



# MAJMAAH JOURNAL OF HEALTH SCIENCES

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**Reliability of INFANIB among normal and high risk  
term neonates: A cross sectional study**

.....Jaya Shanker Tedla

**Complementary and Alternative Medicine Use among Health  
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**Knowledge and Attitudes of the Public, Primary Health  
Care Physicians and other Health Professionals, and  
Policy Makers towards Religious Medical Practices**

.....Asim Abdelmoneim Hussein



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## PREFACE

The first issue of the *Majmaah Journal of Health Sciences* was a great success in every respect. Not only was the quality of the scientific articles high, so was the enthusiasm and willingness with which our researchers and clinician alike have submitted their contributions. The editorial quality and the design of our own journal are also in line with what may be expected of a scientific journal.

*Majmaah Journal of Health Sciences* has passed an important first test. The editorial team has succeeded in making a high quality journal with its own image, with readable content and with an interested and involved group of authors and readers. The challenge is now to continue and proceed on this chosen path. One issue does not make a journal yet. It is up to us to deliver content and commitment over the coming years, which can result in a new, valuable tradition supporting the scientific development in health sciences.

This second issue of the *Majmaah Journal of Health Sciences* is the result of the dedicated contributions of many persons. We thank our editors for sharing their invaluable editorial experience with us. They have played outstanding role in taking on responsibilities to assist in the development and running of this journal. The editorial board has done a tremendous job; I thoroughly enjoyed the professionalism and enthusiasm of our editorial team.

The peer-reviewing processes developed for the journal engages leading scientists and clinicians in the field of health sciences, and, working together with a robust editorial structure, they ensures the highest quality and most original studies are published. The journal recognizes the support of its reviewers, which is of the vital importance to its success.

We gratefully acknowledge the continuing guidance of Majmaah University's Rector Dr. Khalid bin Saad Al-Meqrin, Vice Rector, Dr. Mohammad Abdullah Al-Shaya and Dean Scientific Research Dr. Mohammad bin Nasser Al-Suwaid for their leadership and support, which has been instrumental in the formation and running of this journal.

The journal would not be here before you without the continuous efforts of the editorial assistants Dr. Mohammed Al-Mansour, Dr. Khaled Al-Tohami, Dr. Moattar Raza Rizvi, Dr. Fuzail Ahmad and Mr. Waqas Sami, who kept us all; authors, reviewers and editors, on track and consequently made the Journal's timely publication possible.

But most of all I would like to thank all authors who submitted their paper to the journal. I hope they enjoyed the experience of getting their paper criticized and often improved by the reviewers' and editors' comments.

I am grateful to all of those involved in the production and publication of this and future issues, and hope the demands of our readers and scientific community are met. May the *Majmaah Journal of Health Sciences* continue to be a success.

**Prof. Mohammad Othman Al Rukban**

Editor in Chief

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## ERRATUM

Erratum to CDP-CHOLINE NEUROPROTECTION AND VASCULAR REMODELLING VIA IRS-1 MECHANISMS IN VASCULAR DEMENTIA- GROWING NEURONS ATOP MICROELECTRONIC CHIPS AS A NEW MODEL FOR NEURODEGENERATION

<sup>1</sup>\*Raid Al -Baradie, <sup>2</sup>Stephen Lynch, <sup>3</sup>J Borresen, <sup>4</sup>Jerzy Krupinski, <sup>5</sup>Mark Slevin

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This erratum is inscribed with reference to the published paper “**Raid Al -Baradie, Stephen Lynch, J Borresen, Jerzy Krupinski, Mark Slevin** CDP-CHOLINE NEUROPROTECTION AND VASCULAR REMODELLING VIA IRS-1 MECHANISMS IN VASCULAR DEMENTIA- GROWING NEURONS ATOP MICROELECTRONIC CHIPS AS A NEW MODEL FOR NEURODEGENERATION. MJHS 2013; 1:11-16.

” The affiliation of the corresponding author Dr. Raid Al-Baradie should be written as “Assistant Professor, Pathology, College of Applied Medical Sciences, Majmaah University, Al-Majmaah, Saudi Arabia” and not “Assistant Professor, Family Medicine, College of Medicine, Majmaah University, Al-Majmaah, Saudi Arabia.”

In addition, the caption for figure 1 should be read as “Figure 1 Possible signaling pathways through mCRP linked to neuronal degradation and Alzheimer's disease/vascular dementia.” And not Figure 1 shows the operation of a binary half-adder based on Fitzhugh-Nagumo oscillators (which are simplified versions of the Hodgkin-Huxley models).

This has been corrected in the PDF versions of the manuscript and made available online <http://mu.edu.sa/en/departments/majmaah-journal-health-sciences/current-issue-0>

## ROLE OF SIWAK IN THE MAINTENANCE OF ORAL HOMEOSTASIS AND DENTAL HYGIENE COMPARED WITH TOOTH BRUSH

\*Wafaa A Khalil<sup>1</sup>, Mohammed. Y. Sukkar<sup>2</sup>, Bakri G Gismalla<sup>3</sup>

### ABSTRACT

*While previous research on Siwak has mostly focused on its microbiological effects, this research is aiming to evaluate its role on the maintenance of oral homeostasis and dental hygiene, an important factor for preventing caries and periodontal diseases. Two groups of subjects were studied: regular Miswak (n=60) and tooth paste brush users (n=59). Miswak used was from the “Arak” tree of Sudan, species of *Salvadora Persica*. Oral hygiene was assessed by measurement of plaque index (PI), gingival index (GI) and decayed, missing and filled (DMF) indices. The (PI) was significantly higher in Miswak users, but no difference was noted in the DMF and GI values. A positive correlation was found between DMF values and age among Miswak users, as well as between gingival and plaque index on both study groups. These findings suggest that use of Miswak offers a good option for maintaining oral homeostasis and hence in preventing periodontal disease and cares formation.*

**KEY WORDS:** *Siwak; Miswak use; oral homeostasis; dental hygiene; dental plaque; periodontal disease.*

**المستخلص:** يُلاحظُ اهتمام متزايد للتعرف على طرق لمكافحة لويحات الأسنان الجرثومية يمكن استخدامها يومياً وبأمان. لقد تمت دراسات سابقة للجوانب الأحيائية المجهرية لإستخدام شجرة الأراك (السواك)، بينما دراستنا الحالية هدفت إلى تقييم دور السواك في المحافظة على مستوى التوازن والأستواء الصحي للغم وبالتالي في مكافحة التسوس وأمراض اللثة والأسنان، وذلك من خلال أثره الكيميائي والميكانيكي على اللويحاتالجرثومية السنوية. تضمنت الدراسة مجموعتين رئيسيتين: مستخدمي السواك بانتظام وعددهم ستون، ومستخدمي معجون وفرشة الأسنان بانتظام وعددهم تسع وخمسون بالغاً متطوعاً من المجموعتين. أعواد السواك المستخدمة كانت من شجرة الأراك من فصيلة سلفادورا بيرسكا والتي تكثر زراعتها بالسودان. تم تقييم صحة الغم بقياس مؤشر اللوحة السنوية ومؤشر اللثة ومؤشر تلف وفقدان وحشو الأسنان. كان مؤشر اللويحات السنوية أعلى بدلالة احصائية في مستخدمي السواك. لم يكن هنالك فروق ذات دلالة احصائية في مؤشري اللثة وتلف وفقدان وحشو الأسنان. كان هنالك ارتباط إيجابي بين مؤشر تلف وفقدان وحشو الأسنان والعمر في مستخدمي السواك. كما كان هناك ارتباط إيجابي ذو دلالة احصائية بين مؤشر اللثة ومؤشر اللوحة السنوية في مجموعتي الدراسة. هذه النتائج تستنتج أن السواك قديكون بديلاً جيداً في الحفاظ على صحة الغم والاسنان وبالتالي في منع تكون اللويحات السنوية التسوس.

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## INTRODUCTION

Oral hygiene is one of the most important factors for maintenance of oral homeostasis and health.<sup>1</sup> The pathogenic nature of the dental plaque biofilm can be diminished by maintaining normal oral flora via oral hygiene procedures such as tooth brushing, flossing and rinsing with an antimicrobial mouthrinse, which can completely prevent caries and periodontal diseases.<sup>2-4</sup> Fluoride found in most tooth pastes and mouth rinses, is known for its anti caries properties which is attributed to the formation of fluoroapatite, calcium fluoride, leading to increase of enamel resistance to demineralization.<sup>5</sup> Moreover, it reduces pH fall during frequent ingestion of carbohydrates.

The name miswak, an Arabic word meaning tooth cleaning stick, is known in English as the "natural toothbrush",<sup>6-8</sup> the most common species is the medicinal plant *Salvadora persica*, also known as Arak in East Africa through to the Arabian Peninsula and the Asian subcontinent<sup>6,9</sup> for centuries and its fibrous branches have been promoted by the World Health Organization, for oral hygiene use.

When properly used, miswak had been reported to be as effective as tooth brushing.<sup>10-12</sup> Besides the mechanical effects of its fibers, if left in mouth, stimulate salivation and release of beneficial chemicals<sup>13</sup>; thus, there may be a better cleansing effect. The roots of *S. persica*, contains a number of identified antimicrobial and other prophylactic components including fluoride, alkaloids, sulphur compounds glucosinolates, and volatile oils such as benzyl isothiocyanate. As to other researchers, *Salvadora persica*, contains, in large amounts silica, sulphur, vitamin C, and small amounts of tannins, saponins, flavonoids and sterols. It also contains, trimethylamine, salvadorine, chlorides, fluoride.<sup>14-18</sup> The tannins and

resins have an astringent effect on the mucus membrane and form a layer of enamel, thus giving protection against caries.<sup>19</sup>

Baghdady and Gose in 1979 conducted a study comparing caries prevalence among Iraqi and Sudanese schoolchildren using the WHO DMFT (diseases, missing, filled teeth) index. Their results reported that Sudanese children showed lower caries prevalence due to use of miswak and their diet.<sup>20</sup>

Darout et al (2000) also reported that the periodontal status of miswak users in a Sudanese population was better than that of tooth brush users, suggesting that the efficiency of miswak use for oral hygiene is comparable or even better than tooth brush.<sup>21</sup>

A 2003 scientific study comparing the use of miswak with ordinary tooth brushes concluded that the results clearly were in favor of the users, who had been using the Miswak, provided they had been given proper instruction in how to brush using it [11]. The aim of this study is to compare miswak use with conventional tooth paste and brush use on dental health.

## SUBJECTS AND METHODS

A volunteer non-probability Sampling technique was used to recruit study participants. Volunteers were interviewed and verbal consent was taken. Oral hygiene habits were assessed using a structured questionnaire. The study was conducted on two categories of subjects: regular Miswak users, regular tooth paste and brush users. One hundred and nineteen volunteer students and employees in the Faculty of Medicine U of K, and from Masjid Bilal in Jabra, Khartoum participated in the study. Age of the participants range was 18-65 years.

Periodontal status was assessed clinically using gingival and dental plaque indices (GI, PI) and decayed, missing and filled (DMF). The miswak used by the participants, from the “Arak” tree of Sudan, species of *Salvadora Persica*. Inclusion criteria included regular miswak and brush users, good general health, absence of chronic illnesses such as diabetes and hypertension, no past or present history of smoking or snuff use (Tombak languages). Also excluded from our study, those who had used antiseptic mouth wash or received antibiotics for at least one month before clinical assessment.

**Periodontal status:** Assessed on six sextants/subject according to Loe and Silness<sup>22</sup> for GI, PI and WHO<sup>23</sup> for DMF.

**Gingival index system as follows:**

Appearance	Bleeding	Inflammation	Points
Normal	No bleeding	None	0
Slight change in color and mild edema with slight change in texture	No bleeding	Mild	1
Redness, hypertrophy, edema, glazing	Bleeding on probing/pressure	Moderate	2
Marked redness, hypertrophy, edema, ulceration	Spontaneous bleeding	Sever	3

**Gingival index mean calculation**

The index for each volunteer is obtained by summing the indices for all six teeth and dividing by six.

**Plaque index calculation:** The index of the subject was obtained by summing the indices for all six teeth and dividing by six.

**Plaque index system as follows:**

Scores	Criteria
0	No plaque
1	A film of plaque adhering to the free gingival margin and adjacent area of the tooth. The plaque may be seen in situ only after application of disclosing solution or by using the probe on tooth surface
2	Moderate accumulation of soft deposit within the gingival pocket, or the tooth and gingival margin which can be seen by the naked eye
3	Abundance of soft matter on the tooth and gingival margin.

**Disclosing agent:** used was in the form of tablets colored (red-cote dentdisclosing tabs. butler Code No 130065-0), examination was performed after chewing one tablet where supra gingival plaque could be seen as a violet or purple spots.

**Sites of examination:** The teeth examined in GI and PI represented six sites and 4 surfaces on each tooth: 1) buccal, 2) lingual, 3) mesial, 4) distal

**DMF index:** DMF index has been recommended by WHO, as a parameter to assess the dental health situation in various societies.

**DMF index calculation:** The DMF index mean was calculated simply as the total number of decayed teeth (D), Missed (M) and Filled (F) teeth divided by the number of cases investigated. Great variations between societies, has been noted.

**Statistical analysis:** The data has been organized and analyzed using the statistical program SPSS (Statistical Packages for Social Sciences): The T-test for equality of means; Regressions and curve estimations were used to show relationships between different parameters; Descriptive statistics, include cross- tabulations; simple charts.

**RESULTS**

Below intermediate education, Miswak users were 28.3% compared to 6.8% of brush users. Table.1

Education level	Miswak		Brush	
	Frequency	Percentage	Frequency	Percentage
Illiterate	2	3.3	0	0
Elementary school/ khalwa	15	25.0	4	6.8
Intermediate school	9	15.0	6	10.2
Secondary school	20	33.3	17	28.8
High education	14	23.3	27	45.8

Periodontal status concerning GI and DMF, were the same in both study groups (p=0.345, 0.390); higher PI index was found in Miswak users (p=0.034) [Table.2.].

**Table.2. Comparison of the oral hygiene indices between study groups**

Oral hygiene measures	Miswak		Brush		p-value
	N	Mean±SD	N	Mean±SD	
DMF	5	4.24± 4.13	5	5.00± 4.19	0.345
PI	6	1.62± 0.64	5	1.36± 0.62	<u>0.034</u>
GI	6	1.32±0.50	5	1.40±0.53	0.390

Also in Miswak users only DMF was found to be related positively to age (p=0.009)[Fig.1], while no correlation

between age and DMF in brush users (p=0.127), nor between other indices and age in both study groups.

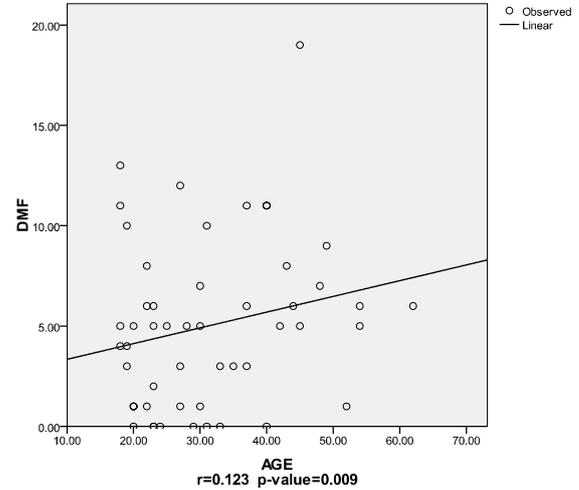
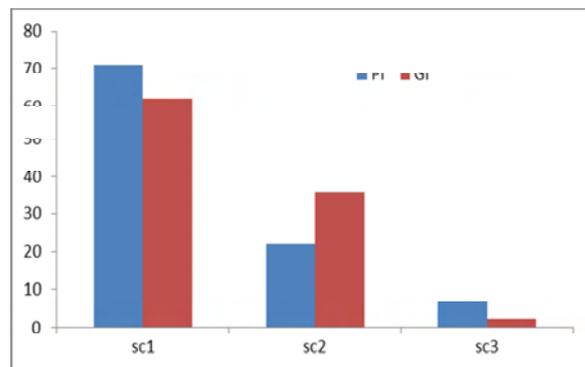


Fig.1. Relationship of the DMF index to age in Miswak users

Strong positive correlation was found between Gingival index (GI) and Plaque index (PI) in both study groups (p=0.000)[Fig.2]. No relationship had been detected in both study groups between oral hygiene indices and years of toothbrush or Miswak use, nor with duration and frequency of use.



Brush (r=0.305, p-value=0.000), Miswak (r=0.243, p-value=0.000)

Fig.2. Relationship between the PI and the GI index in both study groups

## DISCUSSION AND CONCLUSION

Illiterate and elementary school education represented (28.3%) of miswak users compared to only (6.8%) among brush users, indicating more frequent use of Siwak compared to brush use among low educational, and probably also low socio-economic groups in the community. The strong relationship between DMF and age in miswak users can only be explained by other studies that showed that DMF index is directly correlated with the health & economic, cultural, social state of the society and therefore it can be used for comparative studies.<sup>24</sup>

A direct significant relationship between PI and GI was found in both study groups, demonstrate the well, known relationship between dental plaque and periodontal disease.<sup>25</sup>

The three known periodontal variables assessed (DMF, PI, GI), showed no significant differences between study groups except for the plaque index (PI) where higher index was found in regular miswak users compared to the brush users; a finding which could suggest improper use of miswak,<sup>11</sup> as this is contrary to other studies that found that miswak efficacy was comparable to that of the conventional tooth brush.<sup>26</sup> Gazi had demonstrated that there were no significant differences in plaque scores measurements between habitual miswak and toothbrush and that plaque scores could be significantly lower following the use of miswak when compared with the conventional tooth brush, if used without tooth paste.<sup>12</sup> Eid also reported that the majority of miswak users apply miswak to both aspects of their teeth and that there was no significant difference in plaque scores and attachment loss noted between miswak and tooth brush users.<sup>27</sup> Higher (PI) in miswak users without significant difference in the (GI) and (DMF), despite the positive

relationship between PI and GI may suggest the interplay of some other factors in Siwak such as abrasives, antiseptics, astringent, detergents, enzyme inhibitors and fluoride, that may suggest miswak as to be of comparable efficacy to that of the conventional tooth brush.

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## RELIABILITY OF INFANIB AMONG NORMAL AND HIGH RISK TERM NEONATES: A CROSS SECTIONAL STUDY

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### ABSTRACT

**Background:** Infant Neurological International Battery (INFANIB) is one of the common neurological assessment used for the infants. The reliability in the newborns is more essential to prove because INFANIB is used to predict the infant motor capabilities at later stages. **Objective:** Objective of the study is to establish intra-rater and inter-rater reliability of Infant Neurological International Battery between normal and high risk term neonates. **Methods:** In this cross sectional study a convenience sample of term neonates was included. Demographic data were completed from medical records. Rater one administered INFANIB on all the neonates and the assessments were being videotaped. The videos were anonymized and were viewed by two independent raters so they were blinded from knowing the groups from which each neonate belonged to. Rater three viewed 50 videos randomly for assessment of intra-rater agreement after one month. All the raters were blinded from scores of one another as well to avoid bias during assessment. For intra- as well as inter-rater reliability, two-way mixed, absolute agreement and single measure ICC was calculated. **Results:** 112 neonates (normal=56; high risk=56) with mean (SD) gestational age of 39.1 (1.1) and 38.9 (1.1) weeks respectively on mean post natal day of 4 were assessed. For intra-rater agreement the ICC was 0.42 (0.05-0.7) for normal neonates and 0.33 (0-0.63) for high risk neonates. For inter-rater agreement the ICC was 0.1 (0-0.26) for normal neonates and 0.28 (0.05-0.5) for high risk neonates. **Conclusions:** The intra-rater and inter-rater reliability of INFANIB proved to be poor between the normal and high risk term neonates. Formal training should be given to any profession or health workers who are planning to use INFANIB as a screening tool for early neurodevelopmental delay among neonates to improve the inter-rater agreement.

