

**DYSPHAGIA RELATED QUALITY OF LIFE
AND ITS ASSOCIATION WITH COGNITIVE
FUNCTION AND SOCIODEMOGRAPHIC
FACTORS AMONG OLDER STROKE
PATIENTS IN AMMAN, JORDAN**

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by

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TABLE OF CONTENTS

ACKNOWLEDGEMENT	ii
TABLE OF CONTENTS	iii
LIST OF TABLES	vii
LIST OF FIGURES	viii
LIST OF SYMBOLS	ix
LIST OF ABBREVIATIONS	x
LIST OF APPENDICES	xi
ABSTRAK	xii
ABSTRACT	xiv
CHAPTER 1 INTRODUCTION	1
1.1 Background of the study.....	1
1.2 Problem statement/Originality of research.....	2
1.3 Research questions.....	3
1.4 Research hypotheses.....	4
1.5 Research aims and objectives.....	5
1.5.1 General Objective.....	5
1.5.2 Specific Objectives.....	5
CHAPTER 2 LITERATURE REVIEW	6
2.1 Introduction.....	6
2.2 Impact of stroke on QOL.....	6
2.3 Cognitive impairment and QOL.....	7
2.3.1 Cognitive function assessment tools.....	7
2.3.2 Cognitive function following a stroke.....	8
2.3.3 The correlation between cognitive function and QOL.....	10
2.4 The correlation between anxiety, depression and stress, and cognitive function and QOL.....	11

2.5	Impact of dysphagia on QOL	11
2.5.1	QOL measurement tools in patients with dysphagia	11
2.5.2	Physical implications of dysphagia	13
2.5.3	Emotional implications of dysphagia	14
2.5.4	Coping and adaptation with dysphagia after stroke	15
2.5.5	Comparison of the effect of dysphagia on the QOL aspects among stroke patients with and without dysphagia.....	15
2.5.6	Effects of demographic characteristics on the effect of dysphagia on the QOL aspects in stroke patients.....	16
2.5.7	The correlation between dysphagia severity and the effect of dysphagia on the QOL aspects in stroke patients.....	16
2.5.8	Feeding type and the effect of dysphagia on the QOL aspects in stroke patients.....	17
2.5.9	Impact of dysphagia therapy on the effect of dysphagia on the QOL aspects in stroke patients.....	17
2.6	The correlation between cognitive function and dysphagia	18
2.7	Summary of literature review	19
2.8	Conceptual framework	20
2.9	Theoretical Framework	21
CHAPTER 3 MATERIALS AND METHODS		23
3.1	Introduction.....	23
3.2	Study design.....	23
3.3	Study population	24
3.4	Subject criteria	24
3.4.1	Inclusion criteria.....	24
3.4.2	Exclusion criteria.....	25
3.5	Sampling method	25
3.6	Sample size determination.....	25
3.7	Study variables.....	25

3.7.1	Independent variables	25
3.7.2	Dependent variables.....	26
3.8	Operational definition	26
3.9	Research tools and research procedure	27
3.9.1	Research tools	27
3.9.1(a)	Arabic version of the Depression Anxiety Stress Scales-21(DASS-21)	27
3.9.1(b)	Arabic version of the Montreal Cognitive Assessment (MoCA)	28
3.9.1(c)	Arabic version of the dysphagia handicap index (DHI)	28
3.10	3Statistical analysis	30
3.10.1	Descriptive statistics	30
3.10.2	Inferential statistics.....	30
3.11	Ethical considerations	30
3.12	Research procedure	31
CHAPTER 4 RESULTS		33
4.1	Introduction.....	33
4.2	Participants' characteristics	33
4.3	The handicapping effect of dysphagia on emotional, functional and physical aspects.....	33
4.4	Cognitive function in stroke patients with dysphagia	34
4.5	Effects of demographic variables on the handicapping effect of dysphagia.....	35
4.6	The correlation between cognitive function and the handicapping effect of dysphagia.....	37
CHAPTER 5 DISCUSSION		39
5.1	Introduction.....	39
5.2	Dysphagia following a stroke	39
5.3	Handicapping effect of dysphagia in stroke patients	41

5.4	Effects of demographic variables on the handicapping effect of dysphagia in stroke patients.....	42
5.5	Cognitive function following a stroke.....	45
5.6	The correlation between cognitive function and the handicapping effect of dysphagia.....	46
CHAPTER 6 CONCLUSION		50
6.1	Introduction.....	50
6.2	Summary of the study	50
6.3	Limitations of the study.....	50
6.4	Clinical implications of the study	51
6.5	Recommendation for future research	51
REFERENCES		53
APPENDICES		
LIST OF PUBLICATIONS		

LIST OF TABLES

	Page
Table 4.1	Demographic and clinical characteristics of participants 34
Table 4.2	DHI total and subscales scores 34
Table 4.3	Outcomes of MoCA and its subdomains 35
Table 4.4	Effects of demographic variables on the handicapping effect of dysphagia 36
Table 4.5	Correlation between cognitive function and the handicapping effect of dysphagia 38

LIST OF FIGURES

	Page
Figure 2.1 Conceptual framework	20
Figure 3.1 Flowchart of the study	32
Figure 4.1 Level of cognitive function.....	35

LIST OF SYMBOLS

ALS	Amyotrophic lateral sclerosis
CP	Cerebral palsy
DASS-21	Depression Anxiety Stress Scales-21
DHI	Dysphagia Handicap Index
H _A	Alternative hypothesis
H ₀	Null hypothesis
JOD	Jordanian dinar
MCI	Mild cognitive impairment
MoCA	Montreal Cognitive Assessment
MS	Multiple sclerosis
OMD	Oculopharyngeal muscular dystrophy
PD	Parkinson's disease
QOL	Quality of life
SD	Standard deviation
SWAL-QOL	The swallowing quality of life questionnaire

