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ADHERENCE, LEVEL OF MOTIVATION, BENEFITS AND BARRIER TO PRESCRIBED EXERCISE AMONG PATIENTS WITH CHRONIC LIVER DISEASE ATTENDING FOLLOW UP CLINICS IN HEPATOLOGY OPD, NEW DELHI

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ABSTRACT

Introduction: Chronic Liver disease is characterized by diffuse nodular hepatic fibrosis, portal hypertension, and progressive hepatic dysfunction. Adherence, Level of motivation is important to prescribed exercises among chronic liver disease, but has still not been well studied in real life in chronic liver disease. Exercise has the potential to modulate a number of complications associated with chronic Liver disease (CLD). Benefits and Barriers to prescribed exercises have emerged as an important consideration among patients with chronic liver disease. The Adherence and Motivation was seen better in widow/divorced than as seen in married or unmarried patients. Most of the patients reported prescribed exercise as beneficial. The patients reported that the most common barriers perceived by them were "Feeling embarrassed to exercise", "Too much to cost" and "family member do not encourage". Patients with high motivation reported better Exercise Adherence. The adherence is reported better in patients who report exercises as beneficial.

KEYWORDS: Adherence, Level of Motivation, Benefit, Barrier, Chronic liver disease, Prescribed exercise.

INTRODUCTION

Chronic Liver disease characterized by diffuse nodular hepatic fibrosis, portal hypertension, and progressive hepatic dysfunction (D'Amico, Morabito, Pagliaro & Marubini, 1986). Although worldwide prevalence numbers are unknown, estimates of up to 1% have been proposed for histological cirrhosis, the most common etiologies of which are alcohol, Non-alcoholic fatty liver disease, and viral hepatitis (Schuppan, Afdhal Lancet. 2008). In addition to damage to the involved organ, there are important extra hepatic consequences of chronic liver disease, including significant reductions in muscle mass, muscle function, and exercise tolerance (Jones, Coombes & Macdonald, 2012).

In noncirrhotic healthy and clinical populations, regular physical activity have been associated with important health and survival benefits (Myers, Prakash, Froelicher, Partington & Atwood, 2002) (Cawood, Elia & Stratton, 2012). The Prescribed exercise group was associated with significant improvements in peak oxygen uptake, muscle mass, and quality of life as well as significant reductions in fatigue (Zenith, Meena, Ramadi, Yavari & Harvey et al., 2014).

Regular physical activity for individuals can help facilitate healthy aging by lowering the risk of chronic disease, disability, and dependency in later life (DiPietro 2001 & Nelson et al., 2007). A large number of older adults, however, are low-active or sedentary, engaging in levels of physical activity insufficient for health gain (Drewnowski, 2001 & Mummery, Kolt, Schofield & McLean, 2007).

Patients with chronic liver disease show a reduced tolerance to exercise and usually stop exercise testing because of symptoms before reaching their predicted maximal cardiac frequency. Exercise influences hepatic metabolism. In sedentary subjects, adoption of either aerobic- and resistance based exercise regimes result in significant reduction of hepatic and visceral fat accumulation, increased fat oxidation, and increased insulin sensitivity (Johnson et al., 2009).

Studies in monozygotic twins suggest that the effects of exercise are independent of genetic background (Hannukainen et al., 2011). Exercise reducing the flow of fatty acids to the liver irrespective of body mass index (BMI) (DiPietro, Dziura, Yeckel & Neufer, 2006).

Adherence is defined by the World Health Organization (WHO) as: "the extent to which a person's behavior corresponds with agreed recommendations from a healthcare provider" (WHO, 2003). Since the goal of physical therapy is to optimize patient's health, various studies were conducted to identify factors that affect patients' adherence to home exercises. Exercise performance is not directly controlled by the physical therapist, therefore predicting patient's adherence to exercises is very difficult (Bassett, 2003 & Kolt & McEvoy, 2003 & Lyngcoln 2005). Prolonged exercises and self-management are highly recommended for patients with a variety of conditions preparing them to return to their work more quickly (Airaksinen et al., 2004).

A lot of strategies were suggested based on the probable motivators and barriers that affect patient's adherence. Self-efficacy, time, outcome expectations, patient-therapist interaction, positive and negative reinforcement, emotional distress, and characteristics of the home exercise programs (HEP) are all considered potential motivators or barriers (Chan et al., 2010). Furthermore, exercise misunderstanding and forgetting are major factors that preclude patient's adherence. Therefore, there is a clear need to develop methods that facilitate patients' involvement and adherence to an independent exercise program. Those strategies must target all patients with different individual characteristics (e.g. age, sex, intelligence, etc).