KEY WORDS: Neonatology, Neurodevelopment, Reliability, INFANIB, Screening.

**ملخص:** البطارية العصبية الدولية للأطفال الرضع (INFANIB) هي واحدة من أكثر النظم شيوعاً لتقييم الجهاز العصبي للأطفال الرضع، ومن الأهمية اثبات موثوقية هذه الوسيلة في الكشف على الأطفال حديثي الولادة لأنه يتم استخدام هذا النظام للتنبؤ بالمقدرات الحركية للرضع في مراحل لاحقة. **الهدف:** الهدف من هذه الدراسة هو تحديد موثوقية نظام التقييم بين مختلف المقيمين الذين يقيمون حديثي ولادة طبيعيين وآخرين ذو معدل خطورة عالي. **منهج البحث:** هي دراسة مقطعية اشتملت على عينة مناسبة من الاطفال حديثي الولادة كاملي النمو. وقد اخذت البيانات الديموغرافية من السجلات الطبية ثم تم تقييم كل الاطفال بواسطة المقيم الاول و جري تصوير عملية الكشف والتقييم بالفيديو. روجعت الفيديوهات من قبل مقيمين اخرين دون معرفة لأي فئة يتبع الاطفال. بعد شهر من التقييم تم عرض 50 فيديو عشوائياً على مقيم ثالث لمعرفة التوافق في النتائج بين المقيم الاول والثاني. كل مقيم ادي دوره دون معرفة نتائج الاخر لتفادي الانحياز. لحساب الموثوقية بين المقيمين تم التحليل باستخدام معامل الارتباط (Two-way mixed, absolute agreement and single measure ICC).

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**النتائج:** تم التقييم لعدد 112 طفل حديث ولادة ( 56 طبيعي و 56 ذو معدل خطورة عالية) وقد كان التقييم (في المتوسط) في اليوم الرابع للولادة. متوسط العمر الحملي 39,1 أسبوع مع انحراف معياري 1,1 للطبيعيين و 38,9 أسبوع مع انحراف معياري 1,1 لذوي الخطورة العالية. معامل الارتباط بين المقيمين الاول والثاني كانت 0,42 (0,05 حتى 0,7) لحديثي الولادة الطبيعية و 0,33 (0,05-0,63) لحديثي الولادة ذو المخاطر العالية. معامل الارتباط بين المقيم الثالث والآخرين كانت 0,1 (0,05-0,26) لحديثي الولادة الطبيعية و 0,28 (0,05-0,50) لحديثي الولادة ذو المخاطر العالية. **الاستنتاجات:** اثبتت الدراسة ضعف الموثوقية في تطبيق نظام التقييم بواسطة المقيمين المختلفين بين حديثي الولادة الطبيعيين وذوي المخاطر العالية, مما يستوجب التدريب الرسمي للعاملين في المجال الصحي الذين يستخدمون البطارية الدولية للأطفال كأداة فحص أولي لتشخيص تأخر النمو العصبي في وقت مبكر بين حديثي الولادة.

## INTRODUCTION

Neonatal period is a crucial period in detecting neurological illness.<sup>1</sup> Various studies have shown the value of early identification of developmental delay among children.<sup>2,3</sup> Following which timely intervention can be given, these include physical therapy, speech and language therapy, occupational therapy and sensory integration. Evidence showed that early treatment of developmental delay leads to better outcomes for children and reduces the costs of providing health care, educational support and treatment services. Hence, there is an increasing emphasis on the use of appropriate developmental screening for children and early detection of neurodevelopmental delay. The ideal screening method should be a standardized and validated tool with established psychometric properties, easy to perform and interpret, cost effective, and have a good sensitivity and specificity.<sup>2</sup>

Infant Neurological International Battery (INFANIB) was designed to assess the motor development of infants whose corrected gestational age ranged from 0 to 18 months though INFANIB was constructed based on a study consisted of infants from age three to 22 months in 198.<sup>4,5</sup> In view of motor development that is most rapid in infancy,<sup>6</sup> INFANIB is a screening tool used for early detection of gross motor developmental delay.<sup>7</sup> INFANIB has 20 items which were selected from four methods of neurological

examination: 1) the Milani-Comparetti and Gidoni method, 2) the French “angles” method, 3) the primitive reflexes method, and 4) the Paine and Oppe method<sup>8</sup>.

INFANIB is an instrument to assess the neurological integrity of infants and used in follow-up programs. The assessment is practical because it can be completed by the clinicians within several minutes.<sup>4,8</sup> In view of tone abnormalities detected in early infancy may resolve at the end of the first year of life,<sup>9,10</sup> the standard scoring sheet of INFANIB, which allows clinicians and physical therapists to evaluate the infant's tone and posture in a quantified manner<sup>11</sup> give a more accurate diagnosis when the child is being followed-up in the future.

INFANIB was constructed based on practicality and psychometric principles, but reliability is the major concern in view of the variation in the force that the examiner applies to the limbs of the infant and variation in the measurement of angle. Occasionally, clinicians and physical therapists have different rating for the same infant in view of different interpretations of the results when similar methods of examination have been used. This is due to the fact that clinicians examined the infants to make a diagnosis while physical therapist identified minor impairments for therapy.<sup>4</sup> There is scarcity of literature available on the inter- and intra-rater reliability of the INFANIB scale in the neonates.<sup>3,4,8</sup> Since early detection of high risk infant is crucial

for further follow up in the future, neonatal group was chosen as the subject of interest.

## MATERIALS AND METHODS

This cross sectional study included a total of 112 term neonates (56 Normal and 56 High Risk) in the state 3 (eyes open, no gross movement) and 4 (eyes open, gross movements, no crying) of Normal Neonatal Behavioral States of Prechtl and Beintema.<sup>12</sup> This study was conducted in the year 2010-2012 and the full term newborns were selected by convenient sampling as and when they are available in the hospital. Preterm neonates were excluded to eliminate errors from hypotonia of prematurity.<sup>11</sup> Term neonates with systemic illness and congenital musculoskeletal disorder were not eligible. In addition, term neonates under maternal medication in whom alertness was affected were excluded.<sup>13</sup> High risk term neonates were those neonates with risk factors associated with neurodevelopmental delay. The risk factors included low birth weight, perinatal asphyxia, low Apgar score, neonatal hypoglycemia, neonatal seizures, type II pneumonia, and pregnancy complications.<sup>3,12,14,15</sup>

Approval from Institutional Ethical Committee and permission from the Medical Superintendent of the Government Hospital were obtained prior to commencement of the study. Informed signed consents were taken from the parents. The demographic data were completed using the medical records. The INFANIB was administered on the neonates by Rater one, an Intern of MBBS who was new to INFANIB and studied the method of assessment by reading the INFANIB manual written by Patricia H. Ellison, M.D. and via several demonstrations by the experienced physiotherapist. During each assessment, a video recording was taken simultaneously.

The videos were being anonymized to blind the raters from the groups from which the neonates belonged. The videos were viewed by two other independent raters they are rater two and rater three for the purpose of assessing inter rater reliability of the scale.

Rater two was a postgraduate from the Physiotherapy Department who was inexperienced in the use of INFANIB scale and Rater three was an experienced physiotherapist in pediatrics and was skilled in neurological evaluation of infants using INFANIB scale. Rater three had evaluated the score twice for the purpose of intra-rater reliability. All the raters were blinded to the scoring of one another to avoid bias.

### Instrument

14 out of 20 items in the INFANIB scale were applied to the neonates. Each item was scored as 1, 3 or 5 points. The cutoff points for neonatal category was as follows: abnormal  $\leq 48$ , transient = 49-65, normal  $\geq 66$ .<sup>8,11</sup>

**Statistical analysis:** Statistical analyses were performed using SPSS version 11.5.0. Gestational age of the neonates, postnatal day on which they assessed and birth weight was analyzed by using descriptive statistics. Two-way mixed, absolute agreement and single measure ICC were calculated for intra-rater reliability as well as inter-rater reliability.

## RESULTS

A total of 112 term neonates consisting of 56 normal (25 males and 31 females) neonates and 56 high risk (31 males and 25 females) neonates was assessed by three raters in this study. Rater three employed INFANIB scale to all the neonates and 50 videos were randomly selected (23 normal and 27 high risk neonates) for reassessment after one month to assess intra-rater reliability.

**Perinatal characteristics**

The mean (SD) gestational ages of neonates in normal and high risk group were 39.1 (1.1) weeks and 38.9 (1.1) weeks respectively. The median and quartiles for a post natal day on which they were being evaluated were 4 (2 to 5) days and 4 (2.3 to 7) days respectively. The mean (SD) birth weight of normal neonates was 2.9 (0.3) kilograms and for high risk group was 2.7 (0.6) kilograms. Risk factors included in this study were prenatal history of two or more abortion, pre-eclampsia, maternal illness, gestational diabetes mellitus, oligo/polyhydramnios, natal history of meconium stained amniotic fluid, prolonged rupture of membranes, prolonged labor, cephalopelvic disproportion and post natal history of resuscitation, low Apgar scores (<3 at 1 minute),<sup>12</sup> low birth weight (birth weight <2500g),<sup>7</sup> neonatal sepsis and pathological neonatal hyperbilirubinemia.

Reliability	Group	ICC	95% CI
Intra-rater (Rater three)	Normal (n=23)	0.42	0.05-0.7
	High risk (n=27)	0.33	0-0.63
Inter-rater (Rater one- Rater two - Rater three)	Normal (n=56)	0.1	0-0.26
	High risk (n=56)	0.28	0.05-0.5

**Reliability of INFANIB**

Intra-rater agreement the ICC was 0.42 (0.05-0.7) for normal neonates and 0.33 (0-0.63) for high risk neonates. Inter-rater agreement the ICC was 0.1 (0-0.26) for normal neonates and 0.28 (0.05-0.5) for high risk neonates. The intraclass correlation coefficient for the intra-rater agreement of the Rater 3 and inter-rater agreement are shown in Table-1.

**DISCUSSION**

During the construction of INFANIB, Ellison et al had done three hundred and sixty-five assessments among infants

between 3 and 22 months old. The study concluded that the internal consistency of this scale was 0.91 for all subjects. For infants aged less than 7 months, the internal consistency of INFANIB scale was 0.88 and for infants aged 8 months or more it was 0.93.<sup>8</sup>

According to Soleimani et al, the reliability study between the pediatrician and occupational therapists was conducted among 6150 infants aged from 4 to 18 months. The intraclass correlation coefficient was 0.90.<sup>7</sup>

In the current study, the intra- and inter-rater reliability of INFANIB was poor among the raters in both groups of neonates. The raters in this study have different level of experience in the use of INFANIB. The purpose of this study was to find out if there was good inter-rater agreement among different professionals and health workers so that it could be used more widely. Hence, a pilot study for interpretation of the finding for each item in INFANIB was not done for Rater one by skilled professionals in order to find out whether it could be used widely by the health workers in the peripheral area as a screening tool without formal training beforehand.

Only term neonates in the state 3 and 4 of Normal Neonatal Behavioural States of Prechtl and Beintema<sup>12</sup> were included in this study due to the fact that the tone of neonates changes according to the neonatal state which would misguide the raters to evaluate hypertonia if they were in state five and hypotonia if they were in state one and two. Furthermore, term neonates usually sleep 50 minutes out of each hour of the day<sup>12</sup> and this prevented each rater to assess the neonates individually. Hence the use of video capture was chosen. Intra- and inter-rater disagreement between the raters was not due to the variation of tone in the neonates since they rated the individual

neonate from the same video. In addition, use of video capture for the study was decided from the ethical point of view since repeated handling by different raters would carry the risk of infection to the susceptible neonates and there was a need for neonates being by their mothers' side for warmth and breastfeeding. Therefore, the poor intra- and inter-rater agreement was purely affected by the interpretation of findings by the raters.

The lack of pictorial representation in item "hands closed/open" in the INFANIB scoring sheet made it difficult for the inexperienced professional in making the decision of the findings. Most of the neonates had their hands partially closed and the only options available were "Closed" and "Sometimes closed". The experienced professional agreed on "Sometimes closed" (score 3) while the new user of INFANIB interpreted it as "Closed" (score 5).

Interpretation of items in the French angle method<sup>11</sup> such as scarf sign, heel to ear, popliteal angle, leg abduction and dorsiflexion of foot was very subjective. The raters analyzed their observation according to their imaginary protractors. Although it may not be feasible, the use of large protractor or goniometer in the clinical setting may improve the intra- and inter-rater reliability since it is more objective.<sup>16</sup> The evaluation of the above items also required the examiner to feel the resistance during the movement which was crucial in judging the range of angles. However, it was not possible for each of the raters to assess each neonate in view of ethical issue and the risk of infection to the neonates.

In items "tonic labyrinthine-supine and prone"<sup>11</sup>, there was a need to observe the shoulders, trunk and legs simultaneously which would have been difficult for the less experienced raters. They could have missed

the findings which led to poor inter-rater agreement.

For the item "weight bearing", the new user could not detect the difference between "No weight bearing"<sup>11</sup> (score 5) and "Poor weight bearing, breaks at knees"<sup>11</sup> (score 3). This was because the neonates could hardly stand for a few seconds before bending their knees in the latter. It was those few seconds which differentiated whether the neonates would be scored as "3" or "5".

Manual review of data for individual items of all the raters revealed maximum agreement in item "pull to sitting"<sup>11</sup> and good agreement in items "sitting position"<sup>11</sup> and "asymmetric tonic neck reflex"(ATNR). This could be due to the clear pictorial representation of findings in items "pull to sitting" and "sitting position" in the INFANIB scoring sheet that simplified the interpretation of findings among the raters. Meanwhile, item "ATNR" was a primitive reflex with clear cut findings which could be easily identified by the raters. It could only be "persistent", "transitional" or "absence" of posturing.

In the item "lifts head"<sup>11</sup>, there were several neonates who did not raise their heads but there were no results for "no head lifting" in the scoring sheet. In this study, we synchronize it as "3 scores" for this finding.

The poor inter-rater reliability found in this study could also be explained by the fact that INFANIB was designed for the professionals including the pediatricians and physical therapists. On top of that, lack of formal training beforehand made the less experienced raters unable to interpret the findings confidently. Even though the recent study on the Chinese version of INFANIB have excellent reliability for 3, 7 and 10 months old infants but reliability in

neonates is still needs to be explored further.<sup>17</sup>

The use of video limited the raters from judging the force exerted by the neonates in item “foot grasp” as well as items of “French angles method”. This contributed to the poor intra-rater reliability in the interpretation of findings by the experienced rater. Due to convenient sampling, results may not be generalized and the present study was limited in the number of neonates aged more than 7 days. There were only 7 and 9 neonates in normal and high risk groups respectively who were aged from 8 to 21 days post natally. Future studies should fill in the gap of day 8 to 28 in neonatal groups. In addition, the inter-rater reliability between the experienced raters can also be carried out in the future.

In conclusion, the intra- and inter-rater reliability are poor among the normal and high risk term neonates. However, INFANIB is potentially suitable and easy tool to screen for early neurodevelopmental delay among the term neonates because it can be completed in 5 to 10 minutes. Therefore, formal training should be organized for any professions or health workers who are planning to utilize INFANIB in their working set up to improve the inter-rater agreement.

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# KNOWLEDGE AND ATTITUDES OF THE PUBLIC, PRIMARY HEALTH CARE PHYSICIANS AND OTHER HEALTH PROFESSIONALS, AND POLICY MAKERS TOWARDS RELIGIOUS MEDICAL PRACTICES

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## ABSTRACT

**Background:** Religious care and support are vital for a holistic patient care. The phenomenon has widely spread in Muslim countries and in the west as well. WHO is showing marked concern and in our Arabic and Islamic region there is a growing concern towards traditional Arabic and Islamic medicine. **Objectives:** 1. To explore knowledge and attitudes of the public, primary health care physicians and other health professionals, and policy makers towards religious and spiritual medical practices; 2. To describe the religious and spiritual Islamic medical practices content of Arabic speaking Satellite TV channels. **Subjects and Methods:** The National Center for Complementary and Alternative Medicine in Saudi Arabia has conducted four cross-sectional surveys within the last four years from 2009 to 2012, plus a media analysis survey on religious and spiritual medicine on Arabic speaking Satellite TV channels. Studies targeted policy makers of Ministry of Health (112 participated), health professionals (306 participated), primary health care physicians (113 participated), and the public (518 participated). Also, topics and programs of religious healing practices on the Arabic Satellite TV channels. Data were collected through pre-designed questionnaires some self-administered and some filled through direct interviews. In the media study a comprehensive survey was performed for two weeks covering all Arabic speaking Satellite TV channels. Findings were statically presented and analyzed using SPSS statistical package for windows. **Results:** Religious healing utilization reported high rates reaching 70% in some studies, especially among females, older ages and low educational groups, and in particular for chronic and malignant diseases. Media survey on Arab TV channels revealed religious programs and topics to be the most prominent and more frequently repeated compared to other practices of complementary and alternative medicine. **Conclusion:** There is a health professional and community interest on religious therapies. There is a highlighted need for provision of authenticated information about CAM and religious healing practices to the public and to health professional, provision of educational and training programs for doctors and health care providers, for regulating those practices against quackery and sorcery.

