# Sleep disorders in chronic renal failure and haemodialysed patients

*Thesis*

Sumitted in partial fulfilment of the master degree

of internal medicine

By

**Khaled Zakaria El-Karmouty**

( M.B.B.ch. )

Supervised by

**Prof.Dr. Badawy Labieb**

Professor of internal medicine

Department of Internal Medicine

Ain Shams University

**Dr. Mohamed Mahmoud Abd El-Ghany**

Lecturer in internal medicine

Department of Intenal Medicine

Ain Shams University

**Dr. Tarek Asaad**

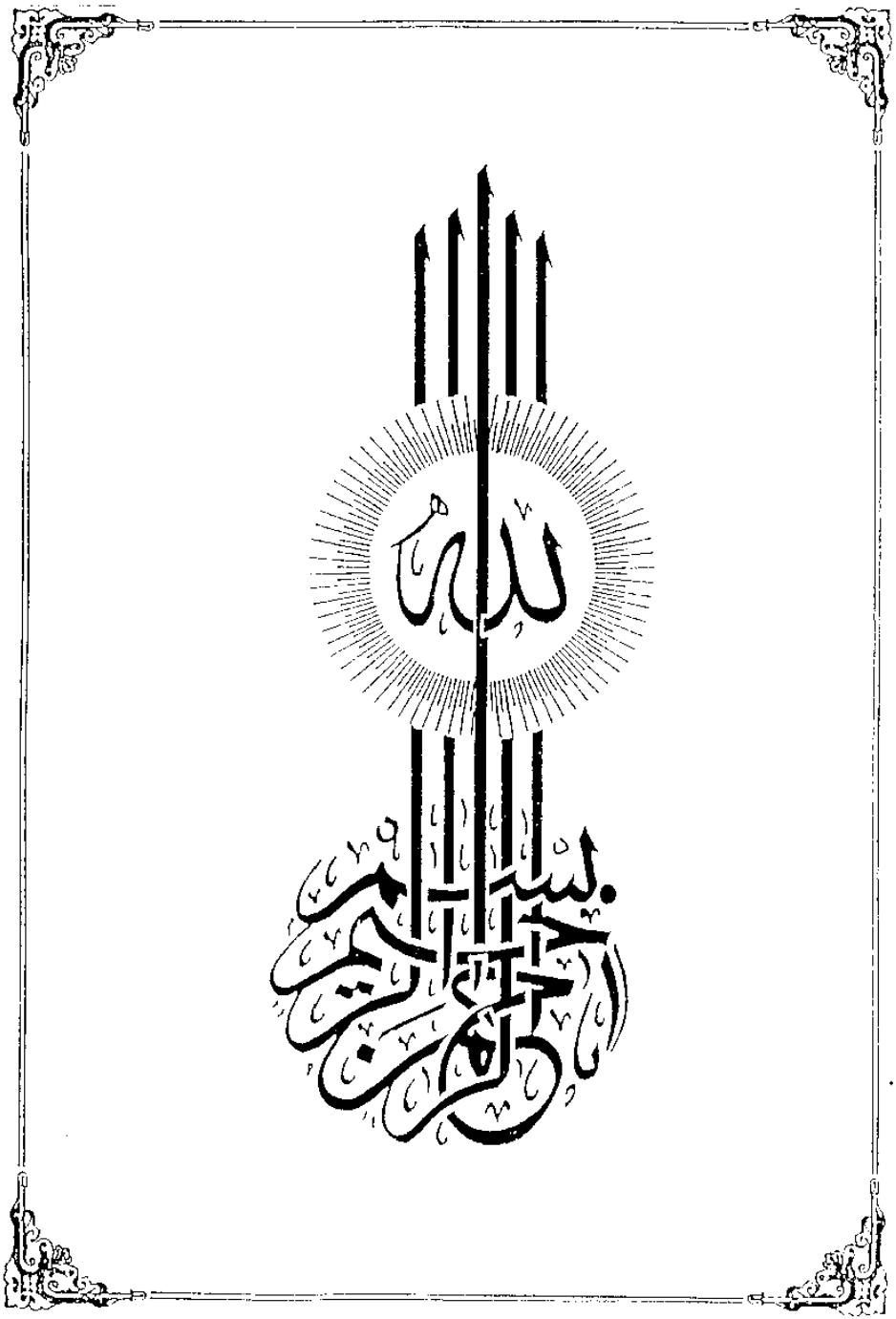
Lecturer in neurology and psychiatry

Department of Neurology and Psychiatry

Ain Shams University

1994

## Contents



## List of tables

## List of figures

## *Acknowledgment*

For all my supervisors , whatever I say , I can't express my deepest gratitude for their harmony work and kind directions .

Much dimity for **Prof.Dr. Badawy Labieb** for his fine encouragement , direful experience and best guiddance althrough this work .

I want to express also my deep feelings for **Dr. Mohamed Abdel-Ghany** for his pleasant assistance , and faithful in our study .

For **Dr.Tarek Asaad** , I offer a gift full of thanks for his elegence work , enormous effort and support .

# Introduction

Sleep disorders including a high incidence of sleep apnea have become a topic of increasing clinical interest in chronic renal failure (CRF) patients (Kimmel et al ., 1989 ., and Mendelson et al ., 1989).

The sleep disorder may take the form of abnormal pattern of sleep and increased requirements for medications as well as an overt sleep apnea . Both obstructive apnea and central apnea occur in CRF patients (Kimmel et al .,1989 and McGregor ., 1989 ) .

The detrimental clinical effects of sleep apnea include arterial oxygen desaturation , cardiac arrhthmias and pulmonary and systemic hypertension ( Parish et al ., 1990 ) .

Also untreated sleep apnea may prevent long-term haemodialysis (H.D) patients with end stage renal disease from fully achieving maximal rehabilitation and improvement in quality of life ( Kimmel et al ., 1989 ) .

# AIM OF WORK

The aim of this work is to study sleep patterns in end stage renal disease patients at regular haemodialysis and chronic renal insufficiency patients not starting dialysis yet , and to determine whether sleep apnea is associated with chronic renal disease .

