



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكرو فيلم

بسم الله الرحمن الرحيم



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شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



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جامعة عين شمس التوثيق الإلكتروني والميكروفيلم

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علي هذه الأقراص المدمجة قد أعدت دون أية تغييرات



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تحفظ هذه الأقراص المدمجة بعيدا عن الغبار



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Cognitive screening for illiterate elderly using telemedicine

Thesis

*Submitted in Partial Fulfillment of the M.Sc. Degree in
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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالَ

سَبَّحَانَكَ يَا مُعَلِّمَ لَنَا
إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ
الْعَلِيمُ الْعَظِيمُ

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List of Contents

Title	Page No.
List of Tables	i
List of Figures.....	ii
List of Abbreviations	iii
Introduction	1
Aim of the Work.....	5
Review of Literature	6
Patients and Methods.....	43
Results	52
Discussion	70
Summary	80
Conclusion	83
Recommendation	84
References	85
Appendix.....	111
Arabic Summary	—

List of Tables

Table No.	Title	Page No.
Table (1):	Personal history of the studied cases	52
Table (2):	Comprehensive geriatric assessment of the studied cases	53
Table (3):	Comorbidities among the studied cases.....	54
Table (4):	MMSE scale among the studied cases.....	55
Table (5):	MoCA-B scale among the studied cases.....	56
Table (6):	MoCA-B scale scores gap between tele and clinic (reference) among the studied cases	57
Table (7):	Cronbach's alpha measure of agreement between tele and clinic (reference) among the studied cases	58
Table (8):	Agreement between MoCA-B scale grades between tele and clinic (reference) among the studied cases	59
Table (9):	Diagnostic performance of tele MoCA-B score in diagnosing dementia (clinic dementia was reference).....	61
Table (10):	Diagnostic characteristics of tele MoCA-B cutoff scores (≤ 16) in diagnosing dementia (clinic dementia was reference).....	63
Table (11):	Agreement between clinic MoCA-B and MMSE scale grades among the studied cases	65
Table (12):	Personal history according to MoCA-B score deviation.....	66
Table (13):	Comprehensive geriatric assessment according to MoCA-B score deviation.....	67
Table (14):	Comorbidities according to MoCA-B score deviation.....	69

List of Figures

Fig. No.	Title	Page No.
Figure (1):	MNSE grades among the studied cases	55
Figure (2):	MoCA-B scale among the studied cases	56
Figure (3):	MoCA-B scale scores gap between tele and clinic (reference) among the studied cases	57
Figure (4):	Cronbach's alpha measure of agreement between tele and clinic (reference) MoCA-B scale scores among the studied cases	58
Figure (5):	Agreement between tele and clinic (reference) MoCA-B scale grades among the studied cases	60
Figure (6):	Kappa measure for overall agreement between tele and clinic (reference) MoCA-B scale grades among the studied cases	60
Figure (7):	AUC for tele MoCA-B score in diagnosing dementia (clinic dementia was reference).....	61
Figure (8):	ROC curve for tele MoCA-B score in diagnosing dementia (clinic dementia was reference).....	62
Figure (9):	Diagnostic characteristics of tele MoCA-B cutoff scores (≤ 16) in diagnosing dementia (clinic dementia was reference).....	64
Figure (10):	Agreement between clinic MoCA-B and MMSE scale grades among the studied cases	65
Figure (11):	Depression according to MoCA-B score deviation	68

List of Abbreviations

Abb.	Full term
<i>AACD</i>	<i>Aging associated cognitive decline</i>
<i>AAMI</i>	<i>Age associated memory impairment</i>
<i>AAN</i>	<i>American Academy of Neurology</i>
<i>ACE</i>	<i>Addenbrooke's Cognitive Examination</i>
<i>ACE-R</i>	<i>ACE-Revised</i>
<i>AD</i>	<i>Alzheimer's disease</i>
<i>ADL</i>	<i>Activities of daily living</i>
<i>AMCI</i>	<i>Amnestic MCI</i>
<i>APP</i>	<i>Amyloid precursor protein</i>
<i>AVH</i>	<i>Ain Shams university virsual hospital</i>
<i>BSF</i>	<i>Benign senescent forgetfulness</i>
<i>C2C</i>	<i>Center-to-center</i>
<i>C2H</i>	<i>Center-to-home models</i>
<i>CANS-MCI</i>	<i>Computer-Administered Neuropsychological Screen for Mild Cognitive Impairment</i>
<i>CDC</i>	<i>Centers for Disease Control and Prevention</i>
<i>CGA</i>	<i>Comprehensive geriatric assessment</i>
<i>CIND</i>	<i>Cognitive impairment no dementia</i>
<i>COVID-19</i>	<i>Coronavirus disease 2019</i>
<i>CVLT-II</i>	<i>California Verbal Learning Test-II</i>
<i>CVLT-LDTR</i>	<i>California Verbal Learning Test Long Delayed Total Recall</i>
<i>DRS-2</i>	<i>Dementia Rating Scale-2</i>
<i>ECGs</i>	<i>Electrocardiograms</i>
<i>F-TICS-m</i>	<i>French version of TICSm</i>
<i>HVLT-R</i>	<i>Hopkins Verbal Learning Test-Revised</i>
<i>IADL</i>	<i>Instrumental activity of daily living</i>
<i>ICC</i>	<i>Intraclass correlation coefficient</i>

