# Assessment of Nutritional Status and Patient's Compliance with the Nutritional Guidelines in Chronic Hepatic Diseases, Ain Shams University Hospital

#### Thesis

Submitted for Partial Fulfillment of Master Degree In Public Health

# **By** Yosra Samir Abd El-Ghaffar $(\mathcal{M}.\mathcal{B}.\mathcal{B}.\mathcal{C}h)$

# Under Supervision of **Prof. Amany Mokhtar Abdelhafez**

Professor of Public Health
Department of Community, Environmental and Occupational Medicine
Faculty of Medicine- Ain Shams University

#### Prof. Azza Emam Mohamed

Professor of Gastroenterology and Hepatology Department of Gastroenterology and Hepatology Faculty of Medicine- Ain Shams University

#### Ass. Prof. Hanan Said Ez Elarab

Assistant Professor of Public Health
Department of Community, Environmental and occupational Medicine
Faculty of Medicine- Ain Shams University

Faculty of Medicine Ain Shams University 2017





At the beginning, I would like to acknowledge favor and thanks to God who granted me the power and patience at all time.

I would like to express my sincere gratitude to **Prof. Dr. Amany Mokhtar Abdelhafez**, Professor in Department of community, environmental Loccupational medicine, Faculty of medicine, Ainshams University for her useful advice, great efforts and help during this study.

I would like to thank **Prof. Dr. Azza Emam Mohamed**, Professor in department of gastroenterology and hepatology, Faculty of medicine, Ainshams University for her great efforts and support during this study.

My deep appreciation to Assistant Prof. Dr. Hanan Said Ez Elarab Assistant Professor in Department of community, environmental Loccupational medicine Faculty of medicine, Ainshams University for her continuous encouragement and enthusiasm to complete this study

No word could express my feeling of gratitude to **Dr. Ghada**Ossama Mohamed Wassif, Lecturer in Department of community,
environmental Loccupational medicine, Faculty of medicine, Ain Shams
University for her marvelous advice, constructive encouragement, and
continuous guidance in conducting this study.

I would like to express many thanks to all staff members of Community, environmental Loccupational medicine department, Ain-Shams University.

My deep appreciation to all staff members of gastroenterology and hepatology department, Faculty of medicine, Ain Shams University who supported me during data collection.

I would also like to thank all study participants who shared in this work.

Words cannot express how much I am grateful to my father, my mother, and my wonderful children Fares and Safya for their support, continuous encouragement, and unlimited help from the start to the end of my present and coming work.

Special thank to my husband Mostafa who has been my inspiration and motivation for continuing this study and made me feel special even when times were tough for me.



## Contents

Title	Page No.
List of Abbreviations	i
List of Tables	iii
List of Figures	viii
Abstract	x
Introduction	1
Goal and aim of work	5
Review of Literature	
<b>Chapter (1):</b> Background; Chronic liver of their effect on the metabolism and nutr	
Chapter (2): Malnutrition in chronic hep diseases	
<b>Chapter (3):</b> Nutritional screening and a of chronic hepatic patients	
<b>Chapter (4)</b> : Dietary recommendations a guidelines for chronic hepatic patients	
Methodology	87
Results	115
Discussion	187

## Contents (Cont..)

Limitations	207
Conclusion	208
Recommendations	210
Summary	212
References	217
Appendices	253
Arabic Summary	

#### List of Abbreviations

Abbreviation	Meaning
AIH	Autoimmune Hepatitis
ALT	ALanine Transaminase
ANOVA	ANalysis Of VAriance
ASPEN	American Society of Parenteral and Enteral Nutrition
AST	ASpartate Transaminase
BCAA	Branched Chain Amino Acid
BMI	Body Mass Index
СВС	Complete Blood Count
CDC	Centers for Disease Control and Prevention
CT scan	Computerized axial Tomography scan
DEXA	Dual-Energy X-ray Absorptiometry
ESPEN	European Society of Parenteral and Enteral Nutrition
FFQ	Food Frequency Questionnaire
HBIG	Hepatitis B Virus Immunoglobulin
HBV	Hepatitis B Virus
НСС	Hepatocellular Carcinoma
HCV	Hepatitis C Virus
HDLs	High <b>D</b> ensity <b>L</b> ipoproteins
HGS	Hand-Grip Strength test
INR	International Normalized Ratio
Kg	Kilogram
LDLs	Low Density Lipoproteins
MAC	Mid-Arm Circumference
MAMA	Mid-Arm Muscle Area

