Original Article

# Sleep Quality and Preoperative Anxiety: Prevalence of Disorders and Impact on Surgical Recovery

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## ABSTRACT

### Background

This study aims to examine the impact of preoperative anxiety on the sleep quality of patients awaiting surgery by assessing three key dimensions of sleep: perceived quality, sleep onset latency, and total duration.

### Method

The study was conducted on 1040 patients at El Idrissi Provincial Hospital (Kenitra, Morocco), recruited between February 2020 and March 2023. Inclusion criteria included an age of 18 years or older and the absence of severe psychological disorders. Sociodemographic and clinical data were collected, and sleep quality was measured using a structured questionnaire. Patients self-reported their sleep quality, sleep onset latency, and habitual sleep duration. Statistical analyses included descriptive tests and correlations to explore the relationship between preoperative anxiety and sleep disorders.

### Results

The results indicate that 21.2% of patients reported poor sleep quality prior to surgery, with 12.1% describing their sleep as "fairly poor" and 9.1% as "very poor." About 45.4% of patients reported experiencing sleep-onset difficulties at least one or two nights per week. Frequent nocturnal awakenings also affected 42.8% of participants. In the perioperative period, 70% of patients reported excessive daytime sleepiness, while 30% described very severe sleepiness, indicating severe sleep disturbances that may compromise recovery.

### Conclusion

These findings underscore the importance of proactive management of sleep disorders in perioperative care, as preoperative anxiety is significantly associated with disruptions in sleep quality, increasing the risks of excessive daytime sleepiness and postoperative complications.

## Keywords

sleep quality; preoperative anxiety; sleep disorders; perioperative care; postoperative recovery

## INTRODUCTION

Sleep is a natural state of reduced wakefulness crucial for normal immune and cognitive function. Recent research has revealed that sleep function and cycles can be disrupted during the perioperative period by surgery and other interventions under general anesthesia[1,2]. Poor sleep quality and postoperative insomnia not only result in hyperalgesia and delayed recovery[3] but may also increase the risk of potential complications, including cognitive disorders, chronic pain, emotional disturbances, metabolic disorders, and pro-inflammatory changes[4]

General anesthesia, a medically induced state of hyporeactivity resembling natural sleep, has been shown to reduce rapid eye movement (REM) sleep and slow-wave sleep (SWS),

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leading to postoperative sleep disturbances. Previous studies have also demonstrated that age, preoperative comorbidities, and severe surgical stimulation are independent risk factors associated with postoperative sleep disorders (Leung).

Additionally, anxiety is an unpleasant sensation that compromises patients' comfort and well-being. A study by Ruis et al. (2007) reported that anxiety frequently occurs in surgical patients, including fears related to surgery and anesthesia, with an incidence ranging from 25% to 80%. Moreover, heightened anxiety states have been studied as a potential predictor of severe postoperative pain and complications such as increased postoperative morbidity and mortality. Given that several previous studies have reported that preoperative anxiety affects postoperative sleep quality in surgical patients[6], the present study aims to examine the effects of preoperative anxiety on sleep quality in patients undergoing surgery.

## MATERIALS AND METHODS

The study was conducted at El Idrissi Provincial Hospital in the province of Kenitra, Morocco.

The official launch of patient interviews took place between February 1, 2020, and October 27, 2023, following authorization from the Ministry of Health and Social Protection.

The target population consisted of all patients who underwent surgery at the operating block of El Idrissi Provincial Hospital in Kenitra province. The final sample size was 1,040 patients.

Patients eligible for inclusion were those presenting at El Idrissi Provincial Hospital for surgery, aged 18 years or older, and without severe psychological disorders

The sociodemographic characteristics of participants were carefully collected, including gender, education level (primary, secondary, tertiary), profession (employed, self-employed, unemployed, retired), marital status, monthly income, and geographic location (urban, rural). These variables were analyzed to assess the influence of sociodemographic factors on sleep quality.