List of Abbreviations *(cont...)*

Abb.	Full term
<i>IQCODE</i>	<i>Informant questionnaire on cognitive decline in the elderly individuals</i>
<i>MCI</i>	<i>Mild cognitive impairment</i>
<i>MES</i>	<i>Memory and executive screening</i>
<i>MMSE</i>	<i>Mini-Mental State Examination score</i>
<i>MoCA</i>	<i>Montreal Cognitive Assessment</i>
<i>MoCA-B</i>	<i>Montreal cognitive assessment basic</i>
<i>MRI</i>	<i>magnetic resonance imaging</i>
<i>MSF</i>	<i>Malignant senescent forgetfulness</i>
<i>NAMCI</i>	<i>non-amnestic type</i>
<i>NCDs</i>	<i>neurocognitive disorders</i>
<i>PET</i>	<i>Amyloid-positron emission tomography</i>
<i>PSEN I</i>	<i>presenilin I gene</i>
<i>PSEN II</i>	<i>presenilin II gene</i>
<i>SD</i>	<i>standard deviation</i>
<i>TAM</i>	<i>technology acceptance model</i>
<i>TICS</i>	<i>Telephone Interview of Cognitive Status</i>
<i>T-MoCA</i>	<i>Telephone Montreal Cognitive Assessment</i>
<i>WMS-R</i>	<i>Weschler Memory Scale-Revised</i>

INTRODUCTION

Ageing of the brain and its association to age-related neurodegenerative comorbidities must be explained as an important portion of global aging with certain age related illness as mild cognitive impairment or Alzheimer's disease. This will not cause a burden on patients or their caregivers only, but to the economy as well secondary to aging society. Therefore, reversible conditions associated with memory affection must be corrected to prevent irreversible cognitive impairment and decrease such an economic burden (*Qiu et al., 2019*).

Ageing is a chief risk factor for developing multiple diseases in elderly especially neurodegenerative diseases as dementia, multiple sclerosis and Parkinson's disease. This occurs due to what is called cellular senescence which is a natural process that has an important role in accelerated ageing. This increases comorbidities and mortalities in such age group leading to increasing health care demands and cost. It was found that accumulation of senescent cells in nervous system not only caused neurodegenerative diseases, but also worsens the condition in healthy elderly with cognitive deficits (*Kritsilis et al., 2018*).

Dementia is a condition occurring due to disease of the brain which is mostly chronic with a progressive course. It involves the impairment of numerous higher cortical functions, which include memory, thinking, attention, calculation, learning, language and judgment. These impairments often

occur together with deviation in emotional control, social performance and motivation. It occurs mostly due to structural and or chemical changes in brain cells resulting in neuronal injury and brain atrophy. It was a global health problem with high costs and economic burden in caregivers and the country estimated to be about 26 billion pounds annually in United Kingdom in 2014, therefore, the early prediction in early stages and screening of mild cognitive impairment (MCI) is a must (*Dening and Sandilyan, 2015*).

In the past, mild cognitive impairment (MCI) was called subclinical dementia and it wasn't considered a disease. Subclinical dementia was defined as a transitional state between the cognitive changes of aging and the earliest clinical features of dementia in which a person has problems with memory, language, or another essential cognitive function that are severe enough to be noticeable to others and show up on tests, but not severe enough to interfere with daily life activities (*Willers et al., 2008*).

The term subclinical dementia had several terms e.g. cognitive impairment/no dementia (CIND) or isolated memory impairment (*Petersen et al., 1999*). Subclinical dementia was found to be much more common than dementia, especially in the younger age groups (up to 7 times more common among those aged 65 and 74 years) (*Hendrie et al., 2001*).

MCI is associated with significant morbidity and mortality. Patients with MCI develop dementia especially Alzheimer's disease (AD) by rates about 5-10% annually, but most of them will not progress to dementia that is called non progressive MCI (*Mitchell and Shiri-Feshki, 2009*).

MCI can be diagnosed using mental status evaluation in addition to other neurological, psychiatric, medical examination, neuroimaging and biological biomarkers (*Albert et al., 2011*). These biomarkers can also predict its liability for progression to dementia as cerebrospinal fluid (CSF) phosphorylated tau (p-tau) and amyloid ($A\beta_{1-42}$) (*Mitchell, 2009; Richard et al., 2013; Li et al., 2016*).

In the face of limited specialized healthcare services for the elderly especially in Egypt and the deficiency of geriatricians, telemedicine offers means to bridge this gap. Telemedicine is the use of telecommunication and information technology to provide clinical health care from a distance. It has been used to overcome distance barriers and to improve access to medical services that would not be available in distant rural communities especially in developing countries (*Wootton, 2001*).

Telemedicine had been already used in the US using minimal state examination (MMSE) to assess the cognition and proved to have equal results to face to face clinical visits, so it will be helpful for far areas with poor medical resources, saves costs of transportation and decreases the burden on patients and their caregivers (*Ciemins et al., 2009; Harrell et al., 2014*).

There was noticeable shift from ordinary care to telemedicine at the peak of the pandemic of COVID-19 all over the world especially in United States and China (*Mann et al., 2020; Hong et al., 2020*).