**خلفية:** تعتبر الممارسات الدينية من أهم ممارسات الطب البديل والتكميلي انتشاراً في الدول الإسلامية والدول الغربية على حدٍ سواء. وقد بدأت منظمة الصحة العالمية اهتماماً واضحاً بالطب الشعبي والطب البديل والتكميلي بما فيها منطقتنا العربية والإسلامية حيث يتوجه الاهتمام والطلب على الممارسات الدينية والروحية. **أهداف البحث:** ١. معرفة واتجاه أفراد المجتمع وأطباء الرعاية الصحية الأولية والعاملين بالقطاع الصحي ومتخذي القرار تجاه الممارسات الدينية في

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المملكة السعودية. ٢. توجهات القنوات الفضائية العربية حيال الطب البديل والتكميلي وما تتضمنه من برامج وموضوعات خاصة بالممارسات الدينية والروحية. **منهجية وطرق البحث:** أجرى المركز الوطني للطب البديل والتكميلي على مدى أربع سنوات عدد من الدراسات منها أربعة دراسات مسحية مقطعية خلال الفترة ١٤٣٠ - ١٤٣٣ هجرية / ٢٠٠٩ - ٢٠١٢ م، إضافة إلى دراسة مسحية على مستوى القنوات الفضائية العربية لدراسة ظاهرة انتشار ممارسات الطب البديل والتكميلي عمومًا والممارسات الدينية على وجه الخصوص، والعوامل المرتبطة بها. شارك في الدراسات من أفراد المجتمع (٥١٨) ومن أطباء الرعاية الصحية الأولية (١١١٣) ومن العاملين بالقطاع الصحي (٣٠٦) ومتخذي القرار بالمملكة العربية السعودية (١١٢)، وكذلك برامج وموضوعات الطب البديل والتكميلي في القنوات الفضائية العربية. تم جمع البيانات عن طريق استمارات استبيان مختبرة ومعدة مسبقًا ومنظمة تم اعتمادها عالميًا لمثل هذا النوع من الدراسات، احتوت على المعرفة واتجاه ورؤية المشاركين حول الممارسات الدينية وعلى رأسها الرقية الشرعية والذكر والصلاة والدعاء واستخدام الماء المقروء عليه وماء زمزم. تم استعراض النتائج وتحليلها احصائياً باستخدام برنامج التحليل الإحصائي SPSS. **النتائج:** بلغت نسبة استخدام المعالجات الدينية والروحية معدلات عالية وصلت لأكثر من ٧٠% من عينات المستطلعين في بعض الدراسات. أظهرت الدراسات أن معدل الاستخدام كان أكثر بين الإناث والفئات السنية الأعلى والفئات ذات المستويات التعليمية الأقل وخاصة للأمراض المزمنة والأورام السرطانية. أظهر مسح القنوات العربية أن البرامج والموضوعات المتعلقة بالاستشفاء الديني كانت الأبرز والأكثر تكرارًا في هذه القنوات. **الخلاصة والتوصية:** أوصت الدراسات بالحاجة إلى المزيد من المعرفة الموثقة للجمهور وللعاملين الصحيين، وأيضًا للحاجة لعقد الدورات التدريبية التعريفية والتأهيلية التي تقدم للأطباء وكافة مقدمي الرعاية الصحية لمثل هذه الممارسات، كما أوصت بأهمية دعم وتنظيم هذه المعالجات بما يضمن بقاءها عن ممارسات الدجل والشعوذة والتي قد تصاحبها.

## INTRODUCTION

Religious and spiritual care is a vital part of holistic patient care. Awareness of common patient beliefs will facilitate discussions about religion and spirituality. Such conversations are inherently good for the patient, deepen the caring staff-patient-family relationship, and enhance understanding of how beliefs influence care decisions. This is especially clear in an area such as the Middle East, where religious beliefs are strong and widespread.<sup>1</sup>

According to the Islamic faith, suffering plays an important role in life. For the Muslim, sickness and suffering are a part of life, spiritual test from the Almighty Creator. Emotional and physical suffering caused by illness is regarded as a test of faith in God, Allah, expunging the sins of the Muslim.<sup>2</sup> Despite the fact that religion is important for a majority of our patients, yet that need is not supported by the medical team most of the time. As physical health wanes, religion and spiritual health may increasingly play a central role in determining patient well-being.<sup>3</sup>

It's to be assumed that this unmet need by modern medicine practitioners is one of the important factors why more patients now seek alternative healing options.

The National Center for Complementary and Alternative Medicine is a newly established official reference center for complementary and alternative medicine in the Kingdom of Saudi Arabia. From the period from 2009 to 2012, the center has conducted four cross-sectional surveys, plus a media analysis survey on Arabic speaking Satellite TV channels on religious healing practices. Those studies targeted policy makers of Ministry of Health, health professionals, primary health care physicians, and the public. A briefing of those study surveys are presented in this paper, though they were targeting CAM in general, our focus would be towards practices related to religious and spiritual healings.

The National Center for Complementary and Alternative Medicines Studies on Religious Healing: A Brief Description:

**1. Perception of Health Professionals and Policy Makers about Complementary and Alternative Medicine in Saudi Arabia:** September through December 2009.

**Aim:** To determine perception and attitudes towards CAM among health professionals

and policy makers.

**Subjects and Method:** Health professionals and policy makers working in the Ministry of Health and National Guard, deans, vice deans and heads departments in faculties of health and medicine, pharmacy, dentistry, were all targeted. 700 self-administered questionnaires were distributed manually, mailed or posted via express mail services. 112 were returned with response rate of 16%. Data was analyzed using SPSS Statistical Package version 16.

**Results:** Most common traditional practices reported were honey and bee products 88.6%, Roquia (spiritual healing) 87.6%, medical herbs 81.4%, Hijama 63.7%, body massage 60.1%, and nutritional supplements 57.5%. These practices were positively perceived by most in view of safety and effectiveness [Table 1]. Quackery was the most feared threat by 82.3%. Reasons reported for use included social and inherited habits (85.9%), poor response to conventional treatment (83.1%) and poor physician patient communication (79.6%), and religious beliefs (78.7%)

**2. Knowledge and Attitude of Health Professionals in Riyadh Region, Saudi Arabia, towards Complementary and Alternative Medicine.**

**Aim:** To identify knowledge and attitude of health professionals in Riyadh region towards CAM.

**Subjects and Methods:** Through a cross-sectional survey and multistage random sample selection, a total number of 306

health professionals (physicians, other non-physician specialists, technicians) working in 19 hospitals in Riyadh city and surrounding governorates participated. Data collected through a self-administered questionnaire.

**Results:** 88.9% had some knowledge about religious healing/CAM. Source of information was mass media (60.1%), followed by family, relatives and friends (29.08%), and educational institutions (14.71%). Most common practices positively perceived by participants were: prayer (spiritual healing) 90.5%, honey and bee products 85%, medical herbs 76.9%, Hijama 70.6%, medical massage 61.8%, nutrition and nutritional supplements 61.4%, cauterization 55.9%, acupuncture 55%, and camel milk and urine 52.5% [Fig. 1].

**3. Public Knowledge, Attitude and Practice about Complementary and Alternative Medicine in Riyadh Region, Saudi Arabia:**

**Aim:** To identify knowledge, attitude and practice of people in Riyadh region, about CAM.

**Subjects and Methods:** A total number of 518 individuals from the public in Riyadh city and surrounding governorates were surveyed and selected by a multistage random sample technique and a cross-sectional study design. Data were collected through direct face-to-face interviews using pre-designed questionnaires.

**Results:** Saudis represented 70% of the sample and 30% non-Saudi nationalities. Religious therapies represented the most used practices: medical herbs (58.89%), prayer (54%), honey and bee products (54%), hijama (35.71%), cauterization or medical massage therapy (22%) [Fig. 2]. Main users were: females, housewives, illiterate or just read and write individuals, and those aged 60 years and more. Mass media e.g. (T.V., newspapers and radio) and family, relatives and friends

represented the main sources of knowledge (46.5% and 46.3%) respectively.

#### 4. Knowledge and Attitude of Primary Health Care (PHC) Physicians towards Complementary and Alternative Medicine in Riyadh Region, Saudi Arabia

**Aim:** To assess PHC physicians' knowledge, attitude and beliefs regarding CAM and to identify factors that might influence them.

**Subjects and methods:** All physicians working in primary health care centers in Riyadh region affiliated by MOH and Ministry of Defence were studied through a cross-sectional survey. A total number of 1113 physicians responded and answered the self-administration questionnaire; forty four physicians were excluded from the study due to incomplete answering of the questionnaire. Data were collected through a self-administrative pretested questionnaire modified after adaptation from Dietlind L.<sup>4</sup>

**Results:** Physicians were significantly using CAM and religious therapies for themselves or their families (51.7%), with female physicians more than males (56.58% versus 49.53%). Of a long list of CAM practices provided in the questionnaire, physicians were significantly more familiar and somewhat comfortable with religious therapies than other non-religious ones: Roqia on top (51.8%) followed by honey and bee products (48.9%), dietary supplements (47.1%), medical herbs (40.8%), cupping (39.5%), and cauterization (32.7%) [Table 4]. The majority of studied physicians (85.1%) agreed on the need for acquisition of good knowledge about religious and other commonly used CAM therapies in the region. 67.4% of studied physicians believed that patient's religious beliefs and practices were important for healing, and 61% of them believed that physicians'

religious beliefs and practices were important for healing patients by 61%.

#### 5. A Survey on CAM Programs at Arab Satellite TV Channels and Topics 18th to 28th Oct 2010.

**Aim:** To identify CAM specialized, religious and other TV channels, CAM programs and topics, and to clarify nature of those programs.

**Study Methods:** All Arab TV channels specialized in or have programs about CAM been included namely: Arab Sat, Nile Sat, Hot Bird. All religious TV channels which present CAM programs were surveyed. All programs about Prophetic medicine, Roqia, bee products and bee honey, medical herbs, Arabic medicine, Chinese medicine, were surveyed. Qualified media bachelor and master holders personnel were trained for the mission of observing Arab Satellite and TV channels all round 24 hours day and night. Content analysis study design was adopted for analyzing CAM programs and topics. Survey started on the 10th of Dual Qaida 1431 H (18th to 28th Oct 2010), and continued for two weeks. Two questionnaires were developed: TV channels survey questionnaire, and CAM programs analysis questionnaire. Data were analyzed by SPSS version 18, descriptive statistical methods; Chi-square test and P-value 5% were employed.

**Results:** 119 channels presented in one way or another CAM topics. 1151 CAM programs/topics repeatedly appeared within the two weeks study. Herbal medicine programs were on top (23%), followed by Prophetic medicine and religious Roqia (18.5%), then aromatherapy (15%), then dietary therapy (11.5%), then Bee honey programs (10.3%) and bee products (10.3%), and then rest of CAM practices. 11 CAM topics were presented, some frequently, some occasionally.

**Table (1): Religious therapies top the list of CAM practices used in Saudi Arabia from Health Professional and Policy Makers Perspective in Saudi Arabia**

Common CAM practices	Usually (>50%)	Sometimes (10-50%)	Total use	Rarely (<10%)	Never (0%)	Total non-use	Z	p
1. Honey and bee products	45.2	43.4	88.6	4.4	7	11.4	8.03	0.000*
2. Roqia (spiritual healing)	71.7	15.9	87.6	2.7	9.7	12.4	7.84	0.000*
3. Medical herbs	29.2	52.2	81.4	9.7	8.9	18.6	6.52	0.000*
4. Hijama	17.7	46	63.7	27.4	8.9	36.3	2.74	0.003*
5. Body massage	21.2	38.9	60.1	28.3	11.6	39.9	1.98	0.02
6. Nutritional supplements	23	34.5	57.5	30.1	12.4	42.5	1.42	0.07
7. Aromatherapy	11.5	28.3	39.8	39.8	20.4	60.2	1.23	0.11

\* Significant at level of 0.05

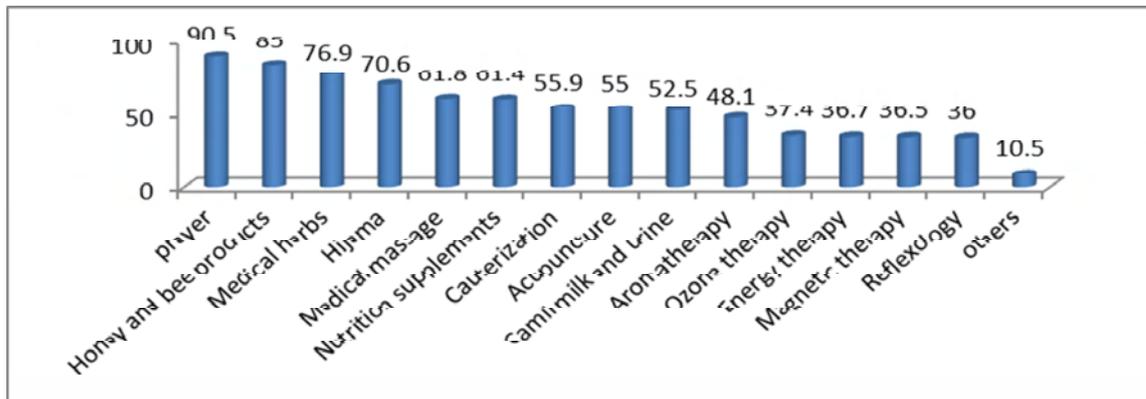


Figure (1) Religious practices are the most likely used CAM practices as to Health professionals in Riyadh Region

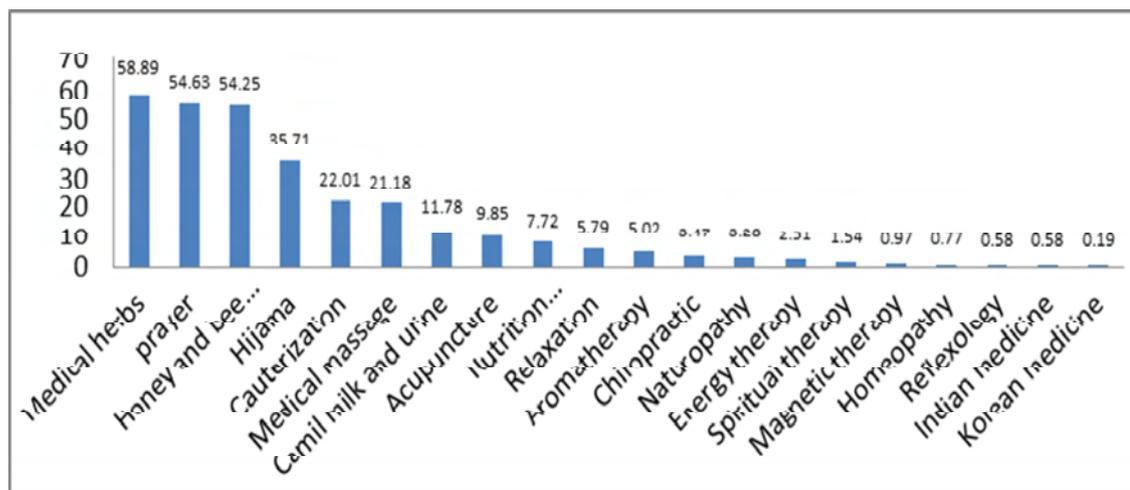


Figure (2): Attitudes of the Public in Riyadh Region towards CAM: Religious practices mostly used.

Herbal medicine appeared most (31.37%), then Prophetic medicine & Roqia (18.43%), then dietary therapies (15.69%), then aromatherapy (14.51%), then bee honey and bee products (12.6%), while the remaining six only appeared so limited.

Table (4) Distribution of studied population and familiarity with religious healing practices

<i>Religious healing practices</i>	<i>Understand it and feel somewhat comfortable about counselling patients % among 1113 studied physicians</i>
Roquia (Spiritual healing)	51.8%
Honey and bee products	48.9%
Dietary supplement	47.1%
Medical herbs	40.8%
Hijama-Cupping	39.5%
Cauterization	32.7%

### DISCUSSION

As to WHO, an estimated 80% of the population in the developing world relies on traditional systems of medicine, and 70-80% of the population in developed countries have used some form of alternative or complementary medicine.<sup>5</sup> Herbal treatments are the most commonly utilized form of traditional medicine, and are lucrative in the international marketplace yielding \$5 billion US in revenues in Western Europe, \$14 billion US in China and \$160 million US in Brazil.<sup>5</sup> Existing data, however, sparse as they are, reveal that the frequency of use of a spiritual healing or reliance on the prayers of others may exceed almost every other CAM therapy.<sup>6</sup> This finding has been validated across racial and ethnic groups in the U.S.<sup>7</sup> The World Health Organization defines traditional medicine as “the sum total of knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures

that are used to maintain health, as well as to prevent, diagnose, improve or treat physical and mental illnesses”.<sup>5</sup> Two examples are widely known traditional systems of medicine, namely Traditional Chinese Medicine (TCM) and Ayurvedic medicine,<sup>8</sup> however, Arabic Islamic/Prophetic traditional system of medicine is another vibrant and expansive system of healing traditions thriving and pervading modern life in the Arab and Muslim world,<sup>8</sup> that need to be highlighted internationally. In Saudi Arabia, CAM therapies are attracting attention of all, the public, media, medical community and governmental agencies. A 2008 national survey on prevalence, costs, and patterns of use of alternative and complementary medicine clearly demonstrated the extensive use of traditional Arabic and Islamic healing practices. Qur’anic healing, honey use and black seeds were the most frequent practices.<sup>9</sup> Idioms used to connote such Islamic and Arab healing traditions, and which are sometimes used interchangeably, include Graeco-Arabic or Unani medicine, Islamic Medicine, and Prophetic Medicine or Tibb Nabawi (medicine of the Prophet).<sup>8</sup> Despite an extant, though finite, literature on the various practices of these healing traditions, no clear and concise model exists to distinguish and organize their multiple, intertwined elements.<sup>8</sup> In the kingdom of Saudi Arabia, the national center for alternative and complementary medicine is a newly established official reference for everything concerning CAM practices. Though having a multitude of tasks, research studies and surveys to analysis the situation in the kingdom are some of its important tasks. Many surveys have been conducted during this mean time to describe people's traditional medicine practices outside the official modern medicine domain, their attitudes and their knowledge. Results of surveys to date revealed vividly an increased interest, knowledge and a positive attitude and

perception towards religious healing therapies compared to other CAM therapies, among studied subjects, whether physicians, health professionals, policy makers, or the public. Roquia (healing through reciting on patients specific Qur'anic verses or Prophetic supplications), prayers, honey and bee products, medical herbs, Hijama (cupping), nutritional supplements, were the most frequently used, understood and felt comfortable about of all CAM practices. They were as well on top of CAM programs and topics in Arab Satellite TV Channels. Studies included community members, primary health care physicians, health professionals and policy makers, and also what's happening in the media. Conceptually, Islamic religious and Arab traditional healing practices are lacking a scientific working definition as well a conceptual model of representation. A few of such propositions and innovations have now started to show on the scene. Azaizeh et al. recently proposed the term Traditional Arabic & Islamic Medicine, given it "TAIM".<sup>10</sup> Conceptually, though neither a definition nor a conceptual model was proposed, this encompassing term recognizes traditional Arabic and Islamic medicine as one system to embrace the entirety of the historical roots and breadth of practices, and represents an innovative step forward. Al-Rawi S & Fetters, gave a push forward to advance clinical and academic applications of this healing tradition, proposing a working definition of TAIM, and presenting a conceptual framework to delineate its scope.<sup>10</sup> They have weaved on the same patterns and taxonomy of the already formalized theoretical frameworks of traditional healing systems, such as traditional Chinese medicine (TCM) and Ayurveda, as well as Complementary and Alternative Medicine (CAM) in developed countries,<sup>11</sup> which incorporate manipulative and massage techniques, herbal medicine, dietary practices, meditation, and exercise.<sup>12</sup> A useful structure for characterizing TAIM

and organizing its elements was then presented. Al-Rawi & Fetters have defined Traditional Arabic and Islamic Medicine as "a system of healing practiced since antiquity in the Arab world within the context of religious influences of Islam and to be comprised of medicinal herbs (e.g. black seed), dietary practices (e.g. bees honey, Zamzam water, observing a fast), mind-body practices (e.g. Islamic ritual prayer, Dhikr) spiritual healing (e.g. Quranic healing, recitations, devotions, supplications, Rugia) and applied therapy (e.g. cupping-hijama, hydrotherapy, massage), and whereby many of these elements reflect an enduring interconnectivity between Islamic medical and prophetic influences as well as regional healing practices emerging from specific geographical and cultural origins.<sup>9</sup> From the results of our study surveys, we can conclude that TAIM practices, if we can borrow that recent definition, are on top of CAM practices that attracting the interest in the Kingdom, and they are as well fitting into that newly proposed conceptual model of medicinal herbs, dietary practices, mind-body practices, spiritual healing, and applied therapy.

