shown that the incidence of meningitis in newborns with late-onset sepsis (LOS) varies significantly, ranging from 1.3% to 3.5%[11,12]. In one study, Kaul V et al. reported an unusually high prevalence of 22.5% of meningitis in neonates with suspected clinical sepsis at a major tertiary care neonatal center in Northern India[13]. Additionally, two other studies from Northern[14] and Central India[15] documented meningitis frequencies of approximately 17% in infants with LOS.

However, localized information from Pakistan remains scarce[16]. The initial signs of bacterial meningitis in newborns and late sepsis lack distinguishing characteristics, complicating distinctions across a diverse population[17]. This could induce delays in diagnosis which subsequently affect the outcomes and survival rates of patients[18]. Research found the mortality rate in neonates with meningitis in suspected late-onset sepsis was a devastating 45.5%[19]. Considering these backgrounds, we require identifying the frequencies and risk factors of bacterial meningitis in late-onset neonatal sepsis at tertiary medical centers.

## METHODOLOGY

This cross-sectional study was conducted by the Pediatrics Department of Shaheed Mohtarma Benazir Bhutto Medical University (SMBBMU) in Larkana over a six-month period from January to July 2022. A total of 250 children were included in the

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***Submitted:*** *June 03, 2024*
***Revised:*** *August 19, 2024*
***Accepted:*** *September 02, 2024*

study, selected using a non-probability consecutive sampling technique. Participants were enrolled sequentially as they presented or became available during the study. The sample size was determined using the W.H.O. sample size calculator, based on a 22.5% frequency of bacterial meningitis in neonates with late-onset sepsis, with a margin of error of 6.1% and a 95% confidence level.

The study included neonates aged 7 to 27 days from both genders who presented with late-onset sepsis. To maintain the accuracy of clinical findings, infants who had received antibiotics prior to enrollment were excluded to avoid interference with cerebrospinal fluid (CSF) results. Additionally, infants with low birth weight (<1000 grams) were excluded due to their higher risk of complications that could confound the results. Infants on total parenteral nutrition were also excluded, as this intervention can alter CSF composition and inflammatory response, potentially skewing the outcomes. Infants with dysmorphic features were not included due to potential confounding from underlying genetic or developmental conditions.

Eligible participants were identified upon visiting the Pediatrics department, and those meeting the inclusion criteria were enrolled after obtaining informed consent from their parents. Ethical approval was secured from the ethical review committee, and strict confidentiality was maintained throughout the study.

Demographic data, including age, gestational age, weight, and gender, were recorded on a pre-designed proforma. A lumbar puncture was performed under aseptic conditions at the lumbar region between the L3 and L4 vertebrae to collect CSF samples. The diagnosis of acute bacterial meningitis was confirmed if the CSF examination revealed all of the following: leukocyte count > 10/mm³, predominance of neutrophils, CSF protein level > 45 mg/dl, and a CSF glucose level < 2/3rd of the corresponding blood glucose level. These CSF samples were analysed in the microbiology and biochemistry laboratories for cytology, protein, and glucose levels to assess the primary outcome variable, which was the presence of bacterial meningitis.

Data analysis will be conducted using SPSS version 26.0. Descriptive statistics will be calculated to summarize the data. The Chi-square test will be applied to assess the statistical significance, with a 5% level of significance ($p < 0.05$) considered as the threshold for determining significant associations.

## RESULTS

The study encompassed 250 participants diagnosed with neonatal sepsis, and their demographic and clinical characteristics were examined. The gender distribution revealed 58.4% males and 41.6% females. Gestational age varied, with 54.4% classified as preterm and 45.6% as term. The mean age was 16.48 days, with 42.4% falling within the 7-14 days category. Weight distribution showed 88.0% with a weight of 1.6-3.0 kg. Laboratory parameters, including platelets, WBC, leukocyte count, CRP level, protein level, and glucose level, were measured, providing valuable insights. Clinical features observed in neonates with sepsis included seizures (88.8%), fever (53.2%), abdomen distension (14.0%), lethargy (68.0%), shock (22.0%), convulsions (14.4%), temperature instability (34.8%), respiratory distress (71.2%), and reluctance to feed (25.0%). These findings contribute to a comprehensive understanding of the characteristics associated with neonatal sepsis in the studied population.

The data reveals the distribution of different bacterial species, with 15 occurrences of Klebsiella, 19 occurrences of E. coli, 8 occurrences of Pseudomonas, 19 occurrences of Acinetobacter, and 14 occurrences of Enterobacter (Figure 1).

In the bacterial meningitis cohort, 18 out of 40 patients (45.0%) demonstrated blood culture positivity, compared to 67 out of 210 patients (31.9%) in the non-meningitis cohort. Conversely, blood culture negativity was observed in 22 patients (55.0%) within the meningitis group and 143 patients (68.1%) in the non-meningitis group. The association between blood culture positivity and bacterial meningitis yielded a 95% confidence interval of 0.878 to 3.472, with a p-value of 0.109 as shown in Table II.