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## MEASUREMENT INSTRUMENT

Sleep measures were collected using a structured questionnaire featuring scales adapted to the three dimensions of sleep studied[7]:

- **Perceived Sleep Quality:** Participants evaluated their sleep quality based on subjective satisfaction by answering the question, "How would you rate your overall sleep?" with four response options: excellent, good, average, or poor. This subjective evaluation captures their overall perception of rest, a key indicator of general well-being.
- **Sleep Latency:** Sleep latency was assessed by asking participants how long it usually takes them to fall asleep after going to bed. Responses were categorized into intervals (less than 15 minutes, 15–30 minutes, 30–60 minutes, more than 60 minutes). These data are crucial for identifying signs of anxiety or other emotional factors affecting ease of sleep onset.
- **Total Sleep Duration:** Participants reported their average nightly sleep duration by answering, "How many hours do you usually sleep per night?" with categorized options (less than 4 hours, 4–6 hours, 6–8 hours, more than 8 hours). This measure identifies cases of insufficient sleep, which could impact physical recovery capacity.

### Procedure

Data were collected through telephone or in-person interviews conducted by a trained member of the research team. After collection, responses were coded and analyzed to determine the average scores for sleep quality, latency, and duration. These scores help identify patients with poor sleep quality or specific difficulties, which may require special attention during the preoperative period.

### Data Analysis

The collected data were analyzed using descriptive statistics to evaluate the means and standard deviations of scores for each sleep dimension. Correlation tests were performed to examine potential links between sleep disorders and reported levels of preoperative anxiety. The results help identify demographic or clinical characteristics associated with poor sleep quality, contributing to the development of targeted preoperative interventions.

## RESULTS AND DISCUSSION

### Sociodemographic Characteristics of the Population

The analysis of patient characteristics for surgical interventions reveals significant elements that influence their preparation and needs. Age appears to be a significant variable. With a t-score of 72.814 and high statistical significance, the mean age difference in this sample is 36.73 years, with a confidence interval ranging from 35.74 to 37.72. This indicates that patient age can be a determining factor in their perception and preparation for surgical interventions. Age can influence how patients perceive risks, recovery time, and pain management (Table 1).

Gender is also an important variable, with a mean difference of 1.60 within a confidence interval of 1.56 to 1.63. This significant difference (t = 91.54) indicates an unequal gender distribution in the sample or the influence of gender on the emotional and psychological preparation of patients. Gender distinctions reflect cultural or social differences in how patients prepare and react to surgical interventions. For example, men and women may express concerns, expectations, or support needs differently.

Marital status appears to have a notable impact, with a mean difference of 1.76 (confidence interval between 1.71 and 1.81) and a t-score of 69.847. Social support, often reinforced by a partner in a marital relationship, can positively influence patient preparation and resilience before surgery. A partner may provide emotional comfort, participate in decision-making, and actively engage in postoperative follow-up. Identifying patients who might benefit from additional psychological support, especially those without a stable partner, is crucial.

The number of children also shows a significant difference, with a mean of 1.63 (t = 94.538). Parenthood influences preoperative preparation both logistically and psychologically. Parents may feel additional pressure due to family responsibilities, increasing their need for security and support. Adapting counseling and information to this reality can help parents manage their stress more effectively.

Patient occupation, with a mean difference of 4.01 (t = 67.69), is another significant factor. This suggests that the type of professional activity may influence how patients approach surgical interventions. Certain professions, such as those requiring significant physical strength or daily presence, may exacerbate anxiety related to work interruption and financial consequences. Providing specific advice and considering professional constraints can help reduce these concerns and offer tailored support to affected patients.

Education level emerges as one of the most influential variables, with a t-score of 115.128 and a mean difference of 2.60. Patients with higher education levels may be better prepared to understand the stakes and risks of the intervention, aiding their mental preparation. They are also more likely to seek additional information and question their medical team. This highlights the importance of providing tailored information and ensuring understanding among less-educated patients to offer them clear and adapted support.

Medical or surgical history also influences patient preparation, with a t-score of 81.005 and a mean difference of 1.43. Patients with medical histories may feel more anxious or have specific expectations due to past experiences. These findings suggest that personalized care that considers their medical history can address their concerns more effectively.

Comorbidities (presence of multiple conditions) also play a significant role, with a t-score of 24.618 and a mean difference of 1.59. Comorbidities can complicate surgical preparation and require additional precautions. Patients with multiple medical conditions (e.g., hypertension and diabetes) may have an increased risk during surgery and require special attention to ensure optimal preparation and safety.

Finally, a history of consultations for psychological disorders is the most significant variable, with a t-score of 199.258 and a mean difference of 2.86. These patients are more likely to experience anxiety or concerns about surgery, necessitating specific psychological support.