The studies have generally come out with some important recommendations to mention: need for further CAM's situation surveys, strict regulation, blockading sorcery and quackery, education and provision of evidence-based information to the public and professionals, and integration of CAM in medical and health education curricula and in the health care system.

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## EVALUATION OF HEPATITIS B CORE ANTIBODY (TOTAL) IN THE PRESENCE OF ID-NAT

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### ABSTRACT

**Background & Aim:** The testing for HBcAb is done by different blood centres to ensure the blood safety for transfusion. However, In India, HBcAb is not compulsory test as per Drugs and Cosmetics Act, 1940. Introduction of ID-NAT (Nucleic Acid Testing) for detection of HBV DNA have proven to be of great success but on the contrary increase the cost of blood transfusion. Therefore, the present study was undertaken to find the possibility of obviating the need of screening of HBcAb with existing ID-NAT, so as to optimize the resource utilization. **Materials & Methods:** Donor blood samples between October 2008 and April 2010 covering 8221 samples were collected and tested simultaneously for Anti-HBc and HBsAg ELISA and ID-NAT tests. **Results:** Nearly 7% (581) were reactive for HBV marker. Further the samples reactive to serological markers HBsAg & HBcAb (Total), were compared with ID-NAT. Of all the samples reactive for HBV, 7.6% was reactive by ID-NAT. About 2.07% of solitary HBcAb reactive samples were reactive by ID-NAT (Table 1). However, none of the non-reactive samples was reactive to ID-NAT. **Conclusion:** Still, HBcAb has a definitive role in ruling out the transmission of HBV among HBsAg non-reactive blood (2.07%; Table 1). On the contrary, not even one sample was NAT reactive and not reactive by CLIA. Screening of blood by Anti-HBcAb didn't enhance the blood safety. In addition, centers that have incorporated NAT testing may not derive any additional benefit as this cannot replace anti-HBc testing, especially in developing country like ours. **KEY WORDS:** Hepatitis core antibody, ID-NAT- Individual donor- Nucleic acid Test, HBsAg- Hepatitis B Surface Antigen, TTI- Transfusion Transmitted Infection

**خلاصة: الخلفية والهدف:** يتم اختبار الاجسام المضادة لنواة فيروس التهاب الكبدى نوع ب (HBcAb) من قبل مراكز الدم المختلفة لضمان سلامة نقل الدم. ومع ذلك فإن اختبار (HBcAb) في الهند ليس إجباريا حسب قانون الادوية و مستحضرات التجميل للعام ١٩٤٠. أثبت إدخال اختبار الحمض النووي {ID-NAT (Nucleic Acid Testing)} للكشف عن الحمض النووي لفيروس التهاب الكبد نوع ب نجاح كبير ولكنه يزيد من تكلفة عملية نقل الدم. لذلك أجريت هذه الدراسة لاختبار إمكانية تفادي أو انتفاء الحاجة لفحص (HBcAb) بواسطة اختبار {ID-NAT (Nucleic Acid Testing)}, وذلك لتحسين استخدام الموارد. **منهج الدراسة:** تم جمع العينات من المتبرعين بالدم ما بين أكتوبر ٢٠٠٨ وأبريل ٢٠١٠ وبلغت العينات ٨٢٢١ عينة واختبرت في وقت واحد لمعرفة أولا: الاجسام المضادة لنواة فيروس التهاب الكبدى نوع ب (Anti-HBc) و ثانيا: المستضد السطحي لفيروس التهاب الكبدى نوع ب (HbsAg ELISA) وثالثا: اختبار الحمض النووي {ID-NAT (Nucleic Acid Testing)}. **النتائج:** حوالي ٧٪ (٥٨١) كانوا ايجابيين لعلامات فيروس الكبد نوع ب. وعلاوة على ذلك كانت العينات ايجابية لعلامات المستضد السطحي وايضا الاجسام المضادة للنواة المصلية (HBsAg) و (HBcAb) عند مقارنتهم جميعا مع اختبار الحمض النووي (ID-NAT (Nucleic Acid Testing)). من كل العينات ايجابية لفيروس التهاب الكبد البائي فقط ٧,٦٪ اعطي نتيجة ايجابية بواسطة اختبار الحمض النووي (ID-NAT (Nucleic Acid Testing)). و حوالي ٢,٠٧٪ من العينات ايجابية ل HBcAb كانت ايجابية بواسطة اختبار (ID-NAT (Nucleic Acid Testing)). ومع ذلك، لم تكن أي من العينات السلبية النتيجة ايجابية مع اختبار (ID-NAT ,Nucleic Acid Testing)

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**الاستنتاج:** لا يزال اختبار ، HbCAb له دور حاسم في استبعاد انتقال فيروس الكبد نوع ب من الدم السلبي النتيجة للمستضد السطحي للفيروس (HBsAg) (2.07%). و على العكس من ذلك، لم يكن حتى عينة واحدة من اختبار الحمض النووي ( NAT ) ايجابية ولم تكن كذلك بواسطة فحص التوهج المناعي (CLIA). فحص الدم عن طريق الاجسام المضادة للنواة للالتهاب الكبدي الفيروسي نوع ب ( HbCAb ) لا يعزز سلامة نقل الدم. وبالإضافة إلى ذلك، المراكز التي أدرجت اختبار الحمض النووي ( NAT ) قد لا تستمد أي فائدة إضافية لأنه لا يمكن أن يحل محل اختبار الاجسام المضادة للنواة للالتهاب الكبدي الفيروسي نوع ب ( HbCAb )، وخاصة في البلدان النامية مثل بلدنا.

## INTRODUCTION

Hepatitis B virus (HBV) infection is a serious global health problem which is affecting two billion people worldwide, and 350 million people suffer from chronic HBV infection. This is approximately 5% of the world population.<sup>1</sup> There are over 4 million new cases of acute clinical hepatitis yearly. About one million of those infected die annually from chronic hepatitis B infection or one of its complications-cirrhosis and hepatocellular carcinoma.<sup>2</sup> Transmission of hepatitis through blood transfusion was first reported in 1943.<sup>3,4</sup>

In India, Hepatitis B virus (HBV) infection via blood transfusion is a serious health problem. After an incubation period that can range between 50 to 180 days, this infection has an insidious onset. The viruses are detectable in the blood for several months or even years and about 5-10% of individuals become chronic carriers. Chronic infection by HBV could lead to the development of cirrhosis and hepatic malignancy.<sup>5</sup> Screening for hepatitis B infection by surface antigen (HBsAg) started in 1971.<sup>6</sup> Usually testing for HBsAg is performed using EIA, radioimmunoassay or other immunological based assays. The latest, most sensitive HBsAg detection method uses chemiluminescence and this method is widely used in Canada, Europe, and some parts of Asia.<sup>7</sup> Method for detection of HBsAg is not yet standardized. The only requirement now for HBsAg testing is licensing or accreditation of the test in this country became selection of the test different in different countries.

In some tropical countries where blood donor centres have limited resources, rapid and less expensive immuno filtration, latex based, or immuno chromatographic methods are used, without any confirmatory testing techniques.<sup>8</sup>

The mandatory screening for HBsAg by ELISA for over 20 years, still transfusion-associated HBV (TAHBV) continues to be a major problem in India, and more so in patients receiving repeated blood transfusions.<sup>9</sup> However, it has been observed that some HBsAg-negative individuals continue to replicate HBV.<sup>10,11</sup> Hence, the non reactive result of HBsAg in the blood can not reflect that the person is completely free from Hepatitis B Virus. Blood containing anti-HBc with or without detectable presence of HBsAg might be infectious. In 1992, antibody to the core protein of hepatitis B (anti HBc total) was introduced in the screening process as a surrogate marker for post-transfusion non A non B hepatitis.<sup>12</sup> With introducing of anti HBc (total) screening, a phenomenal reduction target has been achieved in the number of hepatitis B viral infectious units from entering the donor pool. Therefore, routine blood donor screening for anti-HBc was implemented to reduce the risk of post-transfusion HBV infection.<sup>13</sup> Screening practices of Transfusion Transmitted Infections (TTI) depends on pathogenicity, morbidity, mortality, endemicity of pathogen. Ethics vs. financial viability have led to varied practices across the globe.

Hepatitis B core antibody screening is controversial in blood banks worldwide, because Hepatitis B core antigen is found only in liver cell and not in blood circulation, it is true that blood circulation is detected mainly with anti HB core total (HBcAb IgM & IgG). Recently introduced ID- NAT testing has reduced the window period but does not completely eliminate HBV. Hepatitis B virus infection has a worldwide prevalence due to its infectivity, chronicity and ability to cause substantial morbidity and mortality, in the form of cirrhosis and Hepatocellular Carcinoma (HCC).<sup>14</sup>

However, current development of ID-NAT technology can be proved more sensitive testing for safe blood supply by HBV infection, but it expensive. It can also be an effective test to rule out occult hepatitis, HBsAg negative and anti-HBc positive infections with low levels of viraemia. The complete elimination of traditional testing methods in the near future is difficult.<sup>15,16,6</sup>

Screening of HBsAg and HBV DNA by NAT would appear preminent in the countries with a normal to high prevalence of HBsAg. On the other hand, HBV DNA by NAT and anti-HBc testing may be superior to HBV DNA by NAT and HBsAg testing in countries with low prevalence rate. Pathogen inactivation will possibly have a role in increasing the chances of the safety of blood products reducing the risk of transfusion-transmitted HBV.<sup>17-19</sup>

In India, screening for HIV 1 & 2, HCV and HBsAg is mandatory by law. However, the screening for Anti HBV core antibodies IgM & IgG is employed by various blood banks to ensure the decrease of transmission of HBV in case of HBsAg negative blood.

In Recent time, the use of nucleic acid testing (NAT) of blood donors has been adopted to detect the presence of occult hepatitis B virus in blood donors which is

considered a Potential risk for transfusion of hepatitis B virus.<sup>9</sup> Though the use of NAT to prevent transfusion of hepatitis B virus may offer a new opportunity to blood screening programmes, the feasibility of implementing it should be fully considered, since the requirements for infrastructure, financing, staffing levels, training and quality systems and the overall costs of implementation may far outweigh any potential benefit in terms of increased blood safety. The present study was carried out to look into the possibility of obviating the need of screening HBV core if a facility of NAT exists, so as to optimize the resource utilization.

## MATERIALS & METHODS

Donated blood was evaluated and collected between October 2008 and April 2010 covering 8221 samples. The hospital caters to patient population from different parts of country and world such as USA, Canada, Iraq, Nigeria, Oman, Kazakhstan etc. All samples were screened for serology and ID- NAT. Serological screening was performed by random access Chemiluminescence Immuno Assay (CLIA) for TTI including HBsAg & HBcAb – Total (IgM & IgG), (Vitros ECI; OCD; JNJ from USA). Nucleic acid screening (Supplementary test) Individual donor ID-NAT was performed by Transcription Mediated Amplification (TMA) technology (Novartis Diagnostic from USA).

## RESULTS

Of the 8221 blood donors, 581 (7%) were reactive for HBV marker. All the samples screened reactive by serological markers- HBsAg & HBcAb (Total), were compared with ID-NAT. Of all the samples reactive for HBV, 7.6% is reactive by ID- NAT. About 2.07% of solitary HBcAb reactive samples were positive by ID-NAT (Table 1 & Figure 1). However, no non- reactive

sample was observed to be reactive by ID-NAT, over the study period.

**DISCUSSION**

In the present study, out of 8221, 581(7%) reactive samples for HBV marker, 07(1.21%) samples were HBsAg reactive/anti HB core Total non reactive /ID-NAT non reactive, 17(2.93%) samples were HBsAg reactive/anti HB core Total reactive - /ID-NAT non reactive, 13(5.34%) samples were found to be HBsAg reactive/anti-HB core total reactive/ID-NAT reactive, 513(88.3%) samples were found to be HBsAg non reactive/anti-HB core total reactive/ID-NAT non reactive, 12(2.07%) samples were HBsAg non reactive/anti-HB core total reactive/ID-NAT reactive, 0(0%) samples were found to be HBsAg non reactive/anti-HB core total non reactive/ID-NAT reactive, and only 1(0.2%) samples were found to be HBsAg reactive/anti-HB core total non reactive/ID-NAT reactive. The result shows that there was no sample which was neither ID-NAT reactive nor reactive by CLIA.

**Table 1 Distribution of HBV markers among all samples**

HBsAg	HBcAb	NAT	Total	Percentage (%)
R	NR	NR	7	1.21
R	R	NR	17	2.93
R	R	R	31	5.34
NR	R	NR	513	88.3
NR	R	R	12	2.07
NR	NR	R	0	0
R	NR	R	1	0.2
NR	NR	NR	7640	

The above mentioned fact suggests that though ID-NAT is not supporting to eliminate anti HB core but still is required

validity based upon time to time, because mutation of the viral pathogen.

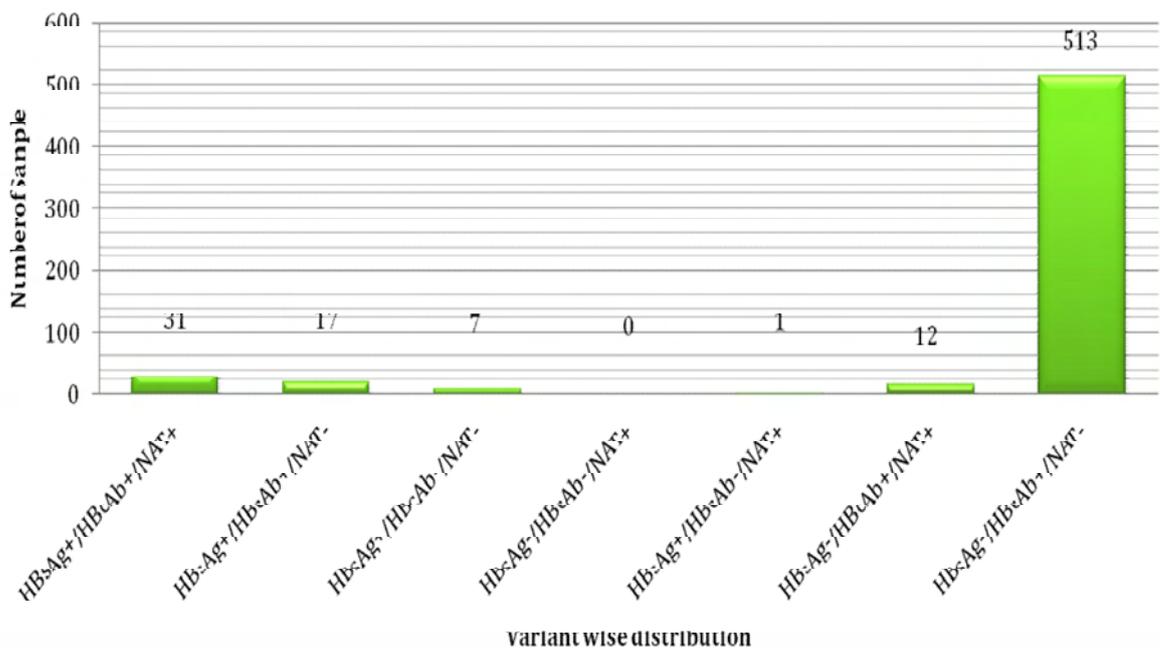
Safety of blood is a challenge in India because of the high prevalence of HBV, HCV and HIV, the relatively low percentage of volunteer donors and the lack of standardization of screening procedures among the multitude of blood collection centres.<sup>20</sup> The potential of NAT yield in India is staggering when compared to other countries that have already implemented the technology. The study showed that only 0.2% of the positive samples were HBsAg reactive/ ant-HB core non reactive/ ID-NAT reactive and none of the sample (0%) were found to be HBsAg non reactive/ anti-HB core non reactive/ ID-NAT reactive. These findings clearly indicate that NAT is capital extensive in the present scenario. Cost effectiveness of introducing universal anti-HBc screening and discarding large number of blood units versus considering ID NAT needs to be assessed.

Another Indian study on large section of blood donors demonstrated 4.2 per cent anti-HBc only positivity.<sup>9</sup> Hence, we have observed 6.24% (513 out of 8221) prevalence of anti-HBc positivity, which corroborates with our finding. The other study supports the presence of occult HBV infections in blood donors positive for antibodies against hepatitis B core antigen and emphasizes on the need for establishing sensitive screening modalities for blood transfusion.<sup>32</sup> In our study, we also find that the presence of occult HBV infections in blood donor’s positive hepatitis B core antibody and focuses on the need for establishing sensitive screening modalities for blood transfusion.

It is commonly followed that the diagnosis of infection by HBV is based on the presence of the HBsAg in the bloodstream.<sup>21</sup> However, screening of blood bank donors for HBsAg does not totally minimize the chances of the risk of HBV

infection through blood transfusion,<sup>22</sup> since the absence of HBV marker in the serum does not exclude the presence of HBV DNA.<sup>23,24</sup> It is in this context it can be say that, donors with occult HBV infection, who lacked detectable HBsAg but whose exposure to HBV infection was indicated by a positive anti-HBc and HBV DNA, may be a potential source of HBV infection.

core non reactive/ ID-NAT reactive and none of the sample (0%) were found to be HBsAg non reactive/ HB core non reactive/ ID-NAT reactive, these finding also indicate the HBV-DNA detection is very low. Bre'chot et al.(2001) Reported that occult HBV infection exists and that most cases are related to very low levels of HBV rather than to HBV mutants that do not express or produce abnormal surface



In India, anti-HBc screening is not mandatory. However, higher prevalence of only anti-HBc (58.8%) cases with 22.8% HBV DNA reactivity from Kolkata.<sup>25</sup> Similarly, other studies also substantiate with Pakistani and Egyptian studies showing 17.2 and 21.47 per cent anti-HBc prevalence in HBsAg-negative, HBV DNA-negative blood donors.<sup>26,27</sup> In India where the anti-HBc reactivity ranges from 4.2% to 18.3 % in healthy donors.<sup>9,28</sup> In this study also found that between the above findings.

proteins and consequently are undetected by standard method.<sup>29</sup> Because HBV-DNA detection is the gold standard method to diagnosis of occult HBV infection, the type of assay used and its sensitivity must be specified. The sensitivity of PCR assays for HBV DNA in studies on occult HBV infection varies from 101 to 103 copies/mL.<sup>30</sup> However, most of the PCR assays including commercially available assays are not standardized.<sup>31</sup>

Most studies on occult hepatitis B infection have reported higher rates of HBV- DNA detection in liver or peripheral mononuclear cells compared with serum or plasma.<sup>22</sup> The result of study on only serum or plasma sample showed that only 0.2% of the positive samples were HBsAg reactive/ HB

Our earlier study shows out of 2740 samples (n= 186) 6.7% sample reactive by HBV marker. There was no sample which was non reactive by serological markers but observed to be ID-NAT reactive. This study shows that about 6% of HB core antibody were reactive and the other related study shows the percentage of anti HB core

reactivity is 4.2% to 18.3 % in healthy donors in our country.<sup>9,28,31</sup> Our study also shows no non-reactive sample was observed to be reactive by ID-NAT, during the study period. Further the study finds that the presence of various races in NCR increases the chances of genetic diversity or mutation of genes and this tendency makes difficult for ID-NAT. Hence, it is suggested that the reliability of NAT should be verified and assessed timely.