MAMC Mid-Arm Muscle Circumference

MELD Mayo Clinic Model of End-stage Liver

Disease

MNA-SF Mini Nutritional Assessment – Short Form

MRI Magnetic Resonance Imaging
MST Malnutrition Screening Tool

MUST Malnutrition Universal Screening Tool

NAFLD Non-Alcoholic Fatty Liver Disease

NHANES National Health And Nutrition Examination

**S**urvey

NRS-2002 Nutrition Risk Screening-2002

P- value Probability value

PG-SGA Patient-Generated-Subjective Global

**A**ssessment

**REE** Resting Energy Expenditure

**RFH-SGA** Royal Free Hospital-Subjective Global

Assessment

SGA Subjective Global Assessment

SPSS Statistical Package for the Social Sciences

t- test Student t test

TIPS Trans-Intrahepatic Portal Shunt

TNF Tumor Necrosis Factor

TPN Total Parenteral Nutrition

**TSF** Triceps **S**kinfold **T**hickness

VLDLs Very Low Density Lipoproteins

WHO World Health Organization

χ2 Chi-square

#### List of Tables

Table No.	. Title Po	age No.
	Tables of Review	
Table (A):	Some nutritional screening tools	48
Table (B):	Advantages and disadvantages of different meth	ods of 59
	dietary assessment	
Table (C):	Protein Recommendations in Chronic Liver Disc	ease <b>78</b>
	<b>Tables of Methodology</b>	
Table (I):	PG-SGA Global Assessment Categories	96
Table (II):	Classification of underweight by using BMI	101
Table (III):	Normal range of different laboratory parameters	107
Table (IV):	Hemoglobin levels to diagnose anemia	107
Table (V):	Grading of liver disease severity using	Child- <b>108</b>
	Pugh score	
	<b>Tables of Results</b>	
Table (1.1):	Socio-demographic characteristics and special	habits 116
	of medical importance of the studied chronic h	epatic
	patients	
Table (1.2):	Socio-demographic characteristics and special	habits 118
	of medical importance of inpatients and outpa	atients
	with chronic liver disease	
Table (1.3):	History of present illness among the studied cl	hronic 120
	hepatic patients	
Table (1.4)	Comparison between inpatients and outpa	atients 123
	regarding severity of the chronic hepatic d	lisease
	assessed by Child- Pugh score	

Title Page N	lo.
Agreement between MELD score and Child score	126
Total PG-SGA score among the studied chronic	134
hepatic patients	
Gender differences as regards anthropometric and	135
functional measurements among the studied chronic	
hepatic patients	
Grading of severity of malnutrition among the studied	137
chronic hepatic patients by using body mass index and	
hand grip strength test	
Comparison between male and female patients as	138
regards body mass index and hand grip strength test	
Assessment of malnutrition among the studied chronic	139
hepatic patients using anthropometric measures	
percentiles with special reference to 5 <sup>th</sup> , 10 <sup>th</sup> and 75 <sup>th</sup>	
percentiles	
Comparison between inpatients and outpatients as	143
regards nutritional status assessed by percentiles of	
different anthropometric measures	
Results of laboratory assessment among the studied	145
chronic hepatic patients	
Comparison between male and female patients as	147
regards the mean of different laboratory results	
Distribution of male and female patients as regards	148
results of laboratory parameters	
	Agreement between MELD score and Child score Total PG-SGA score among the studied chronic hepatic patients Gender differences as regards anthropometric and functional measurements among the studied chronic hepatic patients Grading of severity of malnutrition among the studied chronic hepatic patients by using body mass index and hand grip strength test Comparison between male and female patients as regards body mass index and hand grip strength test Assessment of malnutrition among the studied chronic hepatic patients using anthropometric measures percentiles with special reference to 5 <sup>th</sup> , 10 <sup>th</sup> and 75 <sup>th</sup> percentiles Comparison between inpatients and outpatients as regards nutritional status assessed by percentiles of different anthropometric measures Results of laboratory assessment among the studied chronic hepatic patients Comparison between male and female patients as regards the mean of different laboratory results Distribution of male and female patients as regards

Table No.	. Title Page N	lo.
Table (2.10):	Comparison between inpatients and outpatients as regards number of patients with abnormal laboratory results	150
Table (2.11):	Agreement between global PS-SGA rating and different tools of nutritional assessment	152
Table (2.12):	Correlation between PG-SGA score with anthropometric, functional & laboratory variables among the studied chronic hepatic patients	153
Table (2.13)	Correlation between Child Pugh score and total PG-SGA score, anthropometric, functional & laboratory variables among the studied chronic hepatic patients	154
Table (2.14):	Frequency distribution of male and female patients as regards total daily energy intake	156
Table (2.15):	Comparison between male and female patients as regards mean of daily energy and macronutrients intake	157
Table (2.16):	Comparison between inpatients and outpatients as regards mean of daily energy and macronutrients intake	158
Table (2.17):	Distribution of the studied patients according to consumption of different food items	159
Table (3.1):	Relationship between chronic hepatic disease severity assessed by Child score and total PG-SGA score	161