Motivators of regular exercise participation include health care provider advice, intergenerational and family influences, improvement in physical or motor competence, health benefits, and psychosocial reasons such as enjoying the group interaction and meeting with friends. Chronic health conditions were identified as both a barrier and a motivator to exercise in the older adult population, as individuals may exercise to prevent further physical decline but may be limited in their ability to participate in exercise by the same conditions (Wilcox et al., 2003).

Exercise is being increasingly recognized for its therapeutic benefits in patients with Chronic liver disease, which include improved physical fitness, cardiovascular health and better Quality of life (Heiwe & Jacobson, 2011).

Most of the research regarding such benefits has been conducted on chronic liver disease patients but the potential of exercise to modulate a number of factors related to disease progression, as well as address co-morbidities, makes it a particularly interesting and theoretically important treatment for all patients with Chronic liver disease (Watson et al., 2013).

Identifying barriers and asking participants to strategize ways to overcome them is a popular technique used in behaviour change interventions (Michie et al., 2011). However, little is known about the barriers and motivators Chronic liver disease patients have towards exercise participation, although these have been explored more extensively in other target populations. Commonly reported barriers from other cohorts include a lack of time, fear of pain/injury, health problems and poor weather (Chao, 2000 & Hart, 2010).

Everyday life of people in the western world is increasingly characterized by inactivity. Inactivity contributes to obesity and increased risk for a variety of serious diseases. Regular physical activity thus plays a key role in people's health. There is an emerging body of evidence indicating that physical activity prevents the development of several chronic diseases and is beneficial to people including those with heart disease, stroke, type II diabetes, colon and breast cancer, chronic liver disease. (Cavill et al., 2011).

The World Health Organization recommends at least 30 minutes of regular physical activity with at least moderate intensity most days of the week for adults and healthy elderly (WHO, 2009).

The greatest health benefits are for those who initially are in the worst physical shape (Anderssen & Stromme, 2001). In 2003, the health authorities introduced a system which gave primary physicians the authority to prescribe exercise for their patients. The prescription was for advice and guidance to changing lifestyle which included starting regular physical exercising for sedentary people and those at risk of developing diseases that are consequences of an unhealthy lifestyle.

Exercise prescription is generally a specific plan of Physical Activity (PA) designed for a specific purpose, and it is usually developed by rehabilitation specialists based on the patient's condition. It mainly includes the type, frequency, intensity, and duration of exercise.

MATERIAL AND METHODS

Research Design

The research design selected for the study cross sectional survey research design which was considered appropriate for the present study to assess the Adherence, Level of motivation, Benefits and Barrirers to prescribed exercise among patients with chronic liver disease.

Statement of problem

A study to assess the Adherence, Level of Motivation, Benefits and Barriers to prescribed exercises among patients with chronic liver disease attending follow up clinics in Hepatology OPD at Institute of Liver and Biliary Sciences (ILBS), Delhi.

AIM OF STUDY

The aim of this study was to assess the Adherence, Level of Motivation, Benefits and Barriers among CLD patients in ILBS, Delhi.

OBJECTIVES OF STUDY

Primary Objectives

1) To assess the Adherence related to prescribed exercises among patients with chronic liver disease.
2) To assess the Level of Motivation for performing prescribed exercises among patients with chronic liver disease.
3) To assess the Benefits and Barriers related to prescribed exercises among patients with chronic liver disease.

Secondary objectives

1) To find out the association between Adherence, Motivation, Benefits and Barriers scores related to prescribed exercises with the socio demographic variables among patients with chronic liver disease.
2) To find out the association between Adherence, Motivation, Benefits and Barriers scores related to prescribed exercises with the Clinical variables among patients with chronic liver disease.
3) To find out the Correlation between Adherence with Motivation, benefits and barriers scores related to prescribed Exercise among patients with chronic liver disease.

Operational Definitions

Adherence

The Term Adherence refers to the extent to which the patient follows the prescribed exercise schedule and will be assessed by the self reporting by the Exercise Adherence rating scale for patients(Section A and SectionB1), having a highest score of 24. A higher score indicates better Exercise Adherence.

Relative

Relative refers to a person who is part of patient family and accompanying the patient at the Follow up clinics in Hepatology OPD and is staying with the patient for more than one month. Exercise Adherence as expressed by the patient relatives will be assessed by the self reporting by the Exercise Adherence Rating scale.