### CONCLUSION

Anti-HB core is the most common cause of blood discarding by TTI screening. Still, HBcAb should be carried out to rule out transmission of HBV among HBsAg non-reactive blood (2.07%: Table 1). On contrary, no sample was observed, which was NAT reactive and is not reactive by CLIA. Screening of blood by Anti- HBcAb does enhance the blood safety. In addition, NAT facility can enhance the blood safety but cannot replace Anti HB core Screening.

The facility for HBV core screening is same as that of HBsAg, HIV & HCV, whereas, NAT is capital extensive requiring dedicated space and staff. Practical benefits random access CLIA such as minimal use of rapid methods, high sensitivity, documentation and reproducibility should be taken in to consideration for formulating policies of TTI screening. Therefore, the screening for core antibody seems to be a better strategy than NAT in case of resource limitation. The policy should be based on available resources, potential human economic value in the target population, technical competence and presence of viral strains that can be detected by the NAT.

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## REFERENCE RANGE FOR COPPER IN ADULT POPULATION (20-29 YEARS) OF LAHORE - PAKISTAN

Warda Hussain<sup>2</sup>, \*Asim Mumtaz<sup>1</sup>, Sana Khan<sup>2</sup>, Tauqeer Butt<sup>1</sup>

### ABSTRACT

*Copper, an essential trace element for health, plays various biological roles in human body. Serum copper reference values are important for assessing copper associated abnormalities and the prevalence of copper deficiency. The aim of this study was to determine reference range of copper in adult population of Lahore. Serum copper concentration was measured by flame atomic absorption spectrometry in 450 healthy adults aged 20 to 29 years, which were randomly selected. After application of exclusion criteria reference values were determined in apparently healthy subjects according to guidelines of International Federation of Clinical Chemistry. Reference value for serum copper concentration ranged between 4.72 $\mu$ mol/L to 31.48 $\mu$ mol/L (mean 17.62  $\mu$ mol/L  $\pm$ 6.67). The mean serum copper level for males was 18.57 $\mu$ mol/L  $\pm$  6.61. The value for male subjects ranged between 4.72 $\mu$ mol/L to 31.7 $\mu$ mol/L. The mean serum copper level in females being 16.52 $\mu$ mol/L  $\pm$  6.67. Similarly the values for females range between 4.72  $\mu$ mol/L to 30.48 $\mu$ mol/L. In conclusion this study presents reference values for serum copper concentration in adult population of Lahore. The results here shows that there is significant difference in serum level of copper among different countries. This difference may be due to racial and genetic difference, dietary habits and socioeconomic and analytical variables. KEY WORDS: copper, reference value, atomic absorption spectrometry, population*

**ملخص:** النحاس من العناصر الاساسية في الصحة ويلعب أدوار بيولوجية مختلفة في جسم الانسان. القيم المرجعية لمستوى النحاس في مصل الدم ضرورية لتحديد المستويات الغير طبيعية للنحاس في المصل ولتحديد معدل انتشار نقص النحاس. الهدف من هذه الدراسة هو تحديد مدى مرجعي لقيم النحاس للبالغين من سكان مدينة لاهور. تم قياس تركيز النحاس في الدم لعدد ٤٥٠ من البالغين الأصحاء الذين تتراوح أعمارهم بين ٢٠ إلى ٢٩ عاماً (والذين تم اختيارهم عشوائياً) بواسطة جهاز التحليل الطيفي. بعد تطبيق معايير الاستبعاد تم تحديد القيم المرجعية في الأصحاء وفقاً لموجبات الاتحاد الدولي للكيمياء السريرية. القيمة المرجعية لتركيز النحاس في مصل الدم تراوحت بين (٤,٧٢ ميكرو مول / لتر الي ٣١,٤٨ ميكرو مول / لتر) (المتوسط ١٧,٦٢ ميكرو مول / لتر  $\pm$  ٦,٦٧). كان متوسط مستوى النحاس في المصل للذكور (١٨,٥٧ ميكرو مول / لتر  $\pm$  ٦,٦١), حيث تراوحت القيمة للذكور بين (٤,٧٢ ميكرو مول / لتر الي ٣١,٧ ميكرو مول / لتر). و متوسط مستوى النحاس في المصل للإناث ١٦,٥٢ ميكرو مول / لتر  $\pm$  ٦,٦٧. وبالمثل، فإن القيم لمجموعة الإناث تراوحت بين (٤,٧٢ ميكرو مول / لتر الي ٣٠,٤٨ ميكرو مول / لتر). الخلاصة: قدمت هذه الدراسة القيم المرجعية لتركيز النحاس في مصل الدم للبالغين من سكان مدينة لاهور. النتائج هنا أظهرت أن هناك فرق كبير في مستوى النحاس بالمصل بين مختلف البلدان. هذا الفرق قد يكون راجعاً إلى الاختلافات العرقية أو الجينية، أو للاختلاف في العادات الغذائية أو للمتغيرات الاجتماعية والاقتصادية أو التحليلية.

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## INTRODUCTION

The availability of accurate trace element reference values in human is an important indicator to the health status of the general population and the occupational groups which are exposed to trace elements.<sup>1</sup> The key role of the laboratory scientist is to help the clinician in interpreting observed values, by providing relevant reference values in a convenient and practical form.<sup>2</sup> In Pakistan, reference values used in laboratories have been established in the western population. But these can be questioned due to differences in genetic load, lifestyle, and diet.<sup>3</sup>

Copper, an essential trace element is involved in multiple biological processes.<sup>4</sup> The importance of this trace element in health and disease cannot be ignored. To assess the relation of this trace element with different diseases, it is important to have a baseline status of this trace element in the body in the healthy sample of population. So this requires establishment of accurate reliable reference values that can be used in clinical decision.<sup>5</sup>

The recommended daily requirement of copper in our body is 2.5 - 3 mg/day. About 30% of ingested copper is absorbed in the intestine, bound to albumin and transported to the liver, where it is stored. The major circulating form ceruloplasmin is synthesized in the liver.

Copper is an integral component of at least 16 essential metalloproteinase, including cytochrome oxidase, monoamine oxidase, lysyl oxidase, tyrosinase and ceruloplasmin. It participates in prostaglandin synthesis, in the formation of connective tissues, in the function of Central nervous system and in hematopoiesis. It is required for red and white cell maturation, cholesterol and glucose metabolism and myocardial contractility. The stability of vein's membrane depends on the adequate amount

of copper in the tissues. Copper is involved in the transport of iron and vitamin A.<sup>6</sup> Its deficiency contributes to the development & progression of certain diseases.

The objective of this study was to establish reference range for copper in adult population with 20 to 29 years of age residing in Lahore.

## DESIGN AND METHODS

This was a descriptive cross sectional study which was conducted on apparently healthy individual of age range 20 to 29 years from nine different zones of Lahore. A total of 450 healthy individuals comprising of 216 males & 234 females were randomly selected using a multistage sampling method. Five union councils were selected randomly from each zone. From each selected union council ten healthy subjects who were assessed clinically were selected for the study. So a total of 450 samples were collected from randomly selected 45 union councils. The exclusion and inclusion criteria were based on the IFCC guidelines for the establishment of reference values. The study was approved by Ethical Committee. Written consent was taken from all the subjects.

At the time of sampling based on past medical history and physical examination only those individuals were included who did not prove any signs and symptoms of disease.

The samples were collected under aseptic conditions. 7 ml of blood was collected in 2 serum separator vacutainer tubes (SST, BD vacutainer) one for the determination of trace elements and other 3.5 ml blood was collected in SST for determination of albumin, glucose & ALT without venous stasis and without frothing. The sample was transported to University of Health Sciences, Lahore in an ice box containing ice bags.

Serum was separated by centrifugation at 3000 g for 05-10 minutes. Serum separated was then carefully shifted into 1ml nitric acid treated aliquot (for trace elements determination) & the other separated serum was collected in a separate aliquot for ALT, albumin and sugar levels. Hemolyzed and samples having high levels of glucose, albumin or ALT were excluded from this study.

Only nitric acid washed plastic lab ware was used for sample and standard preparation for trace elements. Urine examination for protein & sugar was also performed. Trace element Copper was performed on Hitachi Z-2000 Series Atomic Absorption Spectrophotometer.

Serum copper was measured by flame atomic absorption spectrometry (Hitachi Z-2000) following a one in five dilution with distilled water. The results were multiplied by dilution factor 5.

**Statistical analysis:** Data was analysed using SPSS version 20. Serum Copper levels were expressed as Mean ± SD.

**RESULTS**

A total of 450 healthy subjects were included in which 216 were males and 234 were females. Only those subjects were included who fulfilled the inclusion criteria. Their health status was assessed after detailed history & physical examination. Blood sugar random, ALT, Albumin, urine for proteins & sugar were performed. The results of these tests were also in the normal range. The blood samples of these healthy 450 subjects were then selected for the estimation of serum copper which was estimated on atomic absorption spectrometer.

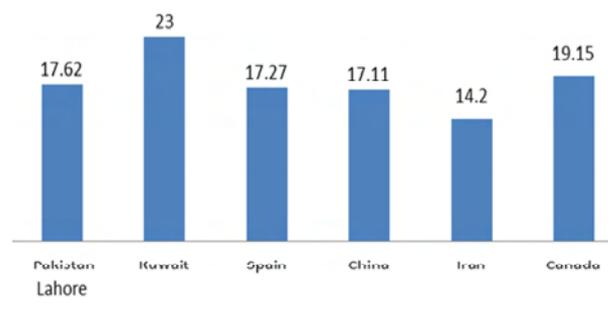
The mean age range of these healthy subjects was 25 years. The mean for serum copper was found to be 17.62±6.67 µmol/L. Here the value of serum copper ranged

between 4.72 to 31.48µmol/L. The mean serum copper level for males was 18.57±6.61 µmol/L with a range of 4.72 to 31.7µmol/L. The mean serum copper level in females being 16.52±6.67 µmol/L. Here the values for females ranged between 4.72 to 30.48 µmol/L. Minimum & maximum levels of Copper in µmol/L along with 95th confidence interval, also the 2.5th percentile & 97.5th percentile are shown in table 1.

Table 1: Minimum & Maximum levels of COPPER in µmol/L with 95th confidence interval (CI), also the 2.5th percentile & 97.5th percentile

Copper	Min µmol/L	Max µmol/L	95th CI	2.5th Percentile	97.5th Percentile
Male	3.14	33.05	17.31 -19.83	4.72	31.7
Female	3.14	41.40	15.58-17.78	4.72	30.48
Overall	3.14	42.49	16.84-18.41	4.72	31.48

**Fig: Mean concentration of copper in µmol/L in different countries**



**DISCUSSION**

Reference interval refers to the interval between reference limits that includes usually 95% of the reference values.<sup>7</sup> It is also defined as a range comprising between 2.5th & 97.5th percentile of the data distribution from a given reference population.<sup>8</sup> Establishing a normal range of trace elements in the sera of healthy individuals in any geographical area is very

important for interpretation of trace element results and for further studies in that particular region.<sup>9</sup>

Copper, an essential trace element is required in body for performing major functions. Copper is an important component of ceruloplasmin and various enzymes including ferroxidase II, lysyl oxidase, Zn-Cu superoxide dismutase, tyrosinase.<sup>9</sup>

The range for copper varies from 4.72 to 31.48 $\mu\text{mol/l}$  with a mean of 17.62 $\mu\text{mol/L}$ . These results were in close proximity with another study carried out in Pakistan in 2004 in Islamabad / Rawalpindi area where mean copper concentration was found to be 18.1 $\mu\text{mol/L}$  with a range of 9.4 to 30.06  $\mu\text{mol/L}$ .<sup>10</sup> This slight difference in the mean value of copper might be attributed to the difference in the age range of the population included in that study. Another factor contributing to this difference may be the integrated diet mainly consisting of wheat & wheat products.<sup>10</sup>

A study conducted by Manser and Khan<sup>11</sup> in Karachi on normal population found that the mean concentration of copper was 14.71 $\mu\text{mol/L}$  which was lower as compared to this study. The main contributing factor for this difference could be the excessive use of the automobiles & pesticides resulting in environmental pollution.

Another factor contributing to the increase in the concentration of copper is the distribution of water for domestic uses, particularly in the system where an acidic pH exists.<sup>12</sup> In this regard, WHO conducted a study in Pakistan on quality of drinking water and found that the concentration of the copper in the drinking water varies widely which is constantly adding copper element to the drinking water. Along with the manufacturing of the commercial appliances like wires & pipes, copper was also used as the copper sulphate

pentahydrate for the control of algae in water pipes.

The other factors include the inhalation of copper fumes produced mainly during welding & plumbing increases copper concentration in blood. Copper could also be present in drinking water pipes as it remains in pipes during water supply. The deficiency of iron, zinc, vitamin B and vitamin C also raises copper concentration in human.<sup>13</sup>

Copper is being constantly added in soil form of pesticides, fertilizers, industry & sewage sludge. Similarly melting, grinding & cutting of copper may produce fumes & dusts & exposure & inhalation of these fumes may be the contributors of raised copper levels in our body.<sup>14</sup>

A study conducted in Iran in 2011 showed that the mean value of serum copper in age ranging from 20 to 29 years was 14.2 $\mu\text{mol/L}$ . The mean age range being 25 years is comparable to population in Lahore where mean copper concentration was 17.62 $\mu\text{mol/L}$ . This was mainly attributed to the lifestyle & habits of the people living in Iran.<sup>15</sup> Urbanization & educational attainments might be the factors contributing to the changes in serum copper levels.

The reference range used by the trace element & Environment Toxicology Laboratory at the University of Alberta had a mean of 19 $\mu\text{mol/L}$  for copper which is close to the mean (17.62 $\mu\text{mol/L}$ ) of our population under study. The author mentioned that the range for a trace element analysis is only suggestive of the usual exposure of this element encountered in daily life.<sup>16</sup>

Similar study conducted in Kuwait determined serum level of copper in normal population. Here mean copper concentration was found to be 23 $\mu\text{mol/L}$ .

This large difference in mean concentration of copper is mainly attributed to Desalination plants which are used in Arabian Gulf. These plants were the main source of increased copper levels in the environment. On the other hand industries & oil pollution were constantly adding copper to the environment.<sup>17</sup>

The concentration of copper in our study was comparable to the reported values from Spain and China where mean copper concentration was 17.27 $\mu$ mol/L and 17.11 $\mu$ mol/L respectively.<sup>18</sup> Similarly mean concentration of copper reported from Italy was 19.15 $\mu$ mol/L which was also comparable with the mean concentration of our study.<sup>19</sup>

The mean copper level (17.62 $\mu$ mol/L) of our study was found to be greater than that reported in studies from Bangladesh & Japan that had a mean concentration of 15.38  $\mu$ mol/L & 12.56 $\mu$ mol/L respectively.<sup>20,21</sup>

Our study did not show a significant difference in mean concentration of copper when compared with mean concentration of copper quoted in reference books ( $p = 0.9$ ).

The mean serum copper concentration of our study compared with various countries is shown in following figure.

### CONCLUSION

This study provides data for the establishment of reference range for copper in healthy population of Lahore. Here the mean concentration of copper is 17.62 $\pm$ 6.6 $\mu$ mol/L. The results showed that there is significant difference in serum level of copper among different countries. Diet, physical environment and socioeconomic conditions all affect the physiology of a population. These values can be useful for interpretation and clinical management of copper disorders. As there are no established reference ranges for trace

elements in Pakistan, these findings can form the basis and reference for any future studies on trace elements in Pakistan.

### LIMITATION OF THE STUDY

The study was carried out on only specific age group due to financial constraint faced during the study.

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## COMPLEMENTARY AND ALTERNATIVE MEDICINE USE AMONG HEALTH WORKERS IN MID-DELTA, EGYPT

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### ABSTRACT

**Background:** Alternative and complementary medicine (CAM) attracted national attention from the media, governmental agencies, and the public. The Study aimed at assessing pattern of CAM use among health workers in mid-Delta, Egypt. **Design and Methods:** A cross-sectional descriptive survey with multi-stage random sample technique was used. A total sample size of 873 health workers (technicians, allied health personnel, pharmacists and physicians) was chosen randomly from two university hospitals and four general hospitals in mid-Delta. They fulfilled self-administered questionnaire regarding their socio-demographic data, knowledge on CAM and their sources, causes of CAM use, diseases for which CAM used and commonly used CAM practices in the area. **Results:** females constituted 77.32% of the sample, 47.42% aged 20 - 25 years, 54.64% have less than 5 years of work, 46.39% have bachelor's degree and 50.52% have diploma. Three fourths of health workers have knowledge about CAM, 4.12% usually use CAM and 38.14% sometimes use it. Media was the source of CAM knowledge for 54.79%, followed by relatives and friends for 31.51%. One fourth of participants talk on CAM with their patients and 28.87% advice patients to use CAM. Minimal side effects (43.29%) and religious believes (21.64%) are the main causes of using CAM. Patients use CAM for backache, joint pain, abdominal colic and flatulence (18.45%, 14.56%, and 12.62%) respectively. Prophetic medicine, Honey and bee products, herbal products, food supplements and Hijama were the commonly used CAM practices in the area (73.2%, 65.98%, 47.42%, 45.26% and 38.14% respectively). **Conclusion:** There is an increasing interest in CAM knowledge among health workers. Media, relatives and friends are the main sources of information. Religious practices as Prophetic medicine, honey and bee products, herbs and hijama are the most prevalent CAM practices in the area. There is reluctance in talking with their patients on CAM or referring patients to CAM practitioners. **KEY WORDS:** Alternative, Complementary, Medicine, Health workers, knowledge, causes, mid-Delta, Egypt.

**ملخص:** جذب الطب البديل والتكميلي (CAM) الاهتمام الوطني به من خلال وسائل الإعلام والوكالات الحكومية والجمهور. هدفت هذه الدراسة إلى تقييم نمط استخدام الطب البديل والتكميلي بين العاملين في مجال الصحة في وسط الدلتا بمصر. **منهج البحث:** تم استخدام المسح الوصفي المقطعي، وباختيار عينة عشوائية متعددة المراحل. بلغ حجم العينة ٨٧٣ من العاملين الصحيين (فنيين وموظفي الصحة، والصيادلة، والأطباء) تم اختيارهم بشكل عشوائي من اثنين من المستشفيات الجامعية وأربعة مستشفيات عامة في وسط الدلتا بمصر. استخدم استبيان يحوي البيانات الاجتماعية والديمغرافية، والمعرفة عن الطب البديل والتكميلي ومصادرها، أسباب استخدامه، والأمراض التي يعالجها وممارسات الطب البديل والتكميلي التي يشيع استخدامها في المنطقة. **النتائج:** شكلت الإناث (٧٧,٣٢٪) من العينة. (٤٧,٤٢٪) اعمارهم بين ٢٠-٢٥ عاماً. ثلاثة أرباع العاملين في مجال الصحة لديهم معرفة حول الطب البديل والتكميلي، (٤٠,١٢٪) عادة ما يستخدمون الطب البديل والتكميلي و(٣٨,١٤٪) يستخدمونه في بعض الأحيان. كانت وسائل الاعلام مصدر المعرفة بالطب البديل والتكميلي ل (٥٤,٧٩٪)، تليها المعرفة بواسطة الأقارب والأصدقاء ل (٣١,٥١٪). ربع المشاركين بالدراسة سبق لهم ان تحدثوا مع مرضاهم عن الطب البديل والتكميلي، (٢٨,٨٧٪) اشاروا علي مرضاهم باستخدام الطب البديل والتكميلي. اتفق (٤٣,٢٩٪) من المشاركين علي استخدام الطب البديل والتكميلي لقله آثاره الجانبية و (٢١,٦٤٪) لمعتقدات دينية. يستخدم (١٨,٤٥٪) من المرضى الطب البديل والتكميلي لآلام الظهر، و(١٤,٥٦٪) لآلام المفاصل، و(١٢,٦٢٪) للمغص وانتفاخ البطن. كان

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الطب النبوي والعسل ومنتجات النحل، ومنتجات الأعشاب والمكملات الغذائية والحجامة من ممارسات الطب البديل والتكميلي التي تستخدم عادة في المنطقة بالنسب التالية (٧٣,٢٪، ٦٥,٩٨٪، ٤٧,٤٢٪، ٤٥,٢٦٪ و ٣٨,١٤٪ على التوالي). الخلاصة: هناك اهتمام متزايد في المعرفة بخصوص الطب البديل والتكميلي بين العاملين في مجال الصحة. وسائل الإعلام والأقارب والأصدقاء هي المصادر الرئيسية للمعلومات. الممارسات الدينية والطب النبوي، والعسل ومنتجات النحل والأعشاب والحجامة هي الممارسات الأكثر انتشارا في المنطقة. هناك تردد في الحديث مع المرضى عن الطب البديل والتكميلي أو إحالة المرضى إلى ممارسين الطب البديل والتكميلي.