### Assessment of Sleep Quality in Patients Awaiting Surgery

The results of the sleep quality assessment in patients before surgery show a varied distribution of responses, highlighting positive aspects as well as concerns regarding the condition of patients prior to the surgical intervention (Table 2).

A third of the patients, 32.7%, rated their sleep quality as "very good." This figure is encouraging, as it indicates that a significant portion of patients felt well-rested before their surgery. Good preoperative sleep is crucial to preparing the body to cope with surgical stress, as it

**Table 1:** Analysis of Demographic and Clinical Factors Affecting Patient Preparation for Surgery

| Variable | t-score | df | Sig. (2-tailed) | Mean Difference | 95% Confidence Interval of the Difference |
|---|---|---|---|---|---|
| Age | 72.814 | 1040 | 0 | 36.73443 | 35.7441 to 37.7248 |
| Gender | 91.540 | 1040 | 0 | 1.59975 | 1.5654 to 1.6341 |
| Marital status | 69.847 | 1040 | 0 | 1.75858 | 1.7092 to 1.808 |
| Number of children | 94.538 | 1040 | 0 | 1.62897 | 1.5951 to 1.6628 |
| Profession | 67.690 | 1040 | 0 | 4.00635 | 3.8902 to 4.1225 |
| Education level | 115.128 | 1040 | 0 | 2.59848 | 2.5542 to 2.6428 |
| Medical or surgical history | 81.005 | 1040 | 0 | 1.43075 | 1.3961 to 1.4654 |
| Comorbidities | 24.618 | 1040 | 0 | 1.587 | 1.46 to 1.71 |
| History of consultations for psychological disorders | 199.258 | 1040 | 0 | 2.85896 | 1.8308 2.8871 |

helps strengthen the immune system and better manage anxiety. These patients are likely in better physical and mental condition to undergo surgery.

In addition to this group, 46.1% of patients reported their sleep as "fairly good." This shows that nearly half of the patients consider their sleep to be generally satisfactory, although there may be room for improvement. While this sleep quality is not perfect, it remains positive enough not to be a major source of concern before the operation. However, exploring simple ways to enhance their sleep, such as sleep hygiene advice or relaxation techniques, could optimize their preoperative condition.

However, approximately 12.1% of patients rated their sleep as "fairly bad," indicating significant issues before the operation. These patients may have been affected by factors such as pre-existing pain, anxiety related to the upcoming surgery, or other health problems. Poor sleep quality before surgery can impact the body's ability to recover effectively afterward, potentially leading to complications or slower recovery. Identifying the causes of these sleep disturbances and proposing solutions to improve sleep quality before surgery would be important.

Finally, 9.1% of patients rated their sleep as "very bad." Although this group represents a minority, it is concerning, as severely disrupted sleep before surgery can exacerbate the effects of surgical stress and increase the risk of postoperative complications. These patients could benefit from more focused medical attention before the operation, including specific measures to address their sleep issues, such as insomnia treatments or psychological support to reduce anxiety.

In conclusion, although the majority of patients rated their sleep quality positively before surgery, approximately 21% (12.1% "fairly bad" and 9.1% "very bad") experienced significant problems. These data underline the importance of preoperative sleep quality, as it can directly impact recovery. Identifying and addressing these sleep disorders beforehand could improve the overall condition of patients, allowing them to approach the surgery in better shape and reducing the risk of postoperative complications.

**Table 2:** Patient Responses on Sleep Quality Before Surgery

| Patient Response on Sleep Quality | Percentage | P-value |
|---|---|---|
| Very good | 32,7 b | ⩽ 0,01 |
| Fairly good | 46,1 c | |
| Fairly bad | 12,1 a | |
| Very bad | 09,1 a | |
| **Total** | **100** | |

The averages in the same column with the same letter do not differ significantly from each other at a 5% significance level.

## Sleep Onset in Patients Scheduled for Surgery (Under 30 Minutes)

The results provide interesting insights into the difficulties patients face falling asleep before their surgery, particularly their inability to fall asleep in less than 30 minutes. These data help better understand the sleep disturbances experienced by patients in the period leading up to their surgical intervention (Table 3).