Level of Motivation

Motivation refers to those factors that will promote the active participation of the patients with chronic liver disease in their exercise schedule as prescribed by their treating hepatologist. This is assessed by Motivation assessment scale having a maximum score of 40 and minimum score of 0. Level of Motivation is categorized in 5 category: 31-40 indicates Highly motivated, 27-30 indicates Fairly motivated, 25-26 indicates Averagely motivated, 22-24 indicates Low motivated and 0-22 indicates Least motivated.

Benefit

Benefit is defined as perception of the patient with chronic liver disease that the exercise is effective intervention in promoting his/her health outcome. This will be assessed by Exercise Benefits/Barriers scale. In this there is two parts Part A is for Exercise Benefit scale.

Barrier

Barrier is defined as factors that the patients with chronic liver disease, face or experience that will hamper their participation in Prescribed exercises. This will be assessed by Exercise Benefits/Barriers scale. In this there is two parts Part B is for Exercise Barrier scale.

Prescribed Exercises

Prescribed exercises refers to the set of physical activities that are recommended by the health team for the overall improvement in health and health outcome in patients with chronic liver disease. The exercise will be prescribed to the patients according to his or her Child Turcotte Pugh Class in Class A and Class B and the exercises sessions include.

Endurance exercises

• Walk with weight cuff :- In this the person walk with weight cuff for 15 minutes for 5 days a week.

• Cross Trainer :- In the cross trainer exercise the person drop their arms to work their core then Pedal backwards to boost your thigh tone after that Push and pull on the handlebars for upper body toning for 5-10 minutes.

Resistance/Strengthening exercises.

• Dumbbell:- In dumbbell exercises the person use the dumbbell, with one dumbbell in each hand. Then flex at elbow for 5-10 minutes.

• Thera band:- In thera band exercise the person Start from the hands and knees with a resistance band looped around the left ankle and the arch of the right foot. Lifts the right leg and extends it out straight behind you, pushing against the resistance of the band. Then try to straighten the leg as much as he/she can. Slowly brings the leg back to the starting position. Do the exercise for 5-10 minutes.

• Weight cuff :- In this the person stands upright with the feet slightly wider than shoulder-width apart. Bends the legs and drop the bottom down. The legs should form a 90-degree angle. Then drives the weight up through the heels and pushes the body upright again for 10-15minutes.

Balance Exercises

• Physio ball:- An exercise ball, the person sits on the ball and check out the hips and knees and do the exercise for atleast 5 minutes.

• Frenkel's exercises:- In this the person head should be raised on a pillow so that he/she can watch every movement. Bends one leg at the hip and knee, sliding the heel along the bed. Straighten the hip and knee to return to the sitting position and do the exercise for atleast 5 minutes.

Aerobic Exercises

• Treadmill exercise:- In treadmill exercise person does proper walking. The posture is upright and not leaning forward or backward for 10-20 minutes.

• Cycling:- Cycling is mainly an aerobic activity, In this tell the person to adjust the seat then set the handlebars correctly for 5-10 minutes.

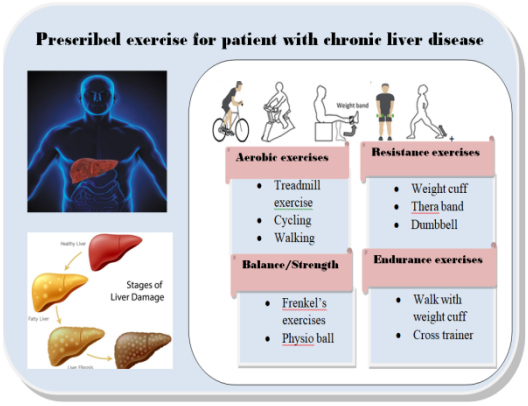

Figure-1 Prescribed exercise for patient with chronic liver Disease

Patient

The term Patient refers to the patient attending Follow up clinics in Hepatology OPD for the treatment of chronic liver disease, diagnosed as having chronic liver disease for more than 1 month, aged 18 years or above and is prescribed for exercises for more than one month. Patients in Child-Turcotte-Pugh Class A and Class B will be included. Patients in Child-Turcotte-Pugh Class C, critically ill, hepatic encephalopathy, chronic obstructive pulmonary disease requiring home oxygen and congestive heart failure with ejection fraction<50% or having physical disability will be excluded.

Chronic liver disease

Chronic liver disease refers to the long standing liver diseases with irreversible changes in hepatic structure over a period greater than 6 months and include but not confined to Non alcoholic steatohepatitis (NASH), Alcoholic liver disease (ALD), Non alcoholic fatty liver disease (NAFLD), Viral hepatitis, Autoimmune hepatitis (AIH), Drug induced liver disease (DILI), Primary biliary cirrhosis (PBC) etc.