## INTRODUCTION

Complementary and Alternative Medicine (CAM) is defined as a group of diverse medical and health care systems, practices, and products that are not generally considered to be part of conventional medicine.<sup>1</sup> National surveys performed worldwide suggest that CAM is popular throughout the industrialized world.<sup>2</sup> Population who use CAM therapies during the last 12 months has been estimated to be 10% in Denmark (1987),<sup>3</sup> 33% in Finland (1992),<sup>4</sup> 49% in Australia (1993),<sup>5</sup> and 15% in Canada (1995).<sup>6</sup> A considerable use exists in many developing countries (Colombia, 40%; Chile, 71%; up to 80% in African countries).<sup>7,8</sup> Exact estimates of expenditure on CAM have been difficult to determine though there is little doubt that it is enormous. In 2002, it was estimated that the amount spent on CAM in the USA was US \$2.7 billion, US\$ 2.4 billion in Canada, and US\$ 2.3 billion in the United Kingdom.<sup>9</sup>

CAM services are usually used alongside and in addition to conventional medicine. Thus, a vast informal and silent health care sector exists in almost all countries. No comprehensive picture of this sector exists as yet in any country.<sup>10</sup> Data on effectiveness of various CAM treatments being used alone and in combination are inadequate. CAM is used by the people in management of chronic conditions that are costly to society, such as chronic pain and arthritis, and more life-threatening diseases, such as heart diseases and cancer.<sup>11</sup>

The exact reasons for the popularity of CAM are complex; they change with time and place; they may vary from therapy to therapy. They are different from one individual to another.<sup>12</sup> On the contrary, many health professionals refuse to take CAM seriously as it lacks, to their opinion, the scientific evidence.<sup>13</sup> Lack of scientific evidence may be related to the financial, methodological and ethical obstacles in researching CAM.<sup>13</sup>

Health workers may be source of knowledge about CAM as they are turned to frequently by some of their patients for seeking advice. This may explain the huge variation in the prevalence rate.<sup>14</sup> Some studies demonstrated a wide variation in the knowledge and practice of physicians. However, there was a tendency towards increasing use and more positive attitude towards CAM. Many factors are interplaying, most importantly the type of training in medical education, as well as the community itself.<sup>15-17</sup> In a Canadian and United States data base search, physicians' attitude towards CAM was more negative compared to other health care professionals such as nurses, public health professionals, dietitians, social workers, medical/nursing school faculty, and pharmacists.<sup>18</sup>

Tibbu Nabawi or prophetic medicine is broadly accepted and practiced by most physicians and the public in Saudi Arabia and most Arab and Islamic countries. National Center for CAM in Saudi Arabia 2010,<sup>19</sup> Al-Faris et al.,<sup>20</sup> and Hassan et al.,<sup>21</sup>

recorded that more than 70% of the public had used practices related to prophetic medicine in their lifetime. The Study aimed at assessing pattern of CAM use among health workers in mid-Delta, Egypt.

**DESIGN AND METHODS**

**Study design:** A cross-sectional descriptive survey.

**Study settings:** General and university hospitals in the four governorates of Mid-Delta region (Gharbia, Kafr El-Sheikh, Dakahlia and Menofyia governorates).

**Study population:** Health workers (technicians, allied health personnel, pharmacists and physicians) working in mid-Delta region.

**Study sample:** Multistage sample technique was used. First phase one General hospital was chosen randomly from all general hospitals in each governorate, in addition to two university hospitals Chosen randomly from the three university hospitals in mid-Delta region. The second phase a stratified random sample was taken from Tanta University hospitals and Zifta general hospital in Gharbia governorate, Kafr El-Sheikh general hospital in Kafr El-Sheikh governorate, Met-Ghamr general hospital in Dakahlia governorate and Menofyia university hospitals and Berket El-Sabe general hospital in Menofyia governorate. Health workers in different hospitals were classified into different strata; technicians including nurses, allied health personnel including psychologists, dietitians, social workers and physiotherapists, pharmacists and physicians. The third phase a systematic random sample was taken from each stratum. One hundred fifty health workers were chosen from each hospital. The total sample size was 873 participants who completed the study.

Table (1): Socio-demographic characteristics of studied population

<i>Characteristics</i>	<i>Number (873)</i>	<i>Percent</i>
<b>Age:</b>		
20-	414	47.41
25-	252	28.87
30-	81	9.28
35-	63	7.22
40+	63	7.22
<b>Sex:</b>		
Males	198	22.68
Females	675	77.32
<b>Years of work:</b>		
-5	477	54.64
5-	207	23.71
10-	63	7.22
15-	72	8.24
20+	54	6.19
<b>Education:</b>		
Bachelor	405	46.39
Diploma	441	50.52
Master	27	3.09
<b>Occupation:</b>		
Physicians	54	6.19
Pharmacists	72	8.25
Allied health personnel	270	30.92
Technicians including nurses	477	54.64
<b>Work site</b>		
Ministry of Health	576	65.98
University	297	34.02

**Methods of data collection:** An international self-administered questionnaire approved by the National Center for CAM in United States was used for data collection.<sup>11</sup> Questionnaires were distributed and collected within 10 minutes at the same session. The questionnaire included: 1. socio-demographic data e.g. age, sex, residence, highest qualification, occupation and years of experience. 2. Knowledge about CAM and its sources. 3. Causes of using CAM. 4. Common diseases for which CAM used. 5. Commonest CAM modalities used in the area. Data were collected from July 2011 to December 2011.

**Statistical analysis:** Data were collected, presented in tables, and statistically analysed using SPSS statistical package version 18. Data were presented using

frequencies, percentages and 95% confidence interval. CAM practices were classified according to use into commonly used (>80%), usually used (60-80%), neutral (40-<60%), sometimes used (20-<40%) and rarely used (<20%).

**Medical ethics:** Approval of the study was taken from administrators of Ministry of Health (MOH) in Mid-Delta governorates (Gharbia, Menofyia, Kafr El-Sheikh and Dakahlia). Also, approval from managers of Tanta and Menofyia university hospitals was taken. A verbal approval was taken from each participant to share in the study. Confidentiality was ensured.

### RESULTS

Table (1) showed socio-demographic data of study participants. Most of participants (47.42%) aged 20 to less than 25 years and 28.87% aged 25 to less than 30 years. Males represented 22.68% while females constituted 77.32%. About fifty five percent have less than 5 years of work, 23.71% have less than 10 years of work and 6.19% have 20 years or more of work. More than four hundred participants (46.39%) have bachelor degree, 50.52% have diploma and 3.09% have Master degree. Technicians including nurses constituted 54.64% and 30.93% allied health personnel. 65.98% of participants are working in hospitals related to MOH.

Health workers have knowledge about CAM represented 75.26%. Only 4.12% of participants usually use CAM and 38.14% sometimes use it. Different media was the source of CAM knowledge for 360 of knowledgeable participants (54.79%), relatives and friends were the source of knowledge for 31.51%, health educational organizations 6.85% and books, lectures, workshops and internet only 6.85%. Only 24.74% of participants talk on CAM with their patients and 28.87% advice patients to

use CAM. Minimal side effects of CAM is the main cause of using it (43.29%) followed by religious beliefs (21.64%), effectiveness of CAM (17.13%), low cost (14.43%) and failure of conventional medicine (11.72%). Easy accessibility, acceptability and more confidence in CAM were the cause for only 1.8% of participants (Table 2).

Table (2): Knowledge and causes of use of CAM among studied population

Knowledge and Causes of CAM use	Number	Percent	Confidence interval
<b>Knowledge about CAM (n=873)</b>			
Participants have knowledge	657	75.26	72.40-78.12
Participants have no or some knowledge	216	24.74	21.88-27.60
<b>Sources of knowledge (n=657)</b>			
Media	360	54.79	50.98-58.60
Relatives and friends	207	31.51	27.96-35.06
Health educational organization	45	6.85	4.92-8.78
books, lectures, workshops and internet	45	6.85	4.92-8.78
<b>Use of CAM for themselves or their family</b>			
Participants usually use CAM	36	4.12	2.80-5.44
Participants sometimes use CAM	333	38.14	34.92-41.36
Participants never use CAM	504	57.73	54.45-61.01
<b>Talking on CAM with patients</b>			
Advice patients to use CAM	252	28.87	25.86-31.88
<b>Causes of CAM use*</b>			
Minimal side effects	432	43.29	40.22-46.36
Religious beliefs	216	21.64	19.09-24.19
Effectiveness of CAM	171	17.13	14.79-19.47
Low cost	144	14.43	12.25-16.61
Failure of conventional medicine	117	11.72	9.72-13.72
Others#	18	1.80	0.97-2.63

#Others include; easy accessible, acceptable and more confidence.

\*Each participant may check more than one answer.

The most common diseases for which patients use CAM were; backache, joint pain, abdominal colic and flatulence, knee pain, influenza and common cold, anxiety, migraine, hypertension, depression, diabetes mellitus, obstetric and gynaecological disorders (18.45%, 14.56%, 12.62%, 10.36%, 8.09%, 7.12%, 6.8%, 5.18%, 4.53%, 3.88% and 3.56% respectively). While the least diseases for which CAM used were renal failure, eye infection, asthma and cancer and malignancy (1.62%, 1.29%, 1.29% and 0.65% respectively) (Table 3).

Table (3): Diseases for which CAM used

<i>Diseases for which CAM used*</i>	<i>Number</i>	<i>Percent</i>	<i>Confidence interval</i>
Backache	513	18.45	17.01-19.89
Joint pain	405	14.56	13.25-15.87
Abdominal colic and flatulence	351	12.62	11.39-13.85
Knee pain	288	10.36	9.23-11.49
Influenza & common cold	225	8.09	7.08-9.10
Anxiety	198	7.12	6.16-8.08
Migraine	189	6.8	5.86-7.74
Hypertension	144	5.18	4.36-6.00
Depression	126	4.53	3.76-5.30
Diabetes mellitus	108	3.88	3.16-4.60
Obstetric & gynecological disorders	99	3.56	2.87-4.25
Renal failure	45	1.62	1.15-2.09
Eye infection	36	1.29	0.87-1.71
Asthma	36	1.29	0.87-1.71
Cancer and malignancy	18	0.65	0.35-0.95

\*Each participant may check more than one answer.

The most commonly used CAM practices by health workers were spiritual healing as prayer and roquia (73.2%), honey and bee products (65.98%), herbal products (47.42%), food supplements (45.36%), hijama (38.14%), acupuncture and massage therapy (about 19%). Among CAM practices rarely used; reflexology, energy medicine, magnetic therapy, ozone therapy,

aromatherapy, camel milk and urine and cauterization (Table 4).

## DISCUSSION

Definition of CAM was explained to all participants in the current study before fulfilling questionnaires to avoid confusion and misconception about CAM meanings. The sample technique was planned on scientific basis to be representative of population with low cost. The response rate was 97.0% and this was high compared with the previous studies. However, there were some limitations in the present study. It represented mid-Delta region only and hence results cannot be generalized to all Egyptian regions due to different cultures, habits and believes in different areas of Egypt. At the same time, Lack of similar local studies on CAM makes it difficult to ensure about the credibility of results.

Religious affiliations and prevailing local culture may be reflected in prevailing CAM practices. Our studied health workers reported a high use of spiritual healing as prayer and roquia, honey and bee products, herbal products, food supplements and hijama, which are both highlighted health practices in the Holy Qura'n and Honored Sunnah. Studies from Saudi Arabia and Gulf countries have, however, shown a similar or slightly different situation. General Practitioners (GPs) in Doha, Qatar were more familiar with diet therapy and food supplements, acupuncture, and massage,<sup>22</sup> whereas in the United Arab Emirates (UAE) preference of health professionals was given to herbal products, acupuncture, and homeopathy.<sup>21</sup> On the other hand, Western countries show a distinctly different portrait of CAM use and knowledge of health workers: 86% had knowledge of hypnosis, 79% of acupuncture, 59% of homeopathy, 47% of osteopathy, and only 19% of herbal medicines.<sup>16</sup>

**Table (4): Most important CAM modalities used by health workers**

CAM modalities	Commonly used		Usually used		Neutral		Sometimes used		Rarely used	
	No.	%	No.	%	No.	%	No.	%	No.	%
Spiritual healing as prayer and roquia	639	73.2	72	8.24	108	12.37	18	2.06	36	4.12
Honey and bee products	576	65.98	189	21.65	63	7.22	9	1.03	36	4.12
Herbal products	414	47.42	171	19.59	162	18.56	63	7.22	63	7.22
Food supplements	396	45.36	171	19.59	81	9.28	90	10.31	135	15.40
Hijama	333	38.14	153	17.53	99	11.34	153	14.43	162	18.56
Acupuncture	171	19.59	162	18.56	144	16.49	162	18.56	243	27.89
Massage therapy	162	18.56	135	15.46	171	19.59	162	18.56	243	27.89
Cauterization	117	13.4	135	15.46	162	18.56	171	19.59	828	32.99
Camel urine and milk	90	10.31	36	4.12	72	8.25	54	6.19	621	71.13
Aromatherapy	45	5.15	81	9.28	144	16.49	144	16.49	459	52.54
Ozone therapy	36	4.12	63	7.22	117	13.4	180	20.62	477	54.64
Magnetic therapy	36	4.12	63	7.22	72	8.5	171	19.59	631	60.82
Energy therapy	27	3.09	45	6.19	72	8.25	153	17.53	567	64.95
Reflexology	27	3.09	18	2.06	45	5.15	162	18.56	621	71.13

In the current study, 24.74% reported poor knowledge about CAM compared with 39% of the general practitioners in Doha, Qatar.<sup>22</sup> In a study among fellows of the Michigan chapter of the American Academy of Paediatrics, majority of paediatricians believed a small percentage of their patients were seeking alternatives to conventional medicine, half would consider referring patients for CAM.<sup>23</sup>

Our study findings of 57.73% of health workers never utilized CAM is very similar to the reported CAM utilization worldwide.<sup>24,25</sup> The present study showed that 28.87% of health workers advise patients to use CAM and 24.74% of physicians talk with their patients on CAM. Some recent surveys reported a similar pattern.<sup>26,27</sup> Our low rates may be attributed to the absence of specific CAM centers in Egypt like The NCCAM in USA and KSA and the lack of knowledge and training of physicians in CAM. Recognition or legitimization of certain CAM practices may encourage physicians to advise and refer patients to CAM practitioners.<sup>28</sup> Only 24.74% of physicians in the present study initiated a discussion of the potential harm and benefits of CAM therapies with their

patients, which is in agreement with published data.<sup>29,30</sup>

Among causes of CAM use in the present study was agreement of health workers about safety (43.29%) and effectiveness (17.13%). Primary health care physicians in Saudi Arabia reported agreement rates of 23.36% and 28.93% for safety and efficacy of CAM therapies, respectively, which is similarly to the majority of Dutch GPs who did not believe in the effectiveness of many alternative therapies, particularly herbal medicines and nutritional supplementation.<sup>31</sup> The physicians' agreement about safety and effectiveness varies from one country to another depending on culture, knowledge, and legitimacy in a country. Unavailability of reliable information, data, and evidence are all important factors for the widespread lack of belief and confidence in CAM within the medical profession.<sup>16</sup>

Different media, relatives, and friends as main sources of CAM knowledge for health workers in our study are considered devastating. Of health professionals in the present study, only 6.85% take their knowledge from educational academies

compared with 29.08% of health professionals in Saudi Arabia. This may indicate lack of medical curricula in CAM. In addition, 6.85% of participants take their knowledge from books, lectures, workshops and internet. This was unexpected where many licensed electronic databases (e.g. Natural Medicine Comprehensive Database, <http://www.naturaldatabase.com>) have been available several years ago. Therefore, educational campaigns should be initiated through lectures, seminar series and other activities demonstrating and highlighting the tools associated with those databases. The surge of information available to the public in the media and the internet is reflected on patients' need for guidance and direction. Physicians may be a source of such knowledge as they are turned to frequently by some of their patients for seeking advice.<sup>14</sup>

#### CONCLUSION AND RECOMMENDATIONS

There is an increasing interest in CAM knowledge among health workers. Most of them depend on the media, relatives and friends as their main sources of information. Most of physicians are reluctant in talking with their patients on CAM or referring patients to CAM practitioners. Safety, religious beliefs, effectiveness, low cost and chronic pain are important determinant factors for seeking alternative care. Religious practices as prayer and roquia, honey and bee products, herbs and hijama are the most prevalent CAM practices in the area. Provision of tuition, educational courses, continuing medical education and postgraduate educational opportunities on CAM modalities are essential. Evidenced sources of CAM information must be available and easily accessible for health workers.

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## HOW MANY SUBJECTS SHOULD BE STUDIED: SAMPLE SIZE DETERMINATION THROUGH HYPOTHESIS TESTING AND CONFIDENCE INTERVAL

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### ABSTRACT

*One of frequently asked question by health researchers is how many individuals will I need to study. Sample size determination is one of the central canons of health research. A study is always better when planned scientifically and determining the sample size for a study is a prime component as it will help to determine optimum number of subjects so that statistically significant results can be detected. If the sample size is larger than what is needed, the study will become cumbersome and ethically exorbitant. On the converse, using too few subjects' will eventually result in wasted time, effort and money etc. Literature is full of examples in which sample size is incorrectly determined for health studies thus resulting in bias conclusions. To ensure the reliability of the results, the significance level and power of study must be fixed before the sample size determination. Sample size determination is very important and always a difficult process to handle. It requires the collaboration of a specialist who has good scientific knowledge in the art and practice of medical statistics. There are numerous situations in which sample size is determined that varies from study to study. This article will focus on the sample size determination for hypothesis testing and confidence interval situations commonly used in health studies.*

**KEY WORDS:** Hypothesis testing, confidence interval, significance level, power of study, effect size, sample size

### ملخص:

واحد من أهم الأسئلة المتكررة من الباحثين الصحيين هو "كم مشاركا نحتاج للقيام بهذه الدراسة؟". ولذلك فإن حجم العينة يعتبر من الركائز الأساسية للقيام ببحث علمي رصين، فدائما ماتكون الدراسة أفضل وأكثر مصداقية في نتائجها الإحصائية إذا بني إختيار حجم العينة على أساس علمي. إن الأدبيات والمصادر العلمية مليئة بنماذج لدراسات كان حجم العينة الغير مناسب زيادة أو نقصا سببا في عدم جدوى الدراسة، ولذلك فإن إختيار حجم العينة المناسب مهم وليس بالأمر السهل فهو يحتاج تعاون بين الخبير في الفن الذي تنطوي تحته الدراسة والمختص في الإحصاء الحيوي. هدف الدراسة: التعرف على الطريقة المناسبة لتحديد حجم العينة لإختبار فرضية البحث وتحديد وضع فاصل الثقة في الأبحاث الصحية.