# *Review of literature*

CHAPTER ONE

# *CHARACTERS OF SLEEP*

**1- The function of sleep**

**2- Stages of sleep**

**3- The normal adult sleep cycle**

**4- Depth of sleep**

**5- Age and sleep patterns**

**6 - Sleep needs**

**7 - Circadian rhythms**

# Characters of normal sleep

**The function of sleep :**

Although the sleep is very important in our life , it is not known why we sleep . Numerous theories about the fuction of sleep have been proposed including the idea that sleep allows general bodily and cortical recovery , the sleep protect the body from tissue damage caused by exhausion that sleep is a natural mechanism for conserving energy and that sleep is an innate , species specific behavior similar to such phenomenon as nest building , migration , or court shipdarces . It is interesting to note that sleep needs seem to be finely tuned to the ecological niche of a given species . Animals with few enemies such as a large cats , or animals that are protected such as small burrowing rodents, sleep a great deal of the time , while animals who are at rest during sleep , such as the large grazing animals , sleep very little ( William and Karacan., 1978) .

Webb ( 1975 ) , observed that sleep length is closely related to the time in which it is best for an animal not to respond , he suggested that the inactivity of sleep may have survival benefits . For example , early humans who sleep little and were active at night were not doubt frequent

victims of animals better adapted to nocturnal huntering , while their sleeping and motionless relatives were more likely to go unnoticed .

Also , since subsistence food gathering propably consumed most of the day time period , those inclined to sleep during the day would soon find themselves starving to death . Thus , there may well have been a survival advantage for those humans who remained unresponsive during darkness , but were active during the day light hours .

Many of these sleep theories are compatible and it seems likely that sleep serves many function ( Webb , 1975 ) . It may well be , for example , that a certain minimal amount of sleep is required to restore some bodily processes , and that additional sleep may vary according to ecological requirments or specific needs to conserve energy .