Variables under study

Study Variables

Adherence as reported by patients and relatives, Level of motivation, Benefits and Barriers.

Attribute Variables

Demographic (Age, Gender, Marital status, educational, Occupation, income, Nature of work & clinical (Diagnosis, CTP class, Duration of illness, weight, height, BMI, Sarcopenia, Clinical parameters, Residence distance from ILBS.

Assumptions

This study is conceptualized with the following assumptions that

1. There exists some Level of Motivation to the prescribed exercises among chronic liver disease patients.
2. Patients believe that there are certain Benefits and Barriers to prescribed exercises among chronic liver disease patients.
3. Nurses play a vital role in assessing the Adherence, Level of Motivation, Benefits and Barriers to prescribed exercises among patients with chronic liver disease.

Conceptual framework

The conceptual framework adopted for this study is bases on Nola Panders' Health Promotion Model. Health Promotion Model was originally published in 1982 and later improved in 1996 & 2002. (Panders, 2011).

Setting

The study was conducted at Hepatology OPD of Institute of Liver and Biliary Sciences, New Delhi.

Sample and Sampling Technique

Population

In present study population comprises of patients with chronic Liver disease attending Follow up clinics in Hepatology OPD and their relatives (who have accompanied the patient) at Institute of Liver and Biliary Sciences, New Delhi.

Sample

The Sample of the study was consisted of the Patients with chronic liver disease with age group of 18 years and above and have been prescribed for exercises for more than one month.

Sampling Technique

The Convenience sampling technique was used for the present study.

Inclusion Criteria

1. Patients with chronic liver disease who are attending follow up clinics in Hepatology OPD at ILBS at the time of data collection.
2. Patient who are prescribed for exercise by their treating Hepatologist.
3. Patients who can understand Hindi or English.
4. Patients aged 18 years and above and have been prescribed for exercises for more than one month.
5. Patient who are in Child-Turcotte-Pugh class A* and class B* according to Child-Turcotte-Pugh Scoring System.

Exclusion Criteria for patient

1. Critically ill chronic liver disease patients.
2. Patient who have any physical disability.
3. Patient with Hepatic encephalopathy or chronic obstructive pulmonary disease requiring home

oxygen and congestive heart failure with ejection fraction <50%.
4. Patient who are in Child-Turcotte-Pugh class C according to Child-Turcotte-Pugh Scoring System.
5. Patients who were not accompanied by relatives.
6. Patients whose relatives were not staying with them for last one month.

Exclusion criteria for relatives

1. Relatives those who are not regularly staying with the patient for last more than one month.
2. The person with the age group <18 years.

Sample size

The sample size of the present study was estimated 300. These were the Chronic liver disease patients Who attending Follow up clinics in Hepatology OPD and their relatives (who have accompanied the patient) at ILBS, New Delhi.

Ethical consideration

Permission for conducting study was obtained from the administrative authorities. The clearance was obtained from scientific Review Committee of Ethical Committee, Institute of Liver and Biliary Sciences.

Data collection tools and technique

In present study, based on the objectives the tools were divided into 6 section.

SECTION I: This section deals with the descriptive analysis of demographic characteristics and clinical characteristics of Chronic liver disease patients.

SECTION II: Description of Adherence to Prescribed exercises among patients.

SECTION III: This section deals with the Level of Motivation among patients with chronic liver disease.

SECTION IV: This section deals with the Exercise Benefits and Barriers as expressed by the patients with chronic liver disease.

SECTION V: Association between Exercise Adherence, Motivation, Exercise Benefits and Barriers scores with the socio demographic and clinical variables of the chronic liver disease patients.

SECTION VI: This section deals with the Correlation between Adherence with Motivation, Benefits and Barriers scores among patients with chronic liver disease.

Validity of the tools

The validity of the tool was obtained by submitting the tools to 7 experts and it was valid. All the rectification was suggested by the experts.

Reliability of the tools

The Test-retest reliability method was used to test the reliability of tool and reliability was found 0.94 for Adherence assessment scale, 0.95 for Motivation assessment scale and 0.96 for Exercise Benefits/Barriers scale (EBBS).

Procedure for data collection

Formal permission was obtained from the concerned authorities to conduct the final study by using Convenient sampling technique according to research design.

RESULT

Section I:- Description of Socio demographic variables and clinical variables Socio demographic variables.