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## INTRODUCTION

Progress in almost every field of science depends upon the contributions made by systematic research, thus research is often viewed as the cornerstone of scientific progress.<sup>1</sup> A scientific research is a one which is a carefully planned investigation, addressing all the important aspects; from generation of research ideas till the publication.<sup>2</sup> The ever increasing demand for research has created a need for an efficient method of determining the sample size to be representative of a given population<sup>3</sup>. Sample size determination is a process of deciding before a study begins, how many subjects should be studied. Whatever type of research design is used for a study, the health researcher will face the problem of sample size determination.<sup>4</sup> The sample size is now easily calculated with the help of computer statistical programs, but the principles underlying the calculation and the limitations must be clearly understood by the investigators.<sup>5</sup> It is not necessarily true that the bigger the sample, the better the study. Beyond a certain point, an increase in sample size will not improve the study in fact, it may do the opposite.<sup>6</sup> Calculation of an appropriate sample size is usually dependent upon six parameters; objectives of the study, variables of interest (qualitative or quantitative), desired significance level, desired power, effect size / clinical important difference, measurement variability and one tailed or two tailed tests.<sup>7</sup> Although a biostatistician may do the necessary exercise to determine the sample size, he/she can only do it with guidance from the investigator on the level of uncertainty that is considered acceptable.<sup>8</sup> In addition, the aforementioned six parameters have to be taken into consideration while calculating the sample size. Since the data are not available before the study begins, the investigators will have to make some assumptions about the data, and provide these assumptions to the

biostatistician to be able to calculate the desired sample size. The procedure for estimating sample size is not as precise as investigators may be led to think. One such assumption is about the prevalence, incidence or frequency of the condition or event. If the rate of the event is large, statistical power will be high with a smaller number of cases. If the event is rare, a larger sample size will be needed. Some information may be available from previous studies to guide the estimates. If not, it is up to the investigators to come up with a tentative estimate which the biostatistician can use.<sup>9-11</sup> The ability of a study to demonstrate an association or causal relationship between two variables given that an association exists is known as power of study, for example, 80% power in a clinical trial means that the study has an 80% chance of ending up with a p value of less than 5% in a statistical test.<sup>12</sup> The effect size in a study refers to the actual size of the differences observed between groups or the strength of relationships between variables. The likelihood that a study will be able to detect an association between a predictor and an outcome variable depends on the magnitude of the association we decide to look for. The choice of effect size is difficult and arbitrary, but it must be set beforehand and must make a meaningful difference.<sup>13,14</sup> There are numerous situations in which sample size is determined that varies from study to study. This article will focus on the sample size determination for hypothesis testing and confidence interval situations commonly used in health studies.

### **Various effects while determining the sample size<sup>15</sup>:**

The information below is a guideline about how sample size is affected by variations that incur due to change in different parameters.

**Values for power of study and significance level<sup>9</sup>:**

Power of study and significance level's are the core components for determining sample size. Earlier, it was cumbersome to calculate the power of study and significance level due to complex formulas and tables respectively, but now due to recent advancements in the field, experts have prepared tables of normal deviates for corresponding exact values of power of study and significance level.

**Sample Size Determination through Hypothesis Testing approach:**

**One Group Proportion:**

One group proportion is use to compare a hypothesized value of population with the sample value, for example, Drug A is administered to 100 patients to treat a particular disease, after administration the health of 50 patients improved. Test whether this drug is better than drug B, which is known to produce improvement in 45% of patients.

Power	Z <sub>1-β</sub>	Alpha	Z <sub>α</sub> (One-sided)	Z <sub>α/2</sub> (Two-sided)
0.80	0.84	0.20 (0.80)	0.84	1.28
0.85	1.03	0.10 (0.90)	1.28	1.64
0.90	1.20	0.05 (0.95)	1.64	1.96
0.95	1.64	0.01 (0.99)	2.33	2.81
0.99	2.33			

Table 1: Normal Deviates 1-β values

Table 2: Normal Deviates α values

**Example for sample size determination:**

The five-year cure rate for a particular cancer is reported in the literature to be 50%. An investigator wishes to test the hypothesis that this cure rate can be applied in a certain local health district. What is the required sample size if the investigator is interested in detecting a true rate of 40%. The level of significance is set at 5% with 90% power of study.

Formula for determination of sample size for one group proportion is<sup>4</sup>:

$$n = \frac{(Z_{1-\beta}[\sqrt{p_1(1-p_1)}] + Z_{1-\alpha/2}[\sqrt{p_0(1-p_0)}])^2}{(p_1 - p_0)^2}$$

Where;

P<sub>1</sub> is the anticipated proportion = 40%

P<sub>0</sub> is the Null Hypothesis value or actual proportion (test cure rate) = 50%

p<sub>1</sub> - p<sub>0</sub> is the difference between proportions = 0.10

Z<sub>1-β</sub> is the desired power of study = 90%

Z<sub>1-α/2</sub> is the desired level of significance = 5%

Alternate hypothesis is two sided

Putting the values in the formula the required sample size is 259.

**Two Groups Proportion:**

Compares responses in two groups but the responses in both groups are independent, for example, two preparations of same drug in tablet form were tested for their efficacy in alleviating headache. Preparation A was given to 25 patients of which 17 claiming its effectiveness, while drug B was given to 20 patients of which 16 claiming its effectiveness. Compare the effectiveness of preparation A and B.

**Example for sample size determination:**

It is believed that the proportion of patients who developed complications after undergoing one type of surgery is 5% while the proportion of patients who developed complications after second type of surgery is 15%. How large should be the sample size in each of the two groups of patients if the investigator wishes to detect with a power of 90% at 5% level of significance.

Formula for determination of sample size for two group proportion is<sup>19</sup>:

$$n = \frac{(Z_{1-\alpha/2}\sqrt{2\bar{p}(1-\bar{p})} + Z_{1-\beta}\sqrt{p_1(1-p_1)p_2(1-p_2)})^2}{(p_1 - p_2)^2}$$

Where  $\bar{p} = \left(\frac{p_1 + p_2}{2}\right)$

Where;

$P_1$  and  $P_2$  are the anticipated proportions = 5% & 15%

$p_1 - p_2$  is the difference between proportions = 10%

$Z_{1-\beta}$  is the desired power of study = 90% (1.28)

$Z_{1-\alpha/2}$  is the desired level of significance = 5% (1.96)

$\bar{P}$  is the average of proportions = 0.10

Alternate hypothesis is two sided

*Putting the values in the formula the required sample size is 93 patients in each group.*

**Paired Groups Proportion:**

Two proportions are paired if they share a common feature that affects the outcome. For example, when comparing two laboratory methods (culture media) to detect bacteria in samples of blood, if blood from the same sample is put into both methods, this is the "pairing". Pairs of results from multiple samples can then be compared as a pair of proportions:

**Example for sample size determination:**

Two drugs A and B were used to treat patients of depression and were compared in-terms of possible side-effects, nausea. The drugs were given to patients on two different occasions. It is believed that incidence of nausea from drug A is 20% less than drug B. Calculate the number of patients required in each group assuming 90% power of study and 5% level of significance.

*Formula for determination of sample size for paired group proportion is<sup>20</sup>:*

$$n = \frac{\bar{p}(1-\bar{p})(Z_{\beta} + Z_{\alpha/2})^2}{(p_1 - p_2)^2}$$

Where;

$P_1$  and  $P_2$  are the anticipated proportions = 20% & 50%

$p_1 - p_2$  is the difference between proportions = 30%

$Z_{1-\beta}$  is the desired power of study = 90% (1.28)

$Z_{1-\alpha/2}$  is the desired level of significance = 5% (1.96)

$\bar{P}$  is the average of proportions = 0.35

Alternate hypothesis is one sided

*Putting the values in the formula the required sample size is 47 participants.*

**Correlation:**

Correlation is the degree to which two or more quantities are linearly associated. This association may be positive or negative. A positive correlation exists where the high values of one variable are associated with the high values of the other variable(s). A 'negative correlation' means association of high values of one with the low values of the other(s). For example, age and blood pressure are positively correlated, whereas, volume and pressure and negatively correlated.

**Example for sample size determination:**

According to the literature, the correlation between salt intake and systolic blood pressure is around 0.3. A study is conducted to test the correlation in a population, with the significance level of 1% and power of 90%. How many participants should be there in the study?

*Formula for determination of sample size for correlation is<sup>10</sup>:*

$$N = \frac{(Z_{1-\alpha/2} + Z_{1-\beta})^2}{\frac{1}{4} \left[ \log_e \left( \frac{1+r}{1-r} \right) \right]^2} + 3$$

Where:

$Z_{1-\beta}$  is the desired power of study = 90% (1.28)

$Z_{1-\alpha/2}$  is the desired level of significance = 1% (2.81)

r is the correlation coefficient = 0.30

Putting the values in the formula the required sample size is 158 participants.

### Sample Size Determination through (Confidence Interval):

There is only one method of determining sample size that allows the researcher to pre-determine the accuracy of the sample results that is “The Confidence Interval Method of Determining the Sample Size”. This method allows the investigator to draw conclusions about the true value of the outcome measure on the basis of information in the sample.<sup>16,17</sup> The sample size is calculated in such a way that there is a 95% probability that it includes the true value. To calculate the sample size from confidence interval the following information is necessary; *Anticipated Population Proportion* which is usually reported in the form of prevalence, incidence or rate etc. *Confidence Level*, tells you an estimated range of values that is likely to include the population parameter being calculated. For example, how confident are we that our confidence interval of 23 – 27 years of age contains the mean age of our population? If this range of ages was calculated with a 95% confidence level, we could say that we are 95% confident that the mean age of our population is between 23 and 27 years<sup>[18-19]</sup>. *Absolute or Relative Precision* which is a measure of consistency i.e. if a survey is repeated several numbers of times the same result is yielded every time; it is usually reported in percentage.<sup>20</sup>

### Example for sample size determination (one group):

A local health department wishes to estimate the prevalence rate of tuberculosis infection among children less than five years of age in its locality. How many children should be included in the sample so that the rate may be estimated to within 5 percentage points of the true value with 95% confidence if it is known that the true rate is unlikely to exceed 20%.

Formula for determination of sample size for one group is<sup>18</sup>:

$$n = \frac{z^2(pq)}{e^2}$$

Where:

Anticipated population proportion = 20%  
Confidence Level = 95%  
Precision = 5%  
(15% - 25%)

Putting the values in the formula the required sample size is 244 children.

### Example for sample size determination (two groups):

Suppose that in a pilot study of 50 agricultural workers in an irrigation project. It was observed that 40% had active schistosomiasis. A similar pilot study of 50 agricultural workers outside the project demonstrated that 32% had active schistosomiasis infection. If we would like to carry out a larger study to estimate the true schistosomiasis risk difference to within 5 percentage points of the true value of the confidence interval, how many people must be studied in each of the two groups.

Formula for determination of sample size for two groups is:

$$n = \frac{Z^2 1 - \alpha / 2 [P_1(1 - P_1) + P_2(1 - P_2)]}{d^2}$$

Where:

Anticipated population proportion = 40% & 32%  
Confidence Level = 95%  
Precision = 5%age points

Putting the values in the formula the required sample size is 354 people in each group.

### Tips in calculation of sample size for Confidence Interval approach:

For situations in which no anticipation is possible a figure of 0.5 should be used. If the anticipation is given in range the closest to 0.5 should be used. The sample size required will be largest when P is equal to 0.5 and in two groups calculation the larger proportion should be kept first.<sup>16</sup>

### CONCLUSION

Sample size is best considered early in the planning of a study. The accuracy of sample size calculations depends on the accuracy of the estimates of the parameters used in the calculations. Determining sample size is necessary so that optimum numbers of subjects are available to achieve statistically significant results. On the converse, If the sample size is larger than what is needed, the study will become cumbersome and ethically exorbitant. For successful resolution of sample size issue close and honest collaboration of biostatisticians and subject-matter experts is required.

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## ULTRASOUND AND PHONOPHORESIS EFFECT ON ECZEMA LESIONS IN A 37-YEAR-OLD MALE PATIENT: A SINGLE CASE STUDY

\*Jaya S Tedla<sup>1</sup>, Irshad Ahmad<sup>2</sup>

### ABSTRACT

*Eczema is a very common form of the dermatological condition with painful lesions and ultrasound is most commonly used electrotherapy modality by physical therapist to provide tissue healing. In this case study, we have treated two such lesions on the left ankle for a 37-year-old patient with ultrasound and phonophoresis. Ultrasound alone was provided to lateral lesion on the ankle. Phonophoresis was provided to the anterior lesion on the ankle. Outcome measures were pain, swelling, itching, redness, lichenification and quality of life. We have seen improvements in the clinical features of both lesions but the anterior lesion where we provided phonophoresis had shown more effect than plain ultrasound.*

الأكزيما هو شكل شائع جدا من الامراض الجلدية التي تحتوي علي جروح مؤلمة وتستخدم الموجات فوق الصوتية كأكثر الطرق شيوعا من قبل أخصائي العلاج الطبيعي لشفاء الأنسجة. في هذه الحالة ، فقد عالجتنا مريض يبلغ من العمر ٣٧ عاما و يعاني من اثنين من هذه الجروح على الكاحل الأيسر، تمت المعالجة بالموجات فوق الصوتية فقط وبالموجات فوق الصوتية مع مرهم هايدروكورتيزون (phonophoresis). استخدمت الموجات فوق الصوتية فقط للجرح الجانبي (الوحشي) للكاحل و الموجات فوق الصوتية مع مرهم هايدروكورتيزون phonophoresis للجرح الامامي للكاحل. استخدم الالم، التورم، الحكاك، الاحمرار، التلين، ونوعية الحياة كمقاييس للنتائج. لقد شهدنا تحسن على العلامات السريرية لكلا الجرحين ولكن الاصابة الامامية والتي استخدمنا فيها ال phonophoresis فقد أظهرت نتائج افضل من نتائج استخدام الموجات فوق الصوتية فقط

### INTRODUCTION

Eczema is a broad term used to designate a variety of skin conditions that cause an itchy, inflamed skin rash.<sup>1</sup> It is a very common form of the dermatological condition<sup>2</sup> and extensively studied in literature.<sup>3</sup> Eczema is broadly classified into two types exogenous (contact) and endogenous (non - contact). The clinical features are varied for each sub-type of eczema, but the features common to most patterns divided into three stages, i.e. acute, sub acute and chronic.<sup>4</sup> In acute stage there are erythema, epidermal swelling, or vesiculation, papules, blisters, oozing or crusting.

In sub-acute stage along with above features there will be scaling. In chronic stages the skin is scaly, hypo or hyper pigmented and thickened. As the condition persists, the skin reaches to a dry leathery thickened stage called lichenification, with increased skin markings and painful fissures secondary to scratching or rubbing.<sup>2,5</sup>

Ultrasound is commonly used as a diagnostic method, operative tool and therapeutic intervention.<sup>6</sup> Ultrasound is the most widely used therapeutic modality in physical therapy departments throughout the world.<sup>7-12</sup> The major effects of ultrasound are divided into thermal and

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nonthermal effects. The thermal effects are due to increased tissue temperature this leads to increase in blood flow, increased metabolic activity, and analgesic effect on nervous system results in improvements in healing and pain relief.<sup>13</sup> The non-thermal effects include cavitation and microstreaming that are useful for altering the cellular function and make it more useful for tissue healing.

**CASE DESCRIPTION**

**Patient history**

The subject chosen in this case study is a male 37-year-old Asian originated from India, but currently residing in the Kingdom of Saudi Arabia. He had chronic eczema with inflamed painful fissures at the ankle region on the anterior and lateral aspect of the left ankle. The itching was so severe in the night disturbing his sleep; unknowingly he used to scratch it in the night leading to an inflamed fissure. To relieve his symptoms he was prescribed a topical hydrocortisone cream, but it was not decreasing his problems even after many weeks of application. He consulted physical therapy department casually for his problem. Discussing his condition we decided to provide him effective drug delivery into the cutaneous system by using an ultrasound technique called Phonophoresis.

**Examination**

After obtaining the written consent form, treatment protocol was explained to him. Following this procedure, we started with the clinical examination of symptoms on visual analog scores. Each symptom visual analog score was assessed on a 10cm line without any markings. The left-hand side starting point was denoted with ‘0’ which indicates no symptom at all and right hand sides ending point was denoted by number ‘10’ which indicates maximum symptoms which they cannot tolerate (Figure-1).

No symptom ‘0’ \_\_\_\_\_ ‘10’ Maximum  
at all \_\_\_\_\_ symptom

Figure -1 : Sample of visual analog scale

The subject was asked to tick any point of the line. After ticking, the length of the line from ‘0’ to the tick mark was measured by scale and distance was noted in centimeters. This kind of VAS was assessed for all the following clinical features, i.e. pain, swelling, itching, redness, lichenification and quality of life. The scores of all these symptoms related to eczema are provided in table-1.



Figure 2: Pre and post phonophoresis treatment for anterior eczema lesion

Table-1: VAS scores of clinical characteristics, pre and post intervention

Clinical characteristics	Ultrasound for lateral lesion		Phonophoresis for anterior lesion	
	Pre	Post	Pre	Post
Pain	7	0.5	6.2	0
Swelling	8.7	0.9	8	0
Itching	10	6.4	8.7	0.6
Redness	10	4.8	6.8	1
Lichenification	10	5.6	8.3	1
Quality of life	10	6	7.7	0.4



Figure 3: Pre and post ultrasound treatment for lateral eczema lesion

### Treatment Method

We choose Enraf-Nonius™ ultrasound mission for both phonophoresis and plain ultrasound treatment. For phonophoresis the frequency of ultrasound was 1MHz, mode continuous, intensity 0.8 w/cm<sup>2</sup> for the anterior lesion on the ankle with hydrocortisone ointment prescribed by the clinician to him. We mixed the ultrasound gel and cream thoroughly, and applied onto the skin and set the apparatus with appropriate settings discussed above and applied for five minutes on the first day and increased one minute every day for five days in a week reached a duration of 10 minutes. Treatment continued same 10 minutes of duration for five days in the next week as well. The other lesion on the lateral aspect of the ankle was treated with plain ultrasound of 1MHz frequency, pulsed mode 1:4, intensity 0.8 w/cm<sup>2</sup> for the same duration of the anterior lesion. Total frequency of treatment is 10 days in two weeks. Post treatment we have seen improvements in both of the lesions, but anterior lesion with phonophoresis had showed better results than plain ultrasound alone. We present both the lesion pre and post photographs and scores in figures-2, 3 and table -1 respectively.