The discharge rate was 80.0% for meningitis and 77.1% for non-meningitis, with no significant difference (p=0.691). Eight cases in the meningitis group (20.0%) and 48 cases in the non-meningitis group (22.9%) resulted in death. The duration of hospital stays was 20.7 ± 8.5 days for meningitis and 19.3 ± 9.7 days for non-meningitis, with no significant difference (p=0.402). Additionally, the duration of antibiotic treatment showed no significant difference between the two groups (p=0.803) as documented in TABLE III.

**Table I: Demographic Characteristics of Study Participants (n=250)**

| **Variable** | **n (%)** |
|---|---|
| **Gender** | |
| Male | 146 (58.4) |
| Female | 104 (41.6) |
| **Gestational Age (Mean ± SD) =** 36.12 ± 2.05 (weeks) | |
| **Gestation** | |
| Preterm | 136 (54.4) |
| Term | 114 (45.6) |
| **Age (Mean ± SD) =** 16.48 ± 6.57 (days) | |
| 7-14 days | 106 (42.4) |
| >14 days | 144 (57.6) |
| **Weight (Mean ± SD) =** 2.60 ± 0.75 (kg) | |
| 1.6-3.0 kg | 220 (88.0) |
| >3.0 kg | 30 (12.0) |
| **LABORATORY PARAMETERS ( Mean ± SD)** | |
| Platelets | 146612 ± 63512.8 |
| WBC | 12376 ± 4120.9 |
| Leukocyte | 22801.1 ± 8563.6 |
| CRP | 5.8 ± 1.3 |
| Protein Level | 128.9 ± 42.9 |
| Glucose Level | 34.1 ± 13.7 |

| Presenting features in neonates with sepsis with or without meningitis | |
|---|---|
| Seizure | 222 (88.8) |
| Fever | 133 (53.2) |
| Abdomen Distension | 35 (14.0) |
| Lethargy | 170 (68.0) |
| Shock | 55 (22.0) |
| Convulsions | 36 (14.4) |
| Temperature Instability | 87 (34.8) |
| Respiratory Distress | 178 (71.2) |
| Reluctant to feed | 15 (25.0) |

**Figure 1: Microorganisms isolated in the study group.**

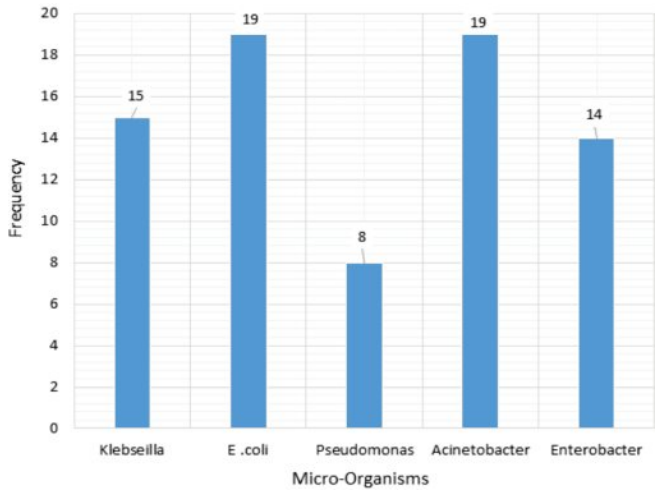


**Table II: Showing Blood culture positivity in bacterial meningitis and non-meningitis patient (n=250)**

| Blood Culture | Bacterial Meningitis | | | P-Value |
|---|---|---|---|---|
| | **Meningitis** (n=40) | **Non-Meningitis** (n=210) | **95% C. I** | |
| Positive | 18 (45.0%) | 67 (31.9%) | (0.878----3.472) | 0.109 |
| Negative | 22 (55.0%) | 143 (68.1%) | | |

**Table III: In-Hospital Outcome of bacterial meningitis and non-meningitis patient (n=250)**

| Outcome | Bacterial Meningitis | | | P-Value |
|---|---|---|---|---|
| | **Meningitis** (n=40) | **Non-Meningitis** (n=210) | **95% C. I** | |
| Discharge | 32 (80.0%) | 162 (77.1%) | (0.512----2.743) | 0.691 |
| Died | 8 (20.0%) | 48 (22.9%) | | |
| Hospital Stays (days) | 20.7 ± 8.5 | 19.3 ± 9.7 | (18.42----20.80) | 0.402 |
| Duration of antibiotic treatment (days) | 9.7 ± 2.3 | 9.8 ± 2.3 | (9.54----10.13) | 0.803 |

## DISCUSSION

Bacterial meningitis in infants presenting with late-onset bloodstream infections is a grave medical circumstance marked by inflammation of the protective layers enveloping the mind and spinal cord brought on by bacterial invasion. Infants are newborns who are under 28 days old, and late-onset bloodstream infections generally surface after the initial week of life. This circumstance is an acute and potentially deadly complication that necessitates instant medical attention.