LIST OF ABBREVIATIONS

%	Percentage
<	Less than
\geq	More than or equal
a	Pearson correlation coefficient
b	P-value
r	Pearson correlation coefficient

LIST OF APPENDICES

Appendix A	Arabic Dass-21
Appendix B	Arabic MoCA
Appendix C	Arabic DHI

**KUALITI HIDUP BERKAITAN DISFAGIA DAN HUBUNGANNYA DENGAN
FUNGSI KOGNITIF SERTA FAKTOR SOSIODEMOGRAFIK DALAM
KALANGAN PESAKIT STROK WARGA EMAS DI AMMAN, JORDAN**

ABSTRAK

Disfagia merupakan kecelaruan yang merencatkan pergerakan makanan dan cecair dari mulut ke perut. Ia berlaku kepada 50% hingga 80% pesakit strok. Disfagia dan komplikasinya memberi kesan negatif terhadap aspek emosi, fungsi, dan fizikal pesakit strok. Selain itu, gangguan kognitif juga adalah antara kecelaruan yang paling biasa berlaku selepas strok, ia menjejaskan 20% hingga 80% pesakit yang selamat dari strok. Kajian terdahulu menunjukkan bahawa keparahan disfagia meningkat dengan keparahan gangguan kognitif. Walau bagaimanapun, hubungan antara fungsi kognitif dan kesan kecacatan disfagia terhadap aspek emosi, fungsi, dan fizikal pesakit strok masih tidak diketahui. Oleh itu, kajian ini bertujuan untuk menyelidiki hubungan antara fungsi kognitif dan kesan kecacatan disfagia terhadap aspek emosi, fungsi, dan fizikal pesakit strok. Sejumlah 31 pesakit strok dengan disfagia telah mengambil bahagian dalam kajian keratan rentas ini. Versi Bahasa Arab Montreal Cognitive Assessment (MoCA) digunakan untuk menilai fungsi kognitif pesakit. Selain itu, versi Bahasa Arab 'Indeks Kecacatan Disfagia' (DHI) digunakan untuk menilai kesan emosi, fungsi, dan fizikal disfagia pada pesakit strok. Kebanyakan pesakit (61.3%) adalah lelaki, dan majoriti (67.7%) berusia antara 60-70 tahun. Dapatan menunjukkan bahawa 35.5% daripada pesakit mengalami kecacatan fungsi kognitif, dan min \pm SD skor keseluruhan DHI adalah 53.5 ± 9.6 . Selain itu, hasil kajian menunjukkan perbezaan yang signifikan secara statistik dalam min skala fizikal ($p=0.003$), min skala emosi ($p=0.020$), dan min keseluruhan DHI ($p=0.005$) antara kumpulan dengan

permulaan disfagia yang berbeza, menunjukkan kesan kecacatan disfagia terhadap aspek fizikal dan emosi, serta kualiti hidup secara keseluruhan berkurangan seiring dengan masa selepas strok. Tambahan pula, dapatan menunjukkan hubungan negatif yang lemah antara fungsi kognitif (skor keseluruhan MoCA) dan kesan kecacatan disfagia pada skala fizikal ($r = -0.418$, $p = 0.019$) dan min keseluruhan DHI ($r = -0.368$, $p = 0.042$). Dapatan kami menunjukkan bahawa disfagia memberi kesan negatif terhadap aspek kualiti hidup, dan fungsi kognitif mungkin memainkan peranan dalam keparahan kesan kecacatan disfagia terhadap aspek kualiti hidup. Oleh itu, pemerhatian terhadap aspek kualiti hidup yang terjejas akibat disfagia yang menjejaskan fungsi kognitif yang berkaitan akan sangat membantu dalam pengurusan dan rehabilitasi disfagia.

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ABSTRACT

Dysphagia is a disorder that compromises the movement of food and liquids from the mouth to the stomach. It is a frequent disorder in stroke patients, affecting 50% to 80% of them. Dysphagia and its complications negatively impact the emotional, functional, and physical aspects of stroke patients. Moreover, cognitive impairment is one of the most common disabilities after a stroke, affecting 20% to 80% of stroke survivors. Previous studies have shown that the severity of dysphagia increases with the severity of cognitive dysfunction. However, the correlation between cognitive function and the handicapping effect of dysphagia on emotional, functional, and physical aspects of quality of life (QOL) in stroke patients is still unknown. Thus, this study aimed to investigate the correlation between cognitive function and the handicapping effect of dysphagia on emotional, functional, and physical aspects of QOL in stroke patients. A total of 31 stroke patients with dysphagia participated in this cross-sectional study. The Arabic version of the Montreal Cognitive Assessment (MoCA) was used to assess patients' cognitive function. Furthermore, the Arabic version of the Dysphagia Handicap Index (DHI) was used to assess the emotional, functional, and physical effects of dysphagia in stroke patients. Most of the patients (61.3%) were male, and the majority (67.7%) were between 60-70 years old. The findings showed that 35.5% of the patients had impaired cognitive function, and the mean \pm SD of the DHI total score was 53.5 ± 9.6 . Moreover, the results indicated that there was a statistically significant difference in the means of the physical subscale

($p=0.003$), emotional subscale ($p=0.020$), and the DHI total score ($p=0.005$) between groups with different onsets of dysphagia, indicating that the handicapping effect of dysphagia on the physical and emotional aspects, and overall QOL decreases with time following a stroke. Additionally, the findings showed a weak negative correlation between cognitive function (MoCA total score) and the handicapping effect of dysphagia on the physical subscale ($r = -0.418$, $p = 0.019$) and the DHI total score ($r = -0.368$, $p = 0.042$). Our findings suggest that dysphagia negatively affects QOL aspects, and cognitive function may have a role in the severity of the handicapping effect of dysphagia on the QOL aspects. Thus, looking into the affected QOL aspects secondary to the debilitating dysphagia and the associated cognitive function will be very helpful for dysphagia management and rehabilitation.