### DISCUSSION

The major clinical problem with eczema are inflamed lesion with pain, swelling, itching, redness, scaling and disturbed life. As the

thermal effects of ultrasound increase the local blood flow [14]. The substances which precipitate inflammation will be washed off and all the signs of inflammation that is swelling, pain, and redness will be decreased.

Therapeutic ultrasound alters the platelet membrane permeability leading to release of serotonin and it also stimulates the release of macrophages and neutrophils.<sup>15</sup> Therapeutic ultrasound can alter the permeability of various ions especially calcium,<sup>16,17</sup> by increasing the intracellular calcium there will be mast cell degranulation and which releases histamine in the surrounding tissues.<sup>18</sup> These are the important steps in inflammatory phase of tissue healing by which there will be adequate readiness of the system for the repair process.

In the second phase of tissue repair, the ultrasound is pro-proliferative by stimulating fibroblasts, myofibroblasts and endothelial cells.<sup>15</sup> It maximizes the proliferative phase of tissue repair and enhances optimal scar formation.<sup>15</sup> The ultrasound is even effective in scar remodelling during this phase of tissue repair it acts on collagen in terms of appropriate orientation and conversion of type-3 collagen to type-1 by this there will be increased tensile strength and scar mobility.<sup>15</sup> By all these cellular changes, the ultrasound helps in all phases of tissue repair this may be the reason for healing of the lesion and decreased symptoms.

Phonophoresis is defined as transferring chemical molecules in to skin by using ultrasound<sup>19</sup>. In our study, one of the lesion was applied phonophoresis using hydrocortisone topical cream. This lesion has shown better effect than the plain ultrasound. This can be due to additional anti-inflammatory effect of the steroid along with the usual effects of ultrasounds. In future, we recommend multi centric

randomized controlled trial with large sample to prove the effectiveness of ultrasound and phonophoresis on eczema related lesions.

### CONCLUSION

Application of ultrasound on eczema is innovative mode of physical therapy application in dermatological conditions. In our case study we have seen improvements in the eczema related clinical problems with plain ultrasound as well as with phonophoresis. But phonophoresis was better than ultrasound in this patient. In future we require further research to ultimately conclude these effects.

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## UNUSUAL PRESENTATION OF BEHCET DISEASE (NEURO-BEH CET)

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### ABSTRACT

*Behcet disease is a common disease and usually present by oral, genital ulcers. Can be affect multiple systems in the body. CNS can be affect but usually after present of orogenital ulcer. In our case report, the patient present with neurological manifestations before orogenital ulcers, and that is rare presentation (less than 3 percent).*

Key words: Behcet disease, neurobehcet disease, Vasculitis

**ملخص:** مرض بهجت هو مرض معروف و منتشر ويظهر عادة بتقرحات بالفم والأعضاء التناسلية ومن الممكن أن يؤثر على أجزاء كثيرة من جسم المريض ومن ضمنها الجهاز العصبي. لكن أعراض الجهاز العصبي تظهر عادة بعد ظهور التقرحات في الفم والأعضاء التناسلية. في هذه الحالة المريض اشتكى من أعراض الجهاز العصبي قبل ظهور التقرحات في الفم والأعضاء التناسلية وهذا شيء نادر الحدوث. (أقل من 3 %)

### INTRODUCTION

Behcet's disease is a multisystem, recurrent, inflammatory disorder.<sup>2</sup> It was first described by H. Behcet (1924) as a three-symptom complex comprising uveitis, oral aphthae and genital ulcerations. Later, in 1930, the Greek physician Adamantiades reported a patient with inflammatory arthritis, oral and genital ulcers, phlebitis, and iritis.<sup>1</sup>

Behcet disease can affect central nervous system in less than one- fifth of patient. There is, a period of approximately five to six years elapsed between the onset of the earliest non-neurologic symptoms of Behçet's disease and the appearance of neurologic symptoms or findings. Nevertheless, neurologic findings may also appear concurrently (7.5 %) or precede non-neurologic features (3 %). Twenty percent of those with neurologic findings were asymptomatic.<sup>3,4</sup>

### DIAGNOSIS

CNS manifestation according to site of lesion, they are commonly present (>50%) by pyramidal signs, hemiparesis and headach. Some patient present by brainstem sign, fever, paraparesis, meningeal sign (aseptic meningitis), movement disorder, sensory disturbance (10-40 % of case). Less common manifestations (5% of case) like seizure, cerebellar syndrome, optic neuropathy, psychiatry disorders may present.<sup>6</sup> It can also present with aseptic meningitis or encephalitis, and Vasculitis. And occurs more commonly in male than female.<sup>5</sup>

Coarse of disease can be recurrent attacks, primary progression or secondary progression.<sup>3</sup>

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### Neuro-Imaging: MRI

The lesion type during an acute attack is usually located in the basal ganglion region or in the brainstem, extending to the diencephalic structures, in about 30% of the cases the lesion are bilateral. In some cases a mass effect may be noted, and the centre of these lesions shows contrast enhancement. And can be small scattered lesions located in the basal ganglion region, brainstem or the internal capsule. In chronic cases, atrophy of the brainstem and enlargement of the third ventricle disproportionate to the lateral ventricles or cortical sulci can occurs.<sup>3</sup>

### CSF examination:

Can be completely normal and can show pleocytosis and/or elevated protein content. CSFs with a high cell count, had either neutrophilic predominance or both neutrophils and lymphocytes, or lymphocytic predominance.<sup>3</sup>

### Management:

Neuro-behcet consider as life threatening condition so we should treat the patient with intensive immunosuppressant. The combination of high dose of glucocorticoid and another immunosuppressive agent (like Azathioprine, Infliximab, and cyclosporine) is required.<sup>7,8</sup>

Aseptic meningitis may occur intermittently in-patient with behcet disease. In absence of other manifestation usually treated with high dose of glucocorticoid with great response.

In case of recurrent aseptic meningitis may need to use long-term maintenance therapy with another immunosuppressive agent like azathioprine.<sup>9</sup>

### CASE REPORT

A 21-year-old male Saudi presented to hospital initially with 12 days history of headache and fever, followed by 3 days history of left sided body weakness, double vision and inability to open right eye.

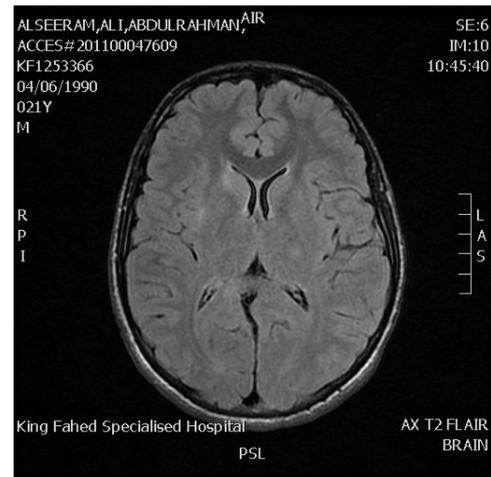


Fig 1: T2 flair (right basal ganglia hyperintense signal)

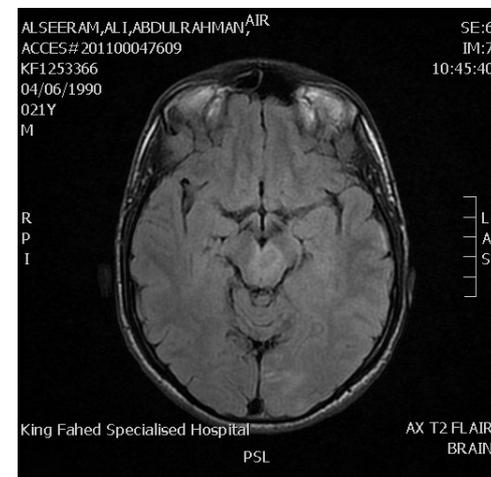


Fig 2: T2 flair (left midbrain hyperintense signal)

There was no history of oral or genital ulcer, red or painful eye and seeing halos. No skin rashes and swollen or painful joint joints.

There was no past history or family history of similar condition.

O/E: Temp: 37.8<sup>0</sup>C, BP: 125/85 mmHg, RR: 19 cpm. Pulse: 90

Patient was confused and slightly slow in mentation. Had left 3rd and 4th cranial nerve palsies with left hemiparesis and bilateral hyper-reflexia. Also had mild dysmetria and ataxia over the right side, though was mobile without support. Other systems including skin and musculoskeletal systems were unremarkable, had no orogenital ulcers, no evidence of lymphadenopathy

X-Ray Chest; unremarkable

CT brain was unremarkable.

MRI showed multiple signal change low T1 bright T2 and flair sequences at right basal ganglia, right parietal lobe, left occipital lobe and midbrain (Figure 1 and 2).

CSF-Analysis; Lumber Puncture was done opening pressure was normal, WBC 200 cell/mm<sup>3</sup>, 85% lymphocyte, 15% polymorph, protein 1.06 gm/L, sugar 2.3 mmol/L. Gram stain and AFB stains were negative, culture revealed no growth. PCR and C/S for mycobacterium was not available at the local hospital so it was send out to the central laboratory but unfortunately no result could be obtained latter on.

CBC and routine Chemistry were unremarkable. ESR and C-reactive protein were normal and ANA was negative.

Possibilities of CNS Tuberculosis, Acute Demylenating Encephalomyelitis (ADEM), Vasculitis (Behcet's disease) and Sarcoidosis were thought off and patient was started on steroids (dexamethasone 4 mg TID then decrease to 2 mg BID at discharge for 1 month then start tapering), and Anti-Tubercular drug(ATT).

Follow up; Patient improved clinically over period 2 weeks, MRI was repeated after one

month, which showed regression in the size and number of lesions (Figure 3 and 4).

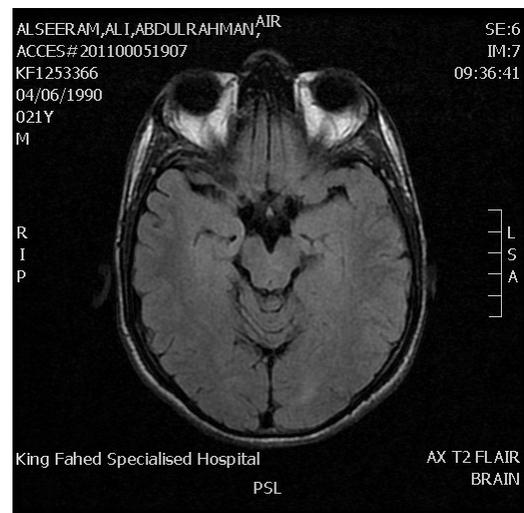


Fig 3: T2 flair (improve midbrain lesion)

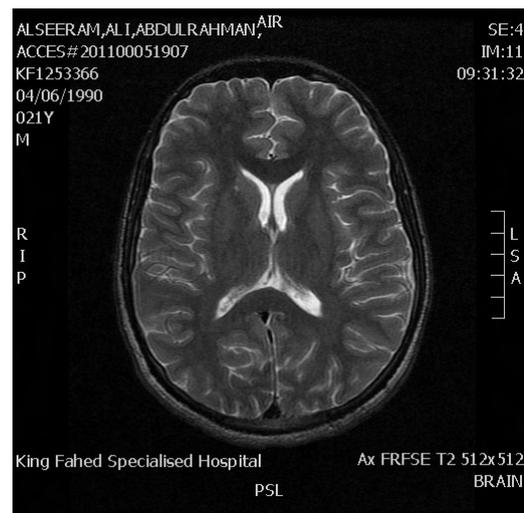


Fig 4: T2 (right basal ganglia lesion improve)

Unfortunately, patient was not compliant to medication and after 10 months had a relapse of his condition. This time patient also reported oral ulcers but no genital ulcer, no visual symptoms or skin manifestations.

Patient was confused, dysarthric, had right side complete and left partial ptosis, pupil 3mm bilateral reactive to light. Fundus examination was normal also had right 6th nerve palsy. Had left hemiparesis (4/5 weakness). Sensations were normal, Gait

was ataxic. No evidence of uveitis or retinitis. Chest, CVS and abdominal examination was unremarkable

**INVESTIGATION**

CBC, Chemistry was unremarkable. ESR: 15mm 1st hour, ANA was Negative and complements C3 and C4 were normal. Serology for HSV 1 & II, Brucellosis, VDRL and HIV was negative. PPD test and skin Pethargy tests were normal.

X-Ray Chest; unremarkable

MRI Brain and cervical Spine:

Multiple T1 hypointense, T2 and flair hyperintense lesion were seen involving brainstem, thalamus, Cerebellar peduncle and left occipital lobe and basal ganglia. Some of the lesions were partially enhanced with GAD contrast. Cervical spine was unremarkable (Figure 5 and 6).

Cerebrospinal fluid (CSF):

Opening pressure was Normal. WBC 60 cells/cmm, 40% were polymorphs and 56% lymphocyte. Proteins; was 1 gm/ L.

Gram & AFB stains and culture were negative. HLA-B52, Mycobacterium culture and PCR were sent to central lab and result came negative.

In Differential Diagnosis this time suspicion of Neuro Behcet’s disease was very high so again started on high dose of steroids (methylprednisolone 1g for 5 days followed by prednisolone 50 mg and steroid sparing drug Azathioprine 50 mg for 1 week then increase to 100 mg daily.

Hospital Course and Follow up:

Patient again showed clinical recovery in about 2 weeks. He was discharged on oral prednisilone 50 mg daily then tapering dose with calcium, vitamin D supplementation and Azathioprine 100 mg daily.

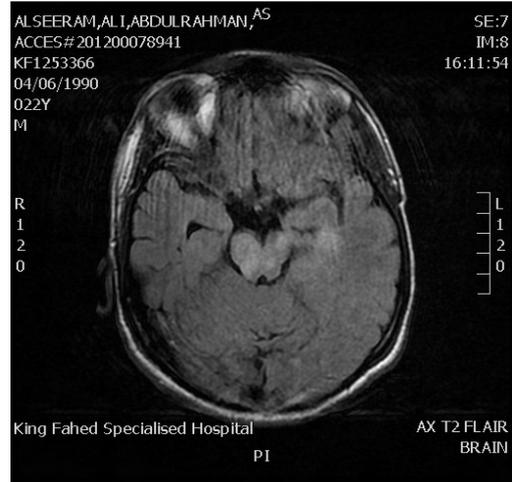


Fig 5: T2 flair ( midbrain hyperintense lesion)

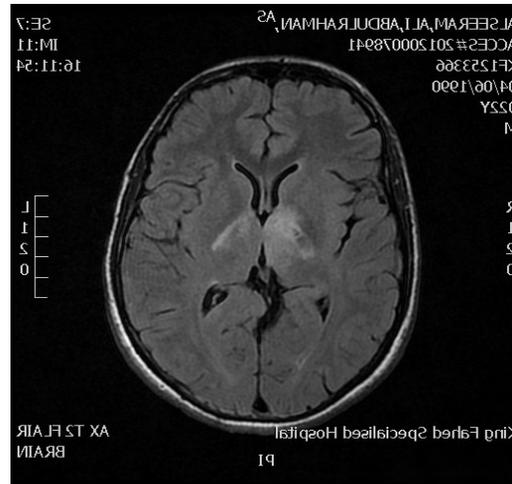


Fig 6: T2 flair (basal ganglia hyperintense lesion)

**DISCUSSION**

Our patient had a diagnostic challenge at 1<sup>st</sup> presentation, as he presented with brainstem, basal ganglia deficit and alteration of sensorium, fever and headache of subacute to chronic course. It was suggestive of subacute multifocal disseminated and diffuse involvement of CNS with progressive course. Initially diagnosis of Encephalitis, including ADEM (Acute disseminating encephalomyelitis), were thought of. Suspicion of CNS-

Tuberculosis could not be ruled out, because of the clinical subacute presentation with headache, fever. Neuroimaging, CSF findings were suggestive and PCR and culture for Mycobacterium were not available at our hospital. However patient was started on High dose IV methyl prednisolone for 5days with anti-tubercular (ATT) and anti-viral coverage, followed by oral steroids (dexamethasone) tapering dose.

Possibility of Vasculitis including neurobehcet's disease was remote at this stage, as there were no other symptoms and signs suggestive or fulfilling diagnostic criteria. Anyhow, our patient was lucky enough to be started on steroids without delay, though for treatment of ADEM and as adjunct with ATT. He was saved from devastating consequences of Neuro Behcet's disease and made a good clinical recovery.

The relapse of his condition due to non compliance to medications, the history of oral ulcer and pattern of lesions on MRI raised our index of suspicion further towards Vasculitis particularly Neuro Behcet's disease. Furthermore, the anti-tubercular workup and serology for connective tissue disease and infections was negative.

### CONCLUSION

Neuro-Behcet can be devastating if left untreated, so it is very important to have high index of suspicion and this rare possibility should be considered in the differential diagnosis of such cases.

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Venue: ARAMAS HOTEL MADINAH  
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10th to 12th February 2014

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01-04 September 2013

**Emergency Medicine & Hyperbaric Medicine Conference & Workshop**

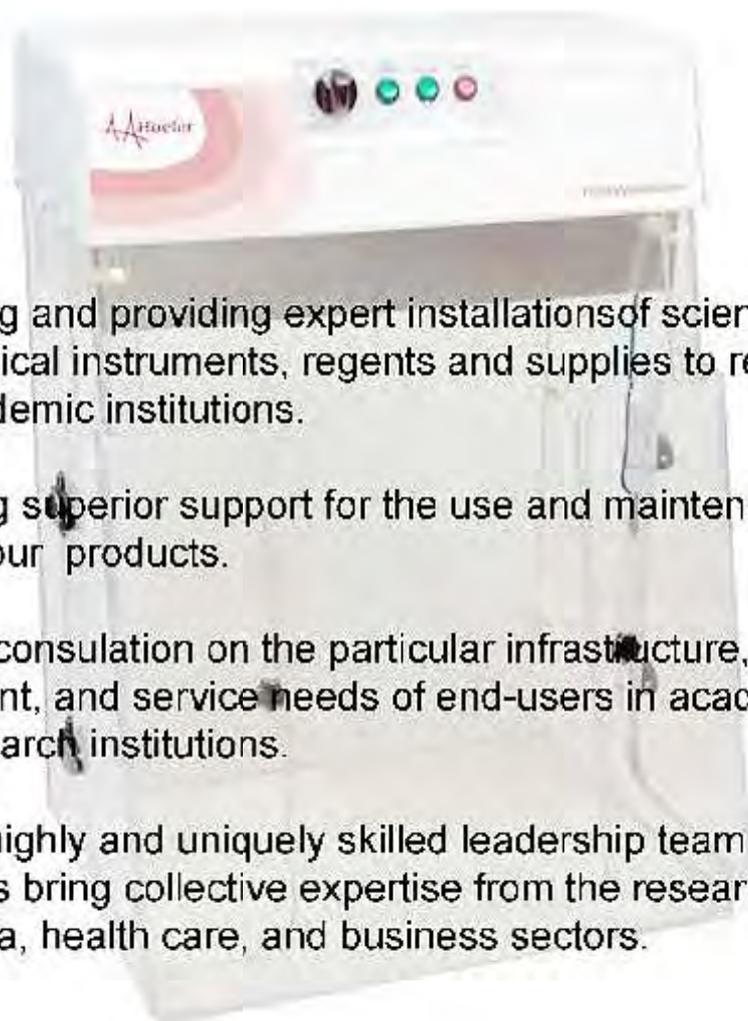
Venue: Le Meridien Hotel, Jeddah,  
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