Neonatal bacterial meningitis is a rare but potentially devastating condition that can have profound consequences on a baby's health and development. It often presents as a secondary infection in infants who are already suffering from sepsis, a systemic infection that can affect various organs in the body. Late-onset sepsis refers to infections that occur after the first few days of life and are usually associated with hospitalization or healthcare exposure.

The clinical presentation of neonatal bacterial meningitis in the context of late-onset sepsis can be subtle and nonspecific, making it challenging to diagnose promptly. Infants may exhibit symptoms such as fever, poor feeding, irritability, lethargy, vomiting, and abnormal movements. The condition can progress rapidly, leading to severe neurological complications, including seizures, developmental delays, hearing loss, and even death if not managed promptly.

Neonatal sepsis is a complex clinical syndrome characterized by indicators and manifestations of infection with or without

accompanying bacteremia in the primary month of life. It can encompass diverse systemic infections of the newborn like meningitis, pneumonia, arthritis, osteomyelitis and urinary tract infections. There is no consensus on how exactly to separate neonatal sepsis and meningitis in times after birth. Earlier and late onset sepsis has been documented as arising before or following 72 hours of age or potentially 96 hours of age [21]. The initial week of life is often reported as early onset sepsis with a subgroup of infections that blossom during the primary 24 hours of life called extraordinarily early onset infections [22]. Later onset infections occur during the second to fourth weeks of life while infections from day 28-30 to day 120-180 are called remarkably late onset infections.

In this study, bacterial meningitis was noted in 16% of neonates. In another study, meningitis was reported in children with late-onset sepsis to be 16% [13]. A study by Saleem S, et al stated the frequency of bacterial meningitis in neonates with late onset of sepsis as 39.5% [23].

Given the serious nature of this condition, early recognition and intervention are crucial. Timely administration of antibiotics and supportive care are essential to improve the chances of a positive outcome. This often involves a combination of diagnostic tests such as lumbar punctures to analyze cerebrospinal fluid, blood cultures, and imaging studies to confirm the diagnosis and guide treatment.

The study's sample size and single-site focus may limit generalizability and fail to capture all risk factors for bacterial meningitis in neonates with LOS. Non-probability sampling and reliance on conventional diagnostic methods might introduce bias and underdiagnosis.

Future studies should expand to multiple centers and larger samples, develop better diagnostic tools, and explore long-term outcomes and preventive strategies to reduce the incidence of neonatal bacterial meningitis.

## CONCLUSION

In conclusion, the significant occurrence of bacterial meningitis in neonates with late-onset sepsis highlights the need for routine screening and prompt treatment. Early lumbar punctures and standardized protocols for diagnosis and management should be prioritized to improve outcomes in this vulnerable population.

**Conflict of Interest:** Authors declare that there is no conflict of interest.

**Authors' Contributions:** The successful completion of the research was the result of the collaborative efforts of all authors. **Altaf T;** conceived the study, led the design, and prepared the manuscript, playing a key role in the project. **Bhojwani SL;** supervised the study and contributed to manuscript revision. **Rahman A;** handled patient recruitment and data collection. **Lal S;** assisted with data analysis. Each author played a crucial role in the study's success.

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**How to cite:** Altaf T, Bhojwani SL, Rahman A, Lal S. Frequency of Meningitis in Neonatal Late Onset Sepsis. Pak J Med Dent Sci. 2024;1(1): 21-25

MS No: PJMDS/CR/008/2024

Case Report

# Enlarged Adenoid in Adult Mimicking Nasopharyngeal Growth

Iqbal Hussain Udaipurwala[1], Muhammad Moiz Ullah Khan[2]


## ABSTRACT

**Background:** Adenoid hypertrophy is more common in children than in adults, though it may persist into adulthood. Due to its subtle and nonspecific symptoms, it is often overlooked and easily misdiagnosed.

**Case Presentation:** A 26-year-old male resident of a remote village in Balochistan presented with complaints of nasal obstruction, snoring, and earache, without any complication like epistaxis or cranial nerve involvement. Nasal endoscopy showed nasopharyngeal mass and imaging demonstrated a soft tissue lesion with isodense. The patient underwent an adenoidectomy and the histopathological diagnosis of the excised tissue was of adenoid hypertrophy.

**Conclusion:** This case illustrates the consideration of adenoid hypertrophy for the differential diagnosis of adult nasal symptoms to achieve proper treatment with symptom resolution.