CHAPTER 1

INTRODUCTION

1.1 Background of the study

Stroke is one of the most debilitating neurological disorders affecting the elderly population and is now a public health problem (Pontes et al., 2017). This neurological disorder causes many disabilities in affected patients, including cognitive impairment and dysphagia, a disorder that compromises the movement of food and liquids from the mouth to the stomach (Onofri et al., 2014 & McCarty et al., 2021).

Dysphagia is a disorder characterized by difficulty in executing a swallow, resulting in further deterioration of patients' health. Dysphagia affects 50% to 80% of stroke patients (Finizia et al., 2012). Dysphagia patients could recover in a matter of weeks after a stroke, or it could be a prolonged illness. Prolonged dysphagia can affect the quality of life (QOL) and psychological health (Lam & Lai, 2012). Also, it can lead to severe complications such as pneumonia, dehydration, nutritional deficiencies, and even death (Cha et al., 2010).

Dysphagia after a stroke has psychosocial repercussions, since swallowing is an essential step in the feeding process, and eating is both a social and enjoyable activity. It is a psychological activity as well as a necessary daily action for good health done in a group or solo (Helldén et al., 2018). However, many dysphagia patients avoid sharing meals and drinks with other people because they need to develop new eating habits and are anxious or afraid of choking or coughing when eating with others (Rofes et al., 2011). Additionally, dysphagia patients may need new eating techniques for safe and effective swallowing, and these feeding adjustments cause these patients to

become depressed and socially isolated, all contributing to patient unhappiness (Ney et al., 2009).

Numerous investigations have revealed a relationship between dysphagia and other neurological problems connected to stroke, such as neglect and cognitive impairment (Smithard, 2016). Following a stroke, between 20% and 80% of stroke survivors develop cognitive impairment (Sun et al., 2014). Cognitive impairment following a stroke negatively impacts the QOL of patients and their families and caregivers (Thingstad et al., 2018).

The Montreal Cognitive Assessment (MoCA) is a test to detect cognitive decline following a stroke. It is scored out of 30 and takes about 10 minutes to conduct. It has sections on language, naming, attention, visuospatial/executive function, abstraction, and orientation to time and place, as well as delayed recall (Nasreddine et al., 2005).

As for dysphagia, the Dysphagia Handicap Index (DHI) is one of the most popular tools for examining the handicapping effect of dysphagia on the emotional, functional, and physical areas of stroke patients' lives. It is a 25-item questionnaire arranged into three sections: the emotional (7 items), the physical (9 items), and the functional (9 items) (Silbergleit et al., 2012).

1.2 Problem statement/Originality of research

Dysphagia is a common disorder following a stroke, affecting up to 50%–80% of cases. It can significantly impact various aspects of a patient's QOL, including physical, functional, and emotional well-being. Therefore, it is essential to assess how patients perceive the impact of swallowing difficulties on these areas. Understanding

their perspective can guide clinicians in tailoring treatment to address the specific challenges faced by dysphagia patients, ultimately leading to more effective rehabilitation.

Previous studies have shown that the severity of dysphagia tends to increase with higher levels of cognitive dysfunction following a stroke. However, these studies have not explored the correlation between cognitive impairment and how dysphagia affects emotional, functional, and physical aspects of QOL. Investigating this relationship is crucial for gaining a deeper understanding of how cognitive function relates to the handicapping effects of dysphagia in the lives of stroke patients.

Furthermore, the findings from this study can inform the development of public policies and healthcare strategies aimed at improving the efficiency of dysphagia treatment and enhancing the overall QOL for stroke survivors dealing with dysphagia.

1.3 Research questions

- i) What effect does dysphagia have on the emotional, functional, and physical aspects in stroke patients?
- ii) What are the differences in the emotional, functional, and physical effects of dysphagia among stroke patients between demographic variables?
- iii) What is the level of cognitive function in stroke patients with dysphagia?
- iv) What is the correlation between cognitive function and the handicapping effect of dysphagia on emotional, functional, and physical aspects in stroke patients?

1.4 Research hypotheses

Second research question:

Null Hypothesis

H0: There are no statistically significant differences in the handicapping effect of dysphagia on emotional, functional, and physical aspects in stroke patients between demographic variables.

Alternative Hypothesis

H1: There are statistically significant differences in the handicapping effect of dysphagia on emotional, functional, and physical aspects in stroke patients between demographic variables.

Fourth research question:

Null Hypothesis

H0: There is no statistically significant correlation between cognitive function and the handicapping effect of dysphagia on emotional, functional, and physical aspects in stroke patients.

Alternative Hypothesis

H1: There is a statistically significant correlation between cognitive function and the handicapping effect of dysphagia on emotional, functional, and physical aspects in stroke patients.

1.5 Research aims and objectives

1.5.1 General Objective

The aim of this study was to investigate the effect of dysphagia on QOL and its correlation with cognitive function and sociodemographic factors among older stroke patients in Amman, Jordan.