Table No.	Title		Page No.	
Table (3.2):	Relationship between hepa	ntic disease	severity <b>163</b>	
	assessed by Child score and m	nalnutrition as	ssessed by	
	Global PG- SGA rating			
Table (3.3):	Relationship between hepa	atic disease	severity 164	
	assessed by Child score and malnutrition assessed by			
	RFH-SGA			
Table (3.4):	Relationship between hepa	atic disease	severity 165	
	assessed by Child score and m	nalnutrition as	ssessed by	
	the mean of different anthrop	ometric and	functional	
	measures			
Table (3.5):	Relationship between hepa	atic disease	severity <b>167</b>	
	assessed by Child score and nutritional status assessed			
	by percentiles of different anthropometric measures			
Table (3.6):	Relationship between hepa	atic disease	severity 169	
	assessed by Child score ar	nd mean of	different	
	laboratory indicators			
Table (3.7):	Relationship between hepa	atic disease	severity <b>171</b>	
	assessed by Child score and n	umber of pat	ients with	
	abnormal laboratory results			
Table (3.8):	Levels of anemia in relation	on to hepati	c disease 173	
	severity assessed by Child scor	re		
Table (3.9):	Relationship between hepa	atic disease	severity 174	
	assessed by Child score and me	ean of daily e	nergy and	
	macronutrients intake			

Table No	. Title Page N	lo.
Table (3.10):	Relationship between hepatic disease severity assessed by Child score and adequacy of total daily energy intake	175
Table (3.11A&B):	Frequency of consumption of different food items in relation to the disease severity assessed by Child score	176 & 178
Table (4.1):	Percentage of recommended daily intake and number of patients compliant with recommendations as regards daily total energy and macronutrients intake	180
Table (4.2):	Percentage of recommended daily intake and number of compliant patients with recommendations as regards daily total energy and macronutrients intake classified by chronic hepatic disease severity	182
Table (4.3):	Number of patients compliant with some nutritional guidelines	184
Table (4.4):	Number of compliant patients with some nutritional guidelines classified by chronic hepatic disease severity	185

#### List of Figures

Figure No	o. Title Po	age N	Jo.		
	Figures of Review				
Figure (A):	The regulation of carbohydrate metabolism	in the	7		
	liver				
Figure (B):	Scheme of etiology of malnutrition in chronic h	nepatic	29		
	patients				
Figure (C):	Nutrition care process		47		
Figure (D):	Scheme of Direct Methods of Nutritional Assess	sment	52		
Figure (E):	A hand grip dynamometer		54		
Figure (F):	Sections of Scored patient-generated-subjective	global	69		
	assessment (PG-SGA)				
Figure (G):	Energy requirements based on ASPEN and E	SPEN	74		
	guidelines				
	Figures of Methodology				
Figure (I):	Scheme of different study tools		91		
Figure (II):	Royal Free Hospital-Subjective Global Asses	ssment	98		
	(RFH-SGA)				
Figure (III):	Measuring the mid- arm circumference		102		
Figure (IV):	Skinfold caliper		103		
Figure (V):	Measuring triceps skinfold thickness		103		
Figure (VI):	Gantt chart		114		

#### List of Figures (Cont.)

Figure No	o. Title Page N	lo.	
	Figures of Results		
Figure (1.1):	Grading of the severity of the chronic hepatic disease	122	
	among the studied patients by Child-Pugh		
	classification		
Figure (1.2):	Grading of the severity of the chronic hepatic disease	124	
	among the studied patients by MELD score		
Figure (1.3):	Correlation between MELD score and Child score	125	
Figure (2.1):	Assessment of malnutrition among the studied chronic	127	
	hepatic patients using Global PG-SGA rate and RFH-		
	SGA		
Figure (2.2):	Comparison between male and female patients	129	
	regarding the Global PG-SGA Rating and RFH- SGA		
Figure (2.3):	Comparison between different age groups as regards	131	
	the Global PG-SGA Rating		
Figure (2.4):	Comparison between different age groups as regards	132	
	RFH- SGA rating		
Figure (2.5):	Comparison between inpatients and outpatients	133	
	regarding the Global PG-SGA Rating and RFH-SGA		
Figure (2.6):	Percentage of patients with normal nutrition, mild/	141	
	moderate and severe malnutrition according to		
	different methods of nutritional assessment		
Figure (2.7):	Frequency distribution of patients as regards total	155	
	daily energy intake		