**Keywords:** Adenoidectomy, adult nasal obstruction, differential diagnosis, earache, nasal endoscopy, snoring

## INTRODUCTION

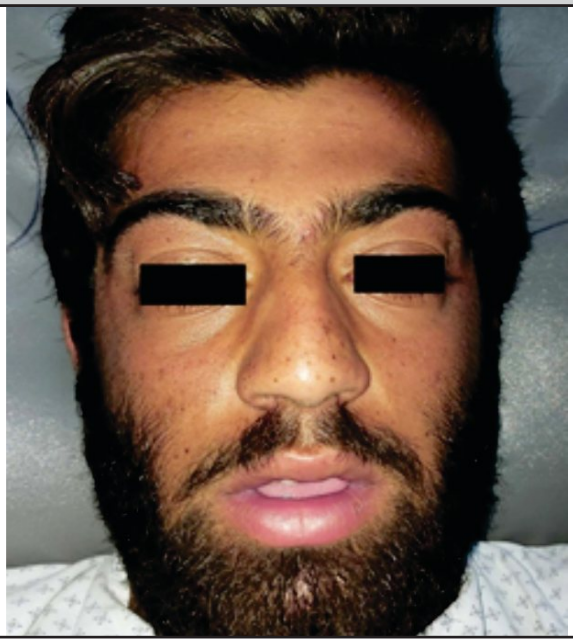
Lymphoid tissue develops to form adenoids at the back of the nose or on the nasopharynx's posterosuperior wall, which is a crucial component of Waldeyer's Ring. It seems to play a significant part in establishment of what is known as "immunological memory" in younger children[1]. Adenoid Hypertrophy usually indicates the non-physiological enlargement of nasopharyngeal tonsils commonly seen in age group of 6 to 10 years and commonly atrophied till 16 years of age[2]. Symptoms of adenoid hypertrohy include obstructive sleep apnea, mouth-breathing, snoring, hyponasal speech and rhinorrhea[3]. The clinical history, nasopharyngoscopy, and lateral soft X-ray of the nasopharynx are generally used to evaluate adenoid hypertrophy[4]. According to some authors, adenoid hypertrophy in adults is predisposed to by chronic infection, allergic rhinitis, cancer, human immunodeficiency virus (HIV) infection, and smoking[5]. However, the presentation of adenoid hypertrophy in adult and old age group is relatively very uncommon and, in many cases, can be misdiagnosed[4]. In this case report we describe an unusual presentation of nasopharyngeal mass in adult which after definitive investigation and management came out to be adult hypertrophy in adult.

## CASE REPORT

"A 26-year-old male presented to the otorhinolaryngology department at a private hospital from a remote village in Balochistan with a history of gradual, progressive, recurrent nasal obstruction, mouth breathing, anterior nasal discharge, snoring, and earache". He had no history of nasal bleeding, Trigeminal Nerve involvement and weight loss. There was no history of pain and fever. The symptoms aggravated with time and didn't get relieve with decongestants. He had not sustained any trauma.

On examination, a young man of average built with stable vital signs and unremarkable systemic examination. Nasal examination showed no gross external deformity or scar mark. Paranasal sinuses were non tender (Figure 1). He had decreased patency and compromised olfactory function. Anterior rhinoscopy was unremarkable. On posterior rhinoscopy there was a mass seen in nasopharynx. Flexible Nasal endoscopic examination showed enlarged soft tissue mass in nasopharynx obstructing the choanae (Figure 2). Ophthalmic examination was normal. Neck lymph nodes were not palpable. All base line investigations were within normal limits. X-Ray lateral view was done which showed enlarged soft tissue shadow at base of skull narrowing airway at nasopharynx. (Figure 3). Further, Computed tomography (CT) scan showed isodense, soft tissue lesion, in nasopharyngeal region. There were no enhancement, calcifications within the mass and no erosions of surrounding walls (Figures 4). A provisional diagnosis of Enlarged Adenoids were made and adenoidectomy was done under general anaesthesia after taking an informed and written consent. Specimen was sent for histopathology, the biopsy revealed adenoid hypertrophy. The patient was followed up after 3 and 9 months and remained symptoms free and nasal endoscopic examination was unremarkable (Figures 5).

**Figure 1**

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***Submitted:*** *May 30, 2024,*
***Revised:*** *August 16, 2024*
***Accepted:*** *August 16, 2024*