27.8% of patients reported no difficulty falling asleep over the past month. This figure is positive, as it shows that more than a quarter of patients did not experience significant problems with their ability to fall asleep quickly. These patients likely benefit from good sleep hygiene, which can help them better cope with preoperative stress and facilitate postoperative recovery.

Approximately 26.8% of patients indicated that these difficulties occurred less than once a week. This means that while these patients occasionally experience difficulty falling asleep, these issues are not regular and should not significantly impact their overall well-being. However, providing advice to prevent these mild disturbances from worsening as the surgery approaches could be beneficial.

However, 34.3% of patients, or just over one-third, reported having difficulty falling asleep one or two times per week. This result indicates that a significant number of patients experience more frequent sleep disturbances, which could suggest a certain degree of anxiety, stress, or physical pain. While this is not systematic, these regular sleep-onset issues deserve attention, as they may lead to fatigue and a decrease in quality of life, potentially influencing the surgery's outcome and recovery.

Finally, 11.1% of patients reported difficulty falling asleep three or four times per week. This group, though a minority, shows a concerning level of sleep disturbance. These patients may suffer from significant stress related to their condition or the upcoming surgery. This regular lack of sleep can negatively impact their overall state, making the operation more challenging physically and emotionally. Targeted interventions, such as stress management or sleep hygiene advice, could help improve their sleep quality.

In conclusion, while the majority of patients do not experience severe sleep-onset difficulties, a significant portion (45.4% in total) struggles with falling asleep at least one or two times a week or more frequently. Addressing this issue before surgery through tailored support, particularly in stress and pain management, could enhance their comfort and optimize postoperative recovery.

**Table 3:** Patient Responses on Sleep Onset Before Surgery

| Falling Asleep in Less Than 30 Minutes | Percentage | P-value |
|---|---|---|
| Not in the past month | 27,8 b | ⩽ 0,01 |
| Less than once a week | 26,8 b | |
| Once or twice a week | 34,3 bc | |
| Three or four times a week | 11,1 a | |
| **Total** | **100** | |

The averages in the same column with the same letter do not differ significantly from each other at a 5% significance level.

## Analysis of Sleep Disruptions in Preoperative Patients

The results regarding nighttime or early-morning awakenings in patients before surgery reveal varied patterns of sleep disturbances, reflecting different levels of nighttime rest interruptions (Table 4).

23.1% of patients reported not waking up in the middle of the night or early in the morning during the past month. These patients appear to benefit from relatively stable and uninterrupted sleep, which is positive for their overall health. Quality sleep before surgery is crucial, as it helps the body better cope with surgical stress and contributes to a better postoperative recovery.

33.9% of patients reported that these sleep interruptions occurred less than once a week. Although these patients occasionally wake up, these disruptions remain sporadic and likely do not have a significant impact on their overall well-being. Nevertheless, monitoring these occasional awakenings, especially as the surgery approaches, could be beneficial since frequent awakenings may worsen with anxiety or postoperative discomfort.

25.8% of patients reported waking up once or twice a week. This group represents a quarter of the patients and indicates more regular sleep interruptions, which may be a sign of stress, physical pain, or other factors affecting sleep. While these interruptions are not daily, they can disrupt the sleep cycle and, over time, harm the patients' recovery and general well-being. These sleep disturbances should be addressed to ensure patients

approach their surgery in the best possible condition.

Finally, 17.2% of patients reported waking up three or four times a week in the middle of the night or early in the morning. These frequent awakenings are concerning, as they may indicate deeper sleep problems. Regular interruptions can cause fatigue, irritability, and decreased concentration, factors that can complicate preoperative stress management. These patients could benefit from a more thorough evaluation of their sleep disturbances and interventions aimed at improving the continuity of their nighttime rest, such as stress management strategies, pain management, or even adjustments to their sleep environment.

In summary, while nearly half of the patients (57%) report not being significantly affected by frequent awakenings, a substantial portion (42.8%) experiences regular sleep interruptions at least once or twice a week. Monitoring and addressing these problems before surgery would be beneficial to improve their physical and mental condition, minimizing the negative impact these nighttime awakenings may have on postoperative recovery.