1.5.2 Specific Objectives

- i) To assess the impact of dysphagia on the emotional, functional, and physical aspects in stroke patients with dysphagia.
- ii) To investigate potential variations in the impact of dysphagia on emotional, functional, and physical aspects based on demographic variables.
- iii) To evaluate the cognitive function levels in stroke patients with dysphagia.
- iv) To examine the potential correlation between cognitive function and the impact of dysphagia on emotional, functional, and physical aspects in stroke patients with dysphagia.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter presents a comprehensive narrative synthesis of previously published information, with a focus on the following key areas: the influence of stroke on QOL, cognitive function in the aftermath of a stroke, assessment tools for cognitive function, the repercussions of cognitive impairment on QOL, the association between anxiety, depression, stress, cognitive function, and QOL, QOL measurement instruments for dysphagia patients, the impact of dysphagia on QOL, the correlation between cognitive function and dysphagia, a summary of the literature review, the conceptual framework, and the theoretical framework. A thorough search was conducted from the inception of relevant literature up to December 2022, encompassing databases such as PubMed, ProQuest, MEDLINE, PsycInfo, Web of Science, and Google Scholar. Additionally, forward citations and ancestry searches of the included papers were executed.

2.2 Impact of stroke on QOL

Globally, numerous studies have explored the impact of stroke on Quality of Life (QOL). Jaracz and Kozubski (2003) conducted a study to compare the QOL of stroke patients with that of control subjects, revealing that stroke patients generally experienced a lower QOL compared to normal individuals. Similarly, Dayapoglu and Tan (2010) investigated the correlation between QOL and socio-demographic and medical factors in stroke patients. Their results indicated a lower mean QOL score among stroke patients and identified a positive correlation between patients' income

and specific QOL domains such as functional capacity, well-being, and general health perception.

Kim et al. (2014) conducted a study highlighting the significant influences on overall QOL scores in stroke patients, emphasizing factors like mobility (transfers) and social cognition. Mjm et al. (2018) delved into the correlation between QOL and the severity of ischemic stroke, revealing a negative correlation between QOL and the severity of ischemic stroke, indicating that QOL tends to decrease with increasing stroke severity. In a study by Szócs et al. (2020), it was found that the length of hospital stay had an impact on the QOL of stroke patients, suggesting that minimizing hospital stays following a stroke may lead to better long-term outcomes.

Cruz (2020) evaluated the impact of rehabilitation on QOL in stroke patients and observed significant improvements in the SF-36 quality of life scale scores following rehabilitation ($p < 0.01$). This underscores the potential benefits of early interventions for stroke patients in reducing post-stroke disabilities and enhancing QOL.

2.3 Cognitive impairment and QOL

2.3.1 Cognitive function assessment tools

When assessing cognitive impairment in stroke patients, several tools have been developed for this purpose. One such tool is the Oxford Cognitive Screen, specifically designed for stroke patients. It offers a quick cognitive evaluation, taking only 15-20 minutes to complete, and includes features that are friendly for individuals with aphasia and neglect. It assesses cognitive domains such as memory, executive function, and language (Demeyere et al., 2015).

Another valuable assessment tool is the Montreal Cognitive Assessment (MoCA), which aids healthcare professionals in detecting mild cognitive impairment (MCI) and Alzheimer's disease. It can be administered in approximately 10 minutes (Nasreddine et al., 2005). The Cognitive Assessment Scale for Stroke Patients (CASP) was developed to evaluate cognitive performance post-stroke (Benaim et al., 2022). Additionally, the Saint Louis University Mental Status test serves as a cognitive screening tool for identifying MCI and dementia (Yoelin & Saunders, 2017).

In our study, we chose to utilize the MoCA to evaluate cognitive function in stroke patients with dysphagia. This decision was motivated by the high sensitivity shown by the MoCA in detecting MCI (Ciesielska et al., 2016) and its increased effectiveness in screening for cognitive dysfunction after stroke (Dong et al., 2010). Furthermore, its widespread adoption as a cognitive assessment tool in numerous research studies (Sharma et al., 2022) and its suitability for administration by speech-language pathologists (Lanzi et al., 2021) made it a suitable choice for our study.

2.3.2 Cognitive function following a stroke

The emergence of cognitive dysfunction following a stroke can vary depending on the stroke type, severity, and location (Kalaria et al., 2016). Multiple cognitive domains may be impacted, including executive function, visuospatial function, attention, abstraction, memory, and language (Al-Qazzaz et al., 2014).

Memory impairment is a common issue after a stroke, with both short-term and long-term memory significantly decreasing (Lugtmeijer et al., 2021). The prevalence of memory impairment within three months following a stroke varies from 23% to 55% (Wortman & Edwards, 2019).

Receptive and expressive language abilities can also decline sharply post-stroke, with aphasia affecting a range from 21% to 38% of stroke patients (Loetscher et al., 2019). Additionally, attention deficits are common, with a prevalence ranging from 46% to 92% (Loetscher et al., 2019). Stroke survivors may struggle with sustained attention, becoming easily distracted and unable to focus on tasks involving conflicting information (Schumacher et al., 2019).

Abstraction problems in cognitive dysfunction refer to difficulties in comprehending and working with abstract concepts, ideas, or thoughts. This condition can hinder a person's ability to think, reason, and solve problems that involve non-concrete or symbolic information, affecting their daily functioning and decision-making (Al-Qazzaz et al., 2014).

Visuospatial function involves the brain's ability to interpret visual information in relation to space. This includes tasks like recognizing objects, estimating distances, understanding spatial relationships, and navigating through space. Symptoms of visuospatial dysfunction may encompass visual field deficits, impaired depth perception, difficulty judging distances accurately, and spatial neglect (unawareness of one side of the body or environment) (Conti et al., 2015).