**Figure 2**

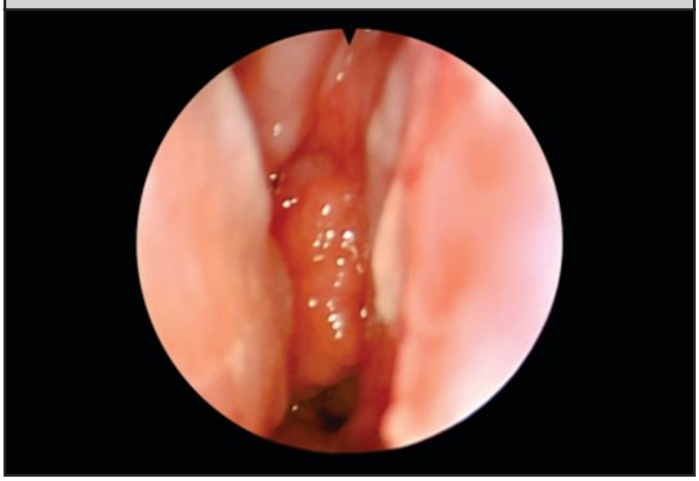


**Figure 3**

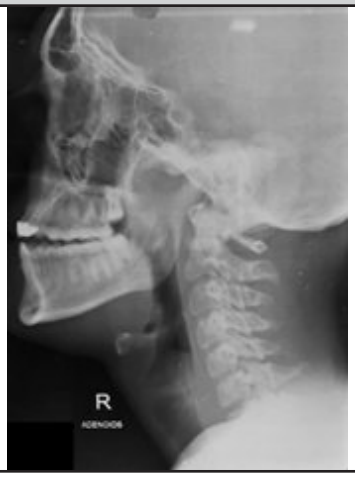



**Figure 4**

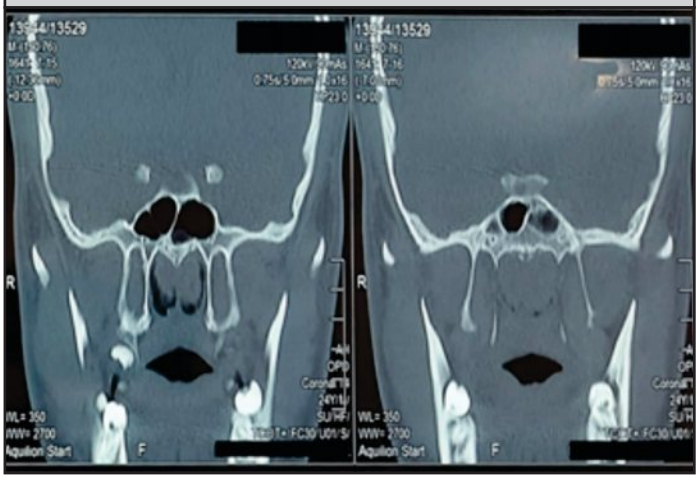
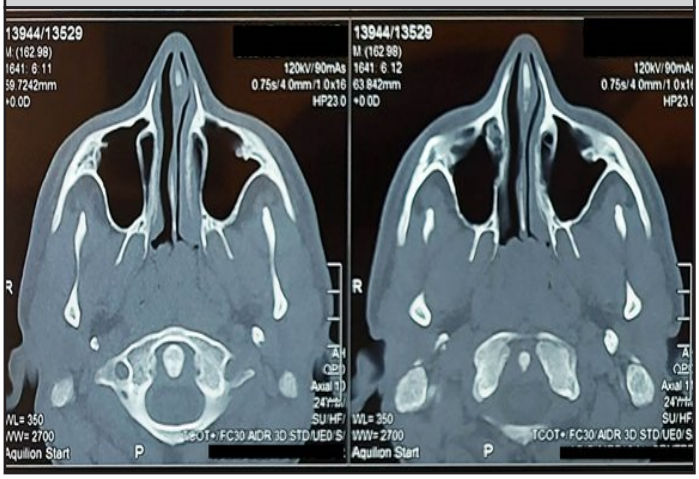


**Figure 5**




## DISCUSSION

In children, adenoid hypertrophy is a usual complain but In adults on the other hand nasal obstruction is mostly due to deviated nasal septum, turbinate hypertrophy and nasal polyps[6]. Adenoid tissue atrophy occurs later in childhood, but it can persist into adulthood and become a significant cause of nasal obstruction[7]. Adult adenoid isn't uncommon but is frequently ignored. The cause of adenoid hypertrophy isn't known yet still come suggest, reactivation or persistence of childhood adenoids in adults leads to chronic inflammation[8].

Excision and a histopathological examination are required to rule out malignancy in adults with adenoid hypertrophy that causes nasal obstruction. Frequency of Adenoids in adults in studies conducted by by Alexey Surov et al, Zeliha Kapusuz et al, Muhammad Ahmed Khan et al[9] in which it was 18%, 26%, 2.5% and 4.31% respectively. Most of adult patients presents between 17 to 25-year age group and males were affected more as compare to females which may be due to more exposure to outdoor pollutants and nasal obstruction was the symptom of presentation[10].

Adenoids can not be diagnosed on clinical examination alone. They may be detected by CT scan but need confirmation by histopathology. There is no role of medical therapy in treatment of adenoid hypertrophy but they may be treated by surgical excision, with minimal risk of recurrence. They carry excellent prognosis after complete excision.

## CONCLUSION

Even though adults rarely have adenoid hypertrophy, otorhinolaryngologists should not miss the diagnosis by properly examining the nasopharynx in cases of nasal obstruction. Adenoidectomy has a similar effect on adults, alleviating symptoms.

**Conflict of Interest:** Authors declared no conflict of interest.

**Authors' Contributions: Iqbal HU;** Designed the study, collected and analyzed clinical data, and wrote the initial draft of the manuscript. **Muhammad MUK;** Conducted the adenoidectomy, reviewed the histopathology, and helped revise the manuscript.