**Table 4:** Frequency of Nighttime or Early-Morning Awakenings in Preoperative Patients

| Nighttime or Early-Morning Awakenings | Percentage | P-value |
|---|---|---|
| Not in the past month | 23,1 ab | ⩽ 0,01 |
| Less than once a week | 33,9 b | |
| Once or twice a week | 25,8 b | |
| Three or four times a week | 17,2 a | |
| **Total** | **100** | |

The averages in the same column with the same letter do not differ significantly from each other at a 5% significance level.

## Sleep Quality Assessment

The results concerning the sleep quality of patients who underwent surgery reveal alarming trends, particularly regarding daytime sleepiness, a critical indicator of sleep disorders. These findings highlight a significant yet often underestimated issue in the postoperative recovery process (Table 5).

None of the 1040 patients included in the study reported having sufficient sleep, representing a total absence of well-being in terms of nighttime rest. The fact that no patient considered their sleep to be optimal is significant, as adequate rest is a key factor in facilitating healing and recovery after surgery. Sleep plays a fundamental role in tissue regeneration, pain management, and emotional balance. Insufficient sleep could therefore not only slow recovery but also exacerbate pain, negatively impact mood, and worsen psychological symptoms such as anxiety or depression.

Similarly, no data suggest that patients described their sleep quality as merely "improvable," which might have indicated less severe disturbances. This absence of intermediate responses between sufficient sleep and severe sleepiness may signify that the majority of patients experienced significant disruptions in their sleep cycle. These results point to widespread disturbances, beyond what could be considered mere postoperative discomfort, necessitating immediate clinical attention.

More specifically, the majority of patients (representing 70% of the total sample) reported excessive daytime sleepiness, suggesting a probable sleep-related pathology. Excessive daytime sleepiness generally indicates an inability to stay alert and awake during the day, often associated with conditions such as sleep apnea, chronic insomnia, or sleep regulation disorders related to pain or medical treatments. In the postoperative context, this level of daytime sleepiness is alarming, as it compromises not only patients' quality of life but also their ability to actively participate in their recovery, follow medical instructions, and avoid fatigue-related accidents such as falls.

Additionally, 30% of the patients, reported suffering from very severe daytime sleepiness, suggesting a highly probable sleep pathology. This notable proportion of patients with severe sleep disturbances is particularly concerning, as it indicates that nearly one-third of patients may have serious disorders requiring urgent clinical intervention. Daytime sleepiness at this level suggests disruptions severe enough to impair cognitive functions, slow responsiveness and alertness, and significantly degrade quality of life. This degree of sleepiness could also pose a risk for the development of postoperative complications, such as delirium, which is often exacerbated by poor sleep and excessive fatigue.

These results raise critical questions about the management of sleep disorders in postoperative patients. The fact that no patient reported optimal sleep quality, or even moderately disrupted sleep quality, suggests that severe disturbances are widespread in

**Table 5:** Sleep Quality Scoring

| Sleep Quality | Percentage | P-value |
|---|---|---|
| Sufficient sleep | 00 a | ⩽ 0,01 |
| Average score, improvable sleep quality | 00 a | |
| Excessive daytime sleepiness, probable pathology | 70 c | |
| Very severe daytime sleepiness, highly probable pathology | 30 b | |
| **Total** | **100** | |

The averages in the same column with the same letter do not differ significantly from each other at a 5% significance level.

this population. Postoperative sleep disorders may be caused by various factors, including postoperative pain, anxiety, medication effects, and a hospital environment that is not conducive to restorative sleep. These combined factors could explain the high levels of daytime sleepiness observed in this study.

It is therefore imperative that healthcare professionals pay particular attention to the evaluation and treatment of sleep disorders in patients after surgery. A proactive approach could include systematic sleep assessments using questionnaires or diagnostic tests such as polysomnography to detect disorders early in the recovery process. Integrating more effective pain management strategies with psychological interventions to reduce stress and anxiety could also contribute to improving patients' sleep quality.

The results also highlight the need for individualized care. The 30% of patients suffering from very severe daytime sleepiness require special attention, possibly including behavioral therapies, tailored pharmacological interventions, or adjustments to pain management and sleep schedules. These patients, due to the severity of their symptoms, might also benefit from extended follow-up after hospital discharge to ensure their sleep disorders do not compromise their long-term recovery.

Overall, these findings underscore the urgent need to review the management of sleep disorders within postoperative care. Sleep is a crucial element for healing and quality of life, and addressing this dimension can not only enhance patient comfort but also prevent serious complications, such as postoperative cognitive impairments or rehospitalizations. Implementing specific protocols aimed at treating and improving patients' sleep quality after surgery could have significant clinical and patient satisfaction benefits.