Executive dysfunction is another cognitive deficit post-stroke, with a prevalence ranging from 18.5% to 39%, depending on the assessment tools used (Rahman et al., 2009). Executive function encompasses skills such as planning, adapting to new situations, problem-solving, decision-making, and performing complex tasks.

2.3.3 The correlation between cognitive function and QOL

Numerous studies have explored the correlation between cognitive function and QOL in stroke patients. Kwa et al. (1996) demonstrated a significant correlation between cognitive dysfunction and poorer QOL. Nys et al. (2006) found a positive correlation between cognitive function and QOL, indicating that QOL decreases with declining cognitive function. Among cognitive disorders, impairments in construction and visual perception had the most significant impact on QOL (Nys et al., 2006). Cumming et al. (2014) showed that cognitive dysfunction three months after a stroke was associated with lower QOL twelve months later. Furthermore, visuospatial ability and attention were the cognitive aspects most closely linked to QOL (Cumming et al., 2014). Verhoeven et al. (2011) evaluated the correlation between cognitive function and QOL one year post-stroke, with the strongest correlations observed for functional independence and social participation.

Glanz et al. (2010) examined the correlation between cognitive performance and QOL in patients with multiple sclerosis (MS) and found a mild correlation, indicating that QOL decreases with increasing cognitive impairment. Kathleen et al. (2012) investigated the impact of cognitive impairment on QOL among nursing home residents. Their results revealed that individuals with more severe cognitive dysfunction had higher QOL in the domains of environment and comfort but lower QOL in areas such as individuality, privacy, activities, meaningful relationships, and mood. Singh et al. (2017) demonstrated that the elderly population with lower cognitive function experienced lower QOL. In a study by Sharma et al. (2018), a moderate positive correlation between cognitive decline and QOL in the elderly was observed. Additionally, Hussenoeder et al. (2020) found that individuals with mild cognitive impairment (MCI) exhibited lower QOL compared to normal subjects.

2.4 The correlation between anxiety, depression and stress, and cognitive function and QOL

Two primary tools have been developed to assess anxiety and depression levels in patients. The first tool is the Hospital Anxiety and Depression Scale (Garaiman et al., 2021), designed to evaluate anxiety and depression in a general medical patient population. The second tool is the Depression Anxiety Stress Scales-21 (DASS-21), which is employed to measure the levels of anxiety, depression, and stress in patients. The DASS-21 categorizes patients' levels of depression, anxiety, and stress into five groups (normal, mild, moderate, severe, and extremely severe). In the present study, it was used to identify and exclude patients with extremely severe levels of these conditions, and it has been translated and validated into Arabic (Ali et al., 2017).

Prior studies have indicated a negative correlation between the severity of depression, anxiety, and stress in patients and their Quality of Life (QOL), suggesting that as the severity of these conditions increases, patients' QOL decreases (Rubio et al., 2014). Lindert et al. (2021) conducted a study to investigate the impact of depression, anxiety, and stress on cognitive function. The results demonstrated that individuals with higher levels of depression, anxiety, and stress exhibited lower cognitive function. Depression was associated with impairments in episodic memory, while anxiety was correlated to impairments in executive functioning and episodic memory.

2.5 Impact of dysphagia on QOL

2.5.1 QOL measurement tools in patients with dysphagia

Several instruments have been developed to assess the QOL of individuals with dysphagia. One such tool is the M.D. Anderson Dysphagia Inventory, primarily used

to evaluate the QOL of patients with head and neck cancer (Chen et al., 2001). Another commonly employed instrument is the SWAL-QOL, a 44-item questionnaire with an additional section on symptom frequency. It assesses dysphagia across ten dimensions of QOL: communication, fear, burden, social role, eating desire, food selection, eating length, mental health, fatigue, and sleep (McHorney et al., 2002). However, it's worth noting that the lengthy and complex wording of this questionnaire can make it time-consuming for patients (McHorney et al., 2002).

The Eating Assessment Tool was developed specifically for patients with dysphagia but is more suitable as a screening tool when there is a suspicion of a swallowing disorder because it does not capture the full impact of dysphagia on emotional, physical, and functional components (Belafsky et al., 2008). The Swallowing Outcome After Laryngectomy instrument was designed to examine how dysphagia affects the QOL of patients who have undergone total laryngectomy (Govender et al., 2012). The Sidney Swallow Questionnaire is intended for use with patients with head and neck cancer (Dwivedi et al., 2010).

For patients with Multiple Sclerosis (MS), the Dysphagia in Multiple Sclerosis tool was developed (Bergamaschi et al., 2008). Silbergleit et al. (2012) created the Dysphagia Handicap Index (DHI), an assessment questionnaire used to evaluate the QOL of individuals with dysphagia. In this study, the DHI was employed to determine the impact of dysphagia on various aspects of QOL. The choice to use the DHI for assessing the effect of dysphagia on QOL in stroke patients was based on several important factors. Firstly, the DHI has been validated and translated into Arabic (Farahat et al., 2014), making it suitable for the study's target demographic. Additionally, the DHI has been previously used in research to assess how dysphagia affects the emotional, functional, and physical aspects of individuals' QOL (Bakhtiyari

et al., 2020), highlighting its reliability and relevance in studying the broader impact of dysphagia on QOL. These qualities make it a well-suited choice for this study.