**Stages of sleep :**

There are 2 different kinds of sleep : rapid eye movement ( REM ) sleep and non REM sleep ( Rech and Kales ., 1968 ) .

**( A ) Non rapid eye movement ( N-REM ) sleep :** is divided into 4 stages :

* Stage 1:A person falling asleep first enter stage 1 which is the transition phase between wakefullness and sleep , occuring at the begining of sleep and at varying times during the night , especially after body movements or noise . Stage 1 sleep is also recorded in many experienced meditators during their meditation

Decreased reactivity to external stimuli and a change in mentation to a more dream like state serve to differentiate stage 1 sleep from wakefulness . However , a person awakened from stage 1 sleep usually reports a feeling of having been awaked . This stage is characterized by low amplitude , fast frequency EEG activity .

* Stage 2 : It is the most abundant of sleep stages and occupies 50% to 70% of adult sleep . When persons are awaked from this stage , they usually report short , murdane , and frequent thoughts

Stage 2 is characterized by the appearance of sleep spindle in EEG . These are bursts of alpha like , 10-14 / second , 30 uVolts waves .

* Stage 3 and stage 4 : Are also called delta or deep or slow wave sleep . Delta sleep is the deepest type of sleep and is commonly believed to be the most restorative . It usually occurs early in the night . As regard EEG , stage 3 is characterized by slower frequency and increased amplitude of EEG waves while maximum slowing with large waves is seen in stage 4 .

**( B ) Rapid eye movement ( REM ) sleep :**

It is characterized by rapid eye movements which usually occur in bursts . Although muscle tone , particularly in the chin and neck muscles , is lowest during REM sleep , small twitches occur in many muscle groups

. Heart rate and respiratory rate are higher , and more variable during REM sleep . In general , about 80% of awakenings from REM sleep yield reports of vivid dreaming .

The high amplitude slow waves seen in the EEG during deep sleep are replaced by rapid , low voltage , irregular EEG activity which resemble that seen in alert state . However sleep is not interrupted , indeed the threshold for arousal is elevated . The condition has been called paradoxical sleep .

**The normal adult sleep cycle**

Upon going to bed , a normal sleeper first enters NREM sleep , passing through stage 1, then 10 - 30 minutes is stage 2 , then , the sleeper gradually enters delta sleep ( stages 3 and 4 ) . Sixty to 90 minutes later , the sleeper return to stage 2 and then enter a REM period which lasts only a few minutes . This first REM period is the least intense of the night , both in terms of physiological manifestation of REM sleep and of dream intensity .

The second cycle begins when stage 2 reoccurs after the first REM period. Then , the sleeper reenters delta sleep , but there is usually less of it in the second cycle than in the first . After about 90 minutes of NREM sleep ; the second REM begins and usually lasts 8 - 10 minutes .

For the remainder of the night , stage 2 sleep and REM sleep usually alternate in approximately 90 minutes cycles with REM sleep typically occupying 15 - 30 minutes of each cycle . Thus , there are 4 - 6 REM periods per night and at all ages REM sleep constitutes 25% of total sleep time . REM sleep becomes more intense ; both physiologically and psychologically toward morning and delta sleep is rarely seen in these later sleep cycles .

Numerous body movements and 5 - 15 spontaneous awakening are spread throughout REM and NREM sleep . In good sleepers , these awakenings typically last from few seconds to few minutes each . Although the sleeper is responsive to environmental stimuli during these short arousals , the awakening are usually forgotten by the morning (Kales and Kales ., 1974) .

**Depth of sleep**

Depth of sleep is measured by the amount of noise required to awaken a sleeper of NREM sleep . Delta sleep is much deeper than stage 2 although stage 2 varies greatly in depth . Thus , it is lighter just after falling asleep and during the early morning , and deeper when adjoining delta sleep

The depth of REM sleep on the other hand , can not be easily classified because it has physiological characters of both light and deep sleep . However , in terms of noise needed to awaken a person REM and stage 2 sleep are similar