## DISCUSSION

Several studies have examined the impact of various interventions on postoperative sleep quality[1,8]. Gong et al. (2015) analyzed the effects of sleep quality on early recovery after surgery and found that patients taking zolpidem experienced a significant improvement in sleep quality and higher satisfaction levels compared to those not taking the medication. Patients in the zolpidem group also reported lower pain scores and used fewer antiemetics than the control group. Furthermore, a significant correlation between sleep quality and range of motion (ROM) was observed[9]. Thus, reducing the incidence of sleep disturbances could decrease pain and improve patients' mental state during the day following total joint arthroplasty (TJA), potentially enhancing functional outcomes and accelerating postoperative recovery[10] focused on the relationship between postoperative sleep quality and rehabilitation without delving into the influence of preoperative sleep quality in patients.

Kirksey et al. explored postoperative sleep disturbances and the impact of melatonin on sleep and postoperative pain. However, exogenous melatonin did not appear to significantly improve postoperative sleep or pain[8].

The dynamic relationship between chronic sleep deficiency and pain thresholds is complex. However, it is well established that chronic pain conditions are often associated with insufficient sleep, which is a predictor of persistent pain symptoms in both the general population and individuals with chronic pain[11]. Haack et al. (2009) conducted a study and discovered that activation of the prostaglandin E2 (PGE2) system appeared to be a potential mediator of increased spontaneous pain in response to insufficient sleep. Weingarten et al. (2016) conducted a population-level study and concluded that very short sleep durations were associated with reports of moderate to severe pain.

Odegard et al. (2015) demonstrated that sleep restriction reduced the central nervous system's (CNS) response to pain, while certain subjective pain measures indicated

hyperalgesia. More recently, Roehrs et al. (2017) conducted a study on extended preoperative recovery measures over a period of 3 to 4 days. The group benefiting from sleep extension reported significantly lower average daily pain scores (4.4 vs. 5.6, $p < 0.04$) and significantly lower daily morphine-equivalent consumption (20.3 vs. 38.6 mg, $p < 0.02$) than the control group. Furthermore, Pittsburgh Sleep Quality Index (PSQI) scores were significantly correlated with nocturnal and activity pain scores as well as analgesic consumption in the early postoperative period.

Our results confirmed a very high prevalence of poor preoperative sleep quality among individuals scheduled for surgery. This can undoubtedly affect postoperative pain, increase sensitivity to postoperative pain, and raise the consumption of postoperative analgesics[16].

## CONCLUSION

In conclusion, the results of this study reveal sleep quality disturbances in patients awaiting surgery, with significant clinical implications for their preoperative condition and recovery. Although 78.8% of patients reported their sleep as "very good" or "fairly good," 21.2% indicated notable difficulties, describing their sleep as "fairly bad" or "very bad," which may compromise their recovery capacity.

Data on sleep onset and nighttime awakenings also indicate that a significant percentage of patients experience frequent difficulties. Finally, the evaluation of daytime sleepiness in patients post-surgery shows that none of the respondents achieved sufficient sleep, and 70% experienced excessive daytime sleepiness—an alarming situation that could delay recovery and increase the risk of postoperative complications.

This study highlights the importance of evaluating and proactively managing sleep disorders as part of preoperative and postoperative care. Targeted care, including stress management techniques and interventions to improve sleep quality, could help optimize patients' conditions before surgery and support their recovery, thereby reducing the risk of complications and promoting a faster, more sustainable return to health.

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### Conflict of Interest

The authors assert that there are no conflicts of interest associated with this research.

### Ethical clearence

There was no need for ethical clearance for this research.

### Authorship contribution

El mostafa amezoute: Acquisition of data, data analysis, interpretation of results, writing-original draft and submitting manuscript, Rachid Elaazia: involved in writing, reviewing, Mostafa Alilou: reviewing, Abdhalem Mesfioui.: supervision and writing-review, Abdhalem Mesfioui : supervision and writing-review, El mostafa amezoute, Abdhalem Mesfioui, Mostafa Alilou : interpretation of results, writing-original draft, reviewing and editing. All authors have read and agreed on the final version of the manuscript

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