2.5.2 Physical implications of dysphagia

In terms of the physical implications of dysphagia, a study conducted by Terre et al. (2006) aimed to describe physical signs and symptoms of dysphagia after a stroke. The findings showed that stroke patients exhibited a weak gag reflex, coughed while eating orally, and experienced changes in their voices after swallowing. Alali et al. (2018) and Printza et al. (2020) reported that throat clearing, coughing, choking on food and fluids, and repetitive swallowing while drinking fluids or eating food were the most common symptoms observed in MS patients with dysphagia. Rönnefarth et al. (2020) showed that weight loss is a physical symptom in cerebral palsy (CP) patients with dysphagia. Another study conducted by Chan et al. (2022) reported that fatigue is a physical implication of dysphagia in Parkinson's disease (PD) patients.

Regarding the functional implications of dysphagia, two studies conducted by Paris et al. (2013) and Franceschini et al. (2015) reported that amyotrophic lateral sclerosis (ALS) patients tend to avoid certain foods due to their swallowing difficulties. However, Rönnefarth et al. (2020) found that dysphagia does not significantly impact nutritional habits in patients with CP. The differences in outcomes between different studies may be attributed to variations in the origin or cause of dysphagia.

A study conducted by Pontes et al. (2017) demonstrated that stroke patients with dysphagia take longer than usual to finish a meal. Other studies conducted by Youssof et al. (2017), Chan et al. (2022), and Tahir et al. (2020) reported similar results

in patients with oculopharyngeal muscular dystrophy (OMD), PD, and MS, respectively.

2.5.3 Emotional implications of dysphagia

In terms of the emotional implications of dysphagia, research has consistently shown that dysphagia negatively impacts the emotional well-being of patients. A study conducted by Ekberg et al. (2002) reported that patients with dysphagia often avoid eating with others, which can lead to feelings of isolation. Anxiety and depression are common emotional implications observed in patients with head and neck cancer, laryngectomy, and stroke who experience dysphagia (Kemps et al., 2020). Drozd et al. (2014) found that 35.3% of stroke patients with dysphagia experienced mild levels of anxiety. Additionally, anxiety during eating was noted as an emotional implication in patients with MS, as reported by Ballard et al. (2018).

Furthermore, Paris et al. (2013) and Franceschini et al. (2015) observed that ALS patients with dysphagia often suffer from a fear of eating, which can significantly impact their emotional well-being. Other studies conducted by Yousof et al. (2017) and Yi et al. (2019) identified a sense of burden as a common emotional implication in patients with OMD and CP, respectively.

In a study by Perry & McLaren (2003), patients reported experiencing feelings of panic and fear when attempting to drink or eat, as well as discomfort in the mouth and throat, and feelings of shame about their appearance. Additionally, patients expressed feelings of despair, dismay, and bewilderment in coping with dysphagia-related challenges. These emotional implications highlight the importance of addressing the psychosocial aspects of dysphagia in patient care and support.

2.5.4 Coping and adaptation with dysphagia after stroke

Several studies have explored how patients cope with dysphagia following a stroke. In a study conducted by Helldén et al. (2018), patients shared their experiences and coping mechanisms. They noted that eating could become more challenging when dining with strangers, leading them to occasionally avoid social gatherings, eating with others, and foods that required cutting when sharing a meal. These findings highlight the impact of dysphagia on social interactions and food choices.

In another study by Bahceci et al. (2017), patients described their coping strategies for dealing with eating difficulties as a journey to regain a sense of normalcy. They emphasized that overcoming eating difficulties after a stroke was a process aimed at returning to a life that resembled their pre-stroke experiences. This process was often characterized as lengthy and challenging.

These insights into how patients cope with dysphagia shed light on the psychosocial aspects of living with this condition and emphasize the importance of providing support and interventions to improve their quality of life and overall well-being.

2.5.5 Comparison of the effect of dysphagia on the QOL aspects among stroke patients with and without dysphagia

Regarding the effect of dysphagia on the QOL aspects in stroke patients with dysphagia and those without dysphagia, Hong et al. (2017) found that functional capacity, including use the restroom, wash oneself, dress oneself, feed oneself, continence and maintain independence, was similar in both groups of stroke patients ($p > 0.05$); however, the group without dysphagia demonstrated better overall QOL than that with dysphagia.

2.5.6 Effects of demographic characteristics on the effect of dysphagia on the QOL aspects in stroke patients

The correlation between the effect of dysphagia on the QOL aspects and demographic factors was investigated in two studies (Pontes et al., 2017 & Terré & Mearin, 2006). These studies found no statistically significant difference in the mean SWAL-QOL scores between men and women ($p > 0.05$). Additionally, it was discovered that there was a weak negative correlation ($r = -0.339$) between age and the "Food selection" domain, indicating that as patients' age increased, their performance in this area decreased (Pontes et al., 2017). Moreover, the latter article (Terré & Mearin, 2006) showed no statistically significant correlation between sex, age, time from stroke onset, and the emotional and physical subscales of the DHI ($p > 0.05$). However, it found that the functional subscale of the DHI was positively correlated with the education level ($r = 0.270$, $p = 0.037$), implying that the negative effect of dysphagia on the functional aspects decreases with an increase in educational level (Hong and Yoo, 2017).

2.5.7 The correlation between dysphagia severity and the effect of dysphagia on the QOL aspects in stroke patients

Bahceci et al. (2017) and Kim et al. (2020) studied the relationship between dysphagia severity and SWAL-QOL following a stroke. They found a negative correlation between SWAL-QOL and dysphagia severity, indicating that the impact of dysphagia on the components of QOL increases as dysphagia severity increases. Furthermore, Bahceci et al. (2017) found a weak negative correlation between dysphagia severity and the SWAL-QOL subdomains "Food selection" ($r = -0.295$, $p = 0.042$), "Burden" ($r = -0.392$, $p = 0.001$), "Fatigue" ($r = -0.401$, $p = 0.041$), "Social functioning" ($r = -0.370$, $p = 0.001$), and "Mental health" ($r = -0.362$, $p = 0.014$).