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**How to cite:** Iqbal HU, M Moiz UK. Enlarged Adenoid in Adult Mimicking Nasopharyngeal Growth. Pak J Med Dent Sci. 2024;1(1): 26-28

MS No: PJMDS/CR/013/2024

Case Report

# Body Packing of Illicit Drugs: An Incidental Radiological Diagnosis In A Covid-positive Patient

Ameet Kumar[1], Muhammad Saqib Qamar Ishaqi[2], Syed Muhammad Shahnawaz Hyder[3], Aneeta[4], Pooja[5]


## ABSTRACT

Body Packing is the smuggling of illegal drugs by hiding them into waterproof capsules, and using human body as a vehicle for transportation. The drugs may be hidden under the skin, taken orally or introduced into body cavities such as rectum and vagina. Many patients are asymptomatic; however, if the capsule disintegrates resulting in systemic drug absorption a variety of non-specific symptoms may develop. This is a case where it becomes difficult to clinically diagnosis and for that, one has to know the proper history, radiological imaging and urine analysis. One of the COVID-positive patients presented with clinical features that were initially attributed to be due to novel infection, but radiological evaluation subsequently revealed many drug-filled capsules within gut and few showing evidence of rupture. Currently, there are few publications describing the CT findings of body disintegration due to drug packets.


**Keywords:** Body packing, radiological imaging of body packing, body positive in covid patient

## INTRODUCTION

Body packers, initially described in 1973, are individuals involved with the illegal smuggling of illicit drugs via intracorporeal concealment. The drugs are generally concealed in bodypacks, which entail small oval-shaped packets containing tightly-wrapped capsules or condoms, ingested normally by mouth; pellets of swallowed cocaine can be found this way. These are called body packers (who swallow drug packets) and body pushers (insertion in a cavitary orifice).[1] Cocaine, heroin, methamphetamines and cannabis are the most common illicit drugs that are smuggled into many countries[2].

Body packers are often asymptomatic; however, severe complications can quickly arise when the packets ruptures or leak into vessel (body-packer syndrome). This can precipitate serious, potentially life-threatening consequences such as seizure, respiratory depression and cardiac arrest if systemic drug absorption occurs[3]. Mechanical problems such as gastrointestinal obstruction and perforation are serious issues, particularly in the setting of packet ingestions[4].

Clinical suspicion for body packing is difficult as symptoms are commonly nonspecific (eg, abdominal pain, constipation or altered mental status). Otherwise, these symptoms are often nonspecific and can be mistaken for other conditions.[5] Imaging plays a significant role in body packing diagnosis. Only 40% to 90% of the time can medication packets be seen on radiographs, depending on the size and quantity of contrast material in the capsules.[6] The most effective diagnostic tool is computed tomography (CT) without contrast because of its sensitivity to drug-filled packets and associated complications between 95.6%-100%[7], but ultrasound can be a suitable option for low-resource settings as well [5]. CT scanning is also useful to instruct, number, size and location of packets but may not detect disintegration or ruption of drug containers8. In the realm of illegal narcotics, body packing has long been used as a smuggling technique since it's essentially a more covert and straightforward approach to get by customs. Body packers continue to be a problem, even with improvements in drug screening measures at the borders. When diagnosing and treating them, doctors must exercise caution to avoid a tragic consequence.

## CASE REPORT

A 31-year-old male, chronic mawa (chewing tobacco) addict looking drowsy presented with fever - 1 day and constipation-4 days followed by diffuse abdominal pain in addition to altered sensorium. On chest examination had bilateral basal crepitations. A COVID PCR was sent because of the current pandemic, which testing positive for his diagnosis. The patient was first placed in an isolation unit when it was determined that his COVID-19 status was the cause of his symptoms. But rather of getting better, his problems grew worse over time. The non-specific abdominal X-ray (erect and supine). A CT chest and abdominal scan with IV contrast demonstrated diffuse large hyperdense capsules packed in the stomach, duodenum and colon consistent with body packing. The biggest capsule was of 3.5 cm in length and showed an attenuation range between 150 to400 Hounsfield units respectively (Fig. The stomach was scanned unenhanced in the axial plane (figure 1), and showed a hyperdense capsule with an attenuation of 250 HU. A second capsule was seen in the transverse colon on coronal CT scan (Figure 2). The average attenuation of the capsules in the proximal duodenum was lower, measuring 110 Hounsfield units that suggested disintegration (Figure 3). Findings in the chest on CT were not highly suspicious for COVID pneumonia and more likely systemic drug-related complications.

Urine toxicology was positive for opiates. Thus, upper GIT endoscopy was performed and two capsules were retrieved from the proximal bowel. Despite this despite treatment, the patient's clinical status worsened over time (he developed an entire depressive episode or drowsiness which later evolved to weakness and paresis of his four limbs leaving him with a Glasgow coma score 2T/10). Unfortunately, the patient could not be revived and died at the hospital.