Moreover, Bakhtiyari et al. (2020) found that dysphagia severity was positively correlated with the functional subscale of the DHI, suggesting that the severity of dysphagia has a greater negative impact on functional aspects.

2.5.8 Feeding type and the effect of dysphagia on the QOL aspects in stroke patients

The effect of dysphagia on the QOL aspects based on the feeding type was compared in two studies (Kim et al., 2020 & Hong & Yoo, 2017). First, Kim et al. (2020) found significant differences between the two groups for the sleep and burden subdomains of the SWAL-QOL ($p = 0.012$ and $p = 0.005$, respectively). Individuals receiving tube feeding scored worse on the SWAL-QOL for sleep and burden than those receiving oral nutrition (Kim et al., 2020). In the second study, it was discovered that patients receiving oral nutrition had significantly higher scores on the SWAL-QOL questionnaire than those receiving tube feeding, apart from sleep, showing that dysphagia has a greater negative impact on patients receiving tube feeding than those receiving oral nutrition (Hong & Yoo, 2017).

2.5.9 Impact of dysphagia therapy on the effect of dysphagia on the QOL aspects in stroke patients

The importance of therapy was discussed by Bahceci et al. (2017). This study examined the effect of dysphagia on the QOL aspects before and after treatment using the SWAL-QOL questionnaire. Results showed that the SWAL-QOL score improved significantly after treatment ($p = 0.001$), indicating that the handicapping effect of dysphagia on patients' lives decreased after treatment, and patients' QOL improved significantly.

2.6 The correlation between cognitive function and dysphagia

More attention has been paid to the correlation between dysphagia and cognitive impairment in recent years. An earlier study found that hemispatial neglect, a neurological condition in which a person fails to attend to or be aware of stimuli presented to one side of their body or environment; people with hemispatial neglect may ignore objects or people on the left side of their visual field, was correlated with dysphagia and increased non-oral feeding in stroke patients.

Additionally, Jo et al. (2017) correlated cognitive function with dysphagia following a stroke. Results showed that dysphagia was significantly associated with subscales of cognitive abilities involving visual attention and executive function areas as opposed to those involving verbal memory or auditory attention.

The severity of dementia and swallowing were found to be negatively correlated in research on older persons needing long-term care, indicating that swallowing capacity declined as dementia severity increased (Sakai et al., 2006). Another cross-sectional study found that older nursing home residents with poorer cognitive function were more likely to experience dysphagia (Yatabe et al., 2018). Additionally, research on people with PD revealed that the frontal/executive or learning/memory domains correlated with oral dysphagia, whereas the frontal functions are correlated with pharyngeal dysphagia (Kim et al., 2015). It has also been demonstrated that the degree of cognitive impairment is correlated with the degree of dysphagia in Alzheimer's disease (Seçil et al., 2016). In other words, dysphagia in Alzheimer's disease will worsen if cortical involvement and cognitive impairment increase (Chouinard, 2000). Moreover, there was a significant correlation between executive functioning and dysphagia in ALS patients (Olchik et al., 2017).

Cognitive impairment in stroke patients can exacerbate dysphagia problems. Cognitive deficits may result in difficulties with attention, memory, and problem-solving during meal preparation and consumption (Seçil et al., 2016). Patients may forget dietary restrictions, have trouble chewing and swallowing safely, or experience impaired awareness of hunger and fullness cues Jo et al. (2017). These cognitive challenges can lead to inadequate nutrition, increased risk of aspiration, and other dysphagia-related issues, highlighting the importance of addressing cognitive function in dysphagia management.

2.7 Summary of literature review

Previous research has identified the prevalence of cognitive impairment and dysphagia among stroke patients, both of which have a negative impact on various aspects of patients' QOL. However, the specific relationship between cognitive function and how dysphagia affects the emotional, functional, and physical dimensions of QOL in stroke patients remains unclear. Therefore, it is essential to investigate the correlation between cognitive function and the handicapping effect of dysphagia on these QOL aspects in stroke patients, as this will provide a better understanding of the connection between cognitive function and dysphagia in this patient population.

2.8 Conceptual framework

Figure 2.1 Shows the conceptual framework of the study.

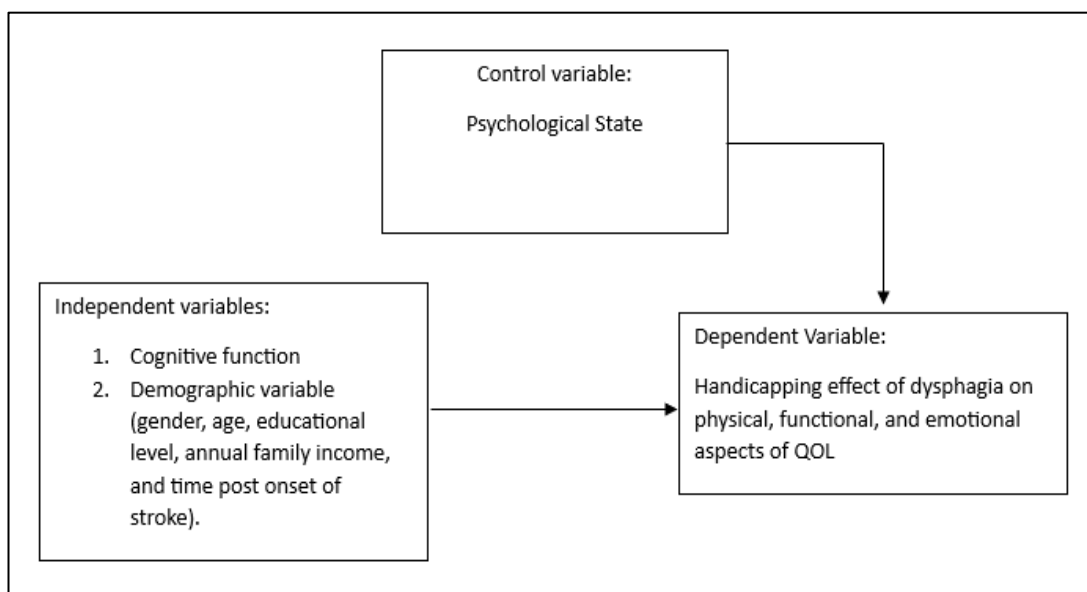


Figure 2.1 Conceptual framework

Figure 2.1 presents the conceptual framework of the study. It consists of three variables; cognitive function is the independent variable, the handicapping effect of dysphagia on the emotional, functional and physical aspects is the dependent variable, and psychological state is the control variable.

In figure 2.1, cognitive function, as the independent variable, refers to multiple mental abilities, including language, naming, attention, visuospatial/executive function, abstraction, and orientation to time and place and memory. It may be affected and impaired after a stroke. Moreover, demographic variables are characteristics of a population that include gender, age, educational level, annual family income, and the time that has passed since the onset of a stroke. These variables help researchers categorize and understand different groups within a study's population.

Dependent variable, the handicapping effect of dysphagia on the emotional, functional and physical aspects, refers to the negative impact of dysphagia on emotional, functional, and physical aspects of stroke patients' lives, and the difficulties they face as a result of dysphagia.

Control variable, psychological state, refers to a person's feelings, attitudes, and way of thinking and acting. Patients with extremely severe depression, anxiety, or stress were excluded because their responses would indicate that dysphagia had a worse impact on emotional, functional, and physical aspects due to their psychological state rather than their swallowing disorder.

2.9 Theoretical Framework

Dysphagia: Dysphagia, characterized by difficulties in swallowing, has a direct impact on the physical well-being of stroke patients. This includes the risk of aspiration, malnutrition, and other health complications stemming from impaired swallowing function. The severity of dysphagia is influenced by neurological damage resulting from stroke.

Cognitive impairment: Cognitive impairment, a common consequence of stroke, can manifest as deficits in memory, attention, executive function, and other cognitive domains. These cognitive deficits may have a significant impact on the management of dysphagia. For instance, individuals with impaired memory may struggle to adhere to dietary restrictions, while those with attention deficits may find it challenging to focus on safe swallowing during meals.

Quality of life: Dysphagia can lead to emotional distress, functional limitations in activities of daily living, and physical consequences such as malnutrition and aspiration pneumonia. QOL is not only influenced by the severity of dysphagia but also by cognitive function. Cognitive deficits can exacerbate the emotional burden by impeding patients' ability to cope with their condition, compromising their functional independence, and increasing the risk of physical health complications.

Interaction and Mediation: The theoretical framework posits that there is an interaction between dysphagia, cognitive function, and QOL. Cognitive function acts as a mediator in this relationship. Cognitive impairment, when present, intensifies the handicapping effect of dysphagia on emotional, functional, and physical aspects of QOL. This mediation effect is expected to be most pronounced in areas involving attention, executive function, and memory, as these cognitive domains are crucial for safe and effective swallowing.

CHAPTER 3

MATERIALS AND METHODS

3.1 Introduction

This chapter covers research design, study population, subject criteria, sampling method, sample size determination, study variables, a conceptual framework, data collection methods and research tools, operational definition, statistical analysis, and ethical considerations.

3.2 Study design

The design of this study was a quantitative cross-sectional study using three questionnaires to determine the correlation between cognitive function and the handicapping effect of dysphagia on emotional, functional, and physical aspects in stroke patients with dysphagia. This study was conducted at several hospitals and rehabilitation facilities in Amman-Jordan, between August 2022 and December 2022. Before any examination, the informed consent form was completed by the participants to participate in this study. Because not all stroke patients were able to communicate, read, and write well, caregivers were included in this study. The authors of this study decided to include caregivers of patients based on a request from the ethical research committee of the Universiti Sains Malaysia (JEPeM) to ensure that all stroke patients were included and that any dysfunction detected was fairly representative of this specific group.

3.3 Study population

The reference population for this study was stroke patients with dysphagia in Amman-Jordan. The source population of this study was stroke patients with dysphagia who were receiving treatment in hospitals and rehabilitation facilities in Amman-Jordan, during the study period. The sampling frame for this study was the attendance lists of hospitals and rehabilitation facilities for stroke patients with dysphagia.

3.4 Subject criteria

3.4.1 Inclusion criteria

- i) A medically confirmed diagnosis of stroke in medical records.
- ii) A medically confirmed diagnosis of oropharyngeal dysphagia in medical records.
- iii) At least two weeks after a stroke. The two-week post-stroke timing was chosen to capture the phenomenon of autorecovery, as many stroke patients with dysphagia experience spontaneous improvement during this period.
- iv) Over 60 years old. Stroke is a condition that disproportionately affects older adults. The prevalence of stroke significantly increases with advancing age, making it more common among individuals over the age of 60. By focusing on this age group, the study ensures a participant pool that is reflective of the population most at risk for stroke.