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***Submitted:*** *July 13, 2024*
***Revised:*** *September 8, 2024*
***Accepted:*** *September 10,2024*

**Figure-1:** Unenhnaced CT scan axial section taken at the level of stomach. Large oval shaped hyperdense (average attenuation 250 Hounsfield unit) capsule seen in stomach

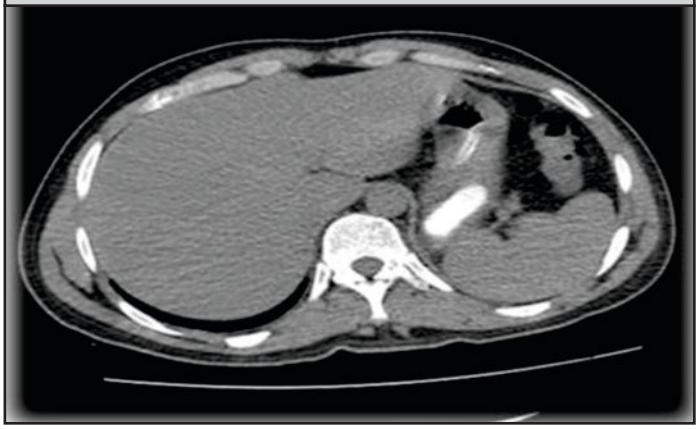


**Figure-2:** CT scan abdomen with contrast, coronal section. Another large oval shaped hyperdense capsule seen in transverse colon.

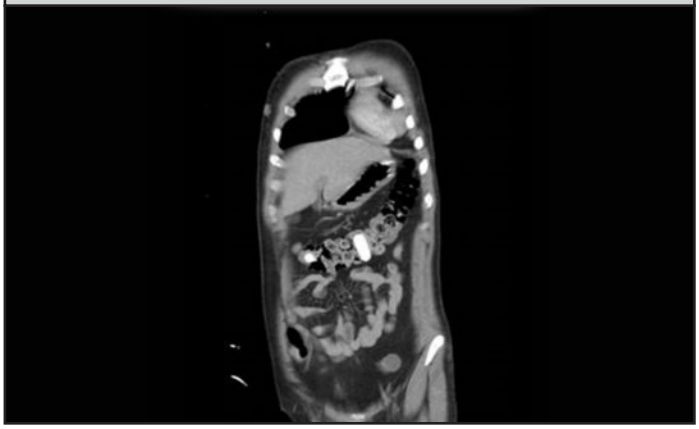
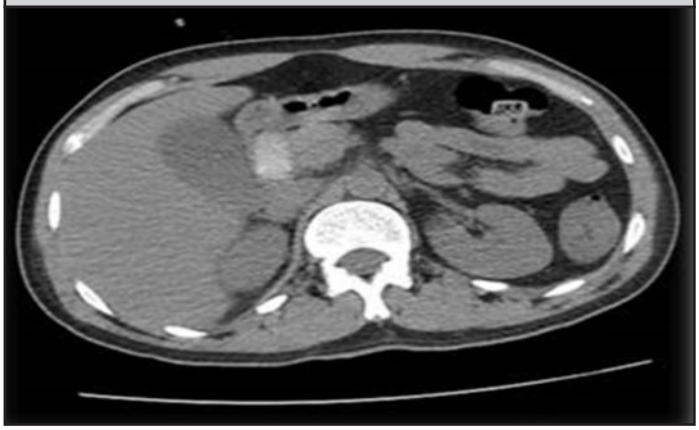


**Figure-3:** Unenhnaced CT scan axial section taken at the level of small bowel. This shows a capsule in 2nd part of duodenum which appears less dense (average attenuation 110 Hounsfield units) representing disintegration of capsule



## DISCUSSION:

Over the last two decades cases of drug smuggling are increased with young to middle aged males most commonly involved (3). Cocaine is one of the most smuggled drugs followed by heroin, cannabinoid and methamphetamine. Most frequent locations are gastrointestinal tract, vagina and ears. Condoms, latex gloves and balloons are typically used as drug packets for keeping drugs in the body.(4) Even after sophisticated techniques of packaging, body packers are at increased risk of complications which can be divided into:

- Mechanical: Gastrointestinal obstruction or perforation
- Chemical: Due to systemic drug absorption and toxicity

Systemic absorption can lead to drowsiness, epileptic seizures, neuropathies, rhabdomyolysis, renal failure and cardiac arrest. If not promptly diagnosed and managed complications can lead to coma and death of patient. Radiological imaging play essential role in diagnosis. Plain radiography is still most widely used imaging modality to diagnose with sensitivity ranging from 40% to 90% depending on size, location, type of drug and foiling material. It can detect drug filled packets of 2-8 cm [2, 5]. Due to high sensitivity of 95.6%-100% CT-scan without oral or rectal contrast is imaging modality of choice.[5,6] CT examination demonstrates number of packets, their exact location and associated complications which is usually not possible with conventional radiographs(7). Saba Sohail(8) concluded that body packing drugs and their location can be easily diagnosed on CT scan as they appear hyperdense (89-340 Hounsfield Unit) foreign bodies on non-contrast CT scan.

In the current study underlying hyperdense foreign entities in the stomach were seen on unenhanced CT scans of the abdomen (Figure 1), with an attenuation of around 250 Hounsfield units. A comparable hyperdense capsule was found in the transverse colon on a coronal CT picture with contrast (Figure 2), and a lower density capsule (110 HU) indicative of disintegration—a sign of systemic drug leakage—was found on a proximal duodenal CT scan (Figure 3).

Density of drugs (Hounsfield unit HU values) on CT scan also depend on the type of drug use(7) such as:

- opium: ~165-200 HU
- cocaine: ~220 HU
- heroin: ~520 HU

Urine analysis for toxicology is performed to aid in radiological diagnosis and confirm about type drug causing toxicity. Management depends upon location, size of packaging, type of drug, symptoms of patient and complications.(3)

## CONCLUSION

Over the years body packing is increasing worldwide. This case report highlights the importance of recognizing body packing as a potential cause of abdominal pain and other gastrointestinal symptoms in patients with a history of drug use or recent travel. Radiological imaging especially CT-scan is valuable tool in diagnosing these patients and associated complications. Very limited data is available in literature about these cases and their imaging patterns especially from our country Pakistan.

**Authors' Contributions: Ameet K:** Conducted the initial clinical assessment. **M Saqib QI:** Supervised the radiological workup. **SM Shahnawaz H:** Analyzed the CT findings. **Aneeta:** performed the literature review and provided radiological insights. **Pooja:** contributed to the discussion on gastroenterological management.

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**How to cite:** Kumar A, M Saqib QI, SM shahnawaz H, Aneeta, Pooja. Body Packing of Illicit Drugs: An Incidental Radiological Diagnosis In A Covid-positive Patient. Pak J Med Dent Sci. 2024;1(1): 29-31

MS No: PJMDS/LE/007/2024

Letter to the Editor

# "Revolutionizing Healthcare: The Evolution of Artificial Intelligence in Healthcare Sector and Its Transformative Impacton the Health Profession"

Bilal Aheed

Dear Editor,

The purpose I am writing this is to highlight the broad repercussions that AI has on Medicine and Surgery announcing a new era of healthcare. This translation of machine gained knowledge has unprecedented accuracy, reaching that of a human expert[1]. In addition to recognizing the importance of interdisciplinary collaborations in developing unbiased AI systems[2], we must consider that despite all the different areas our use cases have spanned, there are several issues affecting some or most life-affecting decisions made by people.

Artificial Intelligence (AI), based on machine learning algorithms, provides the solution to alleviate healthcare challenges by matching patients' signs and symptoms for diagnosis and management, effectively mitigating concerns about infectious disease outbreaks[3]. In addition to designing relevant healthcare systems, artificial intelligence (A.I) will play the role of a disruptive technology for drug discovery where any primary care physician must become familiar with future advancements in A. AI tools like deep learning models, for instance, significantly improve diagnostic accuracy in radiology and pathology and thus reduce human error[5].

AI, especially the analysis of human genomic data using machine learning algorithms is expected to be one day part and parcel in patient care where AI could reveal hidden features about diseases[4]. This ability will enable health specialists to find diseases in advance, even when asymptomatic and anticipate the advent of cancer or cardiovascular disease. Governments may use AI to predict and prevent the outbreak of new diseases, subsequently stopping their dissemination.

While the role for doctors and health care providers remains uncertain, AI beckons those who understand its importance. While more recent programs around AI for clinicians and staff are appearing to improve hospital operations, aide in system level automation[6], reducing clinician burnout.

Still, we need to deal with the ethical dilemmas encountered by AI and specifically in terms of patient confidentiality and data protection. Massive data collection for AI training: Collection of massive datasets to train an algorithm introduces the risk of unauthorized access and ultimately end in a data breach[7]. Healthcare organizations must place a high priority on strong security, and the willingness of patients to share their data in AI-driven healthcare systems. Second, efforts must be made to mitigate algorithmic bias that could worsen the disparities in healthcare outcomes which already exist[8].

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***Submitted:*** *May 30, 2024,*
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***Accepted:*** *September 12, 2024*

For AI to be utilized optimally, collaboration between clinicians with domain knowledge and data scientists is crucial[9]. Finally, physicians need to be empowered with the understanding of how these insights were derived using AI and data scientists need to design models that are informed by real world clinical utility. By working together, AI systems can be human-centred and ethical.

In conclusion health professionals must prepare for advances in artificial intelligence to improve the care they offer patients. While AI has the capacity to transform surgery and medicine in amazing ways, it is crucial for one to go into this technology with a clear understanding of its strengths as well as - or even more importantly at times! - limitations. To fully gain from the transformational impact of AI, cross-disciplinary collaboration must be maintained.

Sincerely,

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**How to cite:** Aheed B. "Revolutionizing Healthcare: The Evolution of Artificial Intelligence In Healthcare Sector and Its Transformative Impact on the Health Profession". Pak J Med Dent Sci. 2024;1(1): 32-33

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Medical & Dental Sciences

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