Table 1: Frequency and percentage distribution of patients with chronic liver disease according to selected socio-demographic variables.

n= 300

Socio-Demographic variables	Frequency (f)	Percentage (f %)
Age(in years)		
18-40	62	20.7
41-60	146	48.7
61-80	92	30.6
Gender		
Male	192	64
Female	108	36
Marital status		
Married	253	84.3
Unmarried	42	14
Widow/ Divorced	5	1.7
Qualification		
Diploma	75	25
Graduate	140	46.7
Post graduate	52	17.3
Doctorate	1	0.3
Other	32	10.7
Working status		
Working	279	93
Not working	21	7
Monthly Income (in Rupees)		
30000 or less	73	24.3
30001-50000	163	54.4
50001-70000	43	14.3
More then 70000	21	7

Data in Table 1 shows that nearly half the number of patients (48.7%) were in the age group of 41-60 years, 30.6 percent were in the age group of 61-80 years and 20.7 percent of the patients were in the age group of 18-40 years. Majority of the patients (64 percent) were male and 36 percent were female. Approximately 84.3 percent of the patients with chronic liver disease were married, 14 percent of the patients were unmarried and 1.7 percent of the patients were widow/divorced. Nearly (46.7%) of patients were graduates, 25 percent of patients were diplomates, 17.3 percent of patients were post graduate, 0.3 percent was doctorate. About 10.7 percent of the patients were educated till 12^{th} standard or less then primary school education. Majority of the

Patients (93%) were found to be working and 7 percent were not working. About 54.4 percent of patients had their monthly income between Rupees 30001 to 50000, 24.3 percent of the patients had their monthly income less than Rupees 30,000, 14.3 percent of patients had monthly income between Rupees 50,000-70,000 and 7 percent had their monthly income level above Rupees 70,000.

Clinical variables

Data shows that Majority of the patients (46 percent) were having diagnosis of alcoholic liver disease (ALD), 22.3 percent had Non alcoholic fatty liver disease (NAFLD), 20 percent of patients had Non- alcoholic steatohepatitis (NASH), 7.3 percent of patients had primary biliary cirrhosis, 2.3 percent of patients had Hepatitis (viral hepatitis, autoimmune hepatitis) and 2% of patients had diagnosis of drug induced liver disease (DILI).

Nearly 57.3 percent of the patients belonged to Child-Turcotte-Pugh class B and 42.7 percent of patients belonged to Child-Turcotte-Pugh class A.

In Nearly one third (35 percent) of patients the duration of illness more than 1 years to 2 years and 33 percent of patients had the duration of illness was between 6 month to 1 year and 32 percent of patient had more than 2 years of duration.

With respect to BMI, 46.3% of patients were found to have normal body mass index, 32.3 percent of the patients were overweight, 16.7 percent of patients were obese and 4.7 percent of patients were underweight. About 59.3% of chronic liver disease patients did not have sarcopenia. With respect to distance of residence to ILBS 66.7% of patients were staying, at a distance more than 10 kilometers, and 33.3% of patients resided within 10 kilometers.

The data related to clinical variables is depicted in figure 2 (2 D column) in terms of Diagnosis, figure 3 (Donut) showing CTP class, figure 4 (Pie) showing Duration of Illness.

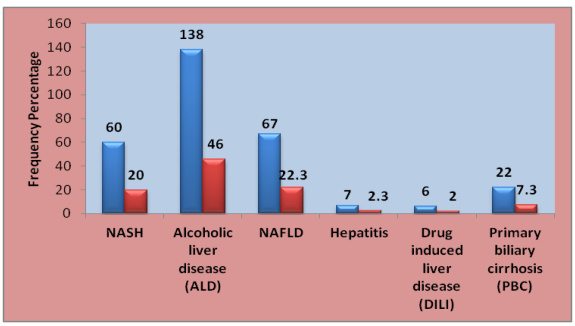

Figure 2: A 2-D Column diagram showing frequency percentage of Diagnosis of patients with chronic liver disease.

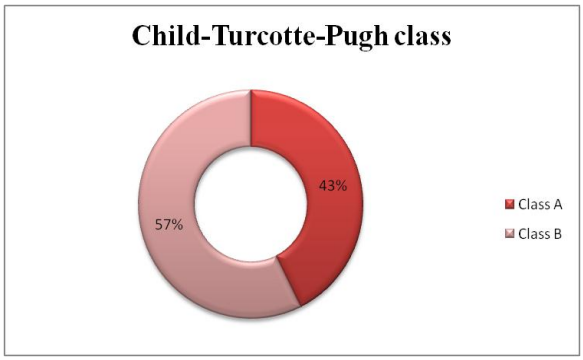

Figure 3: A Donut diagram showing frequency percentage distribution of chronic liver disease patients by the Child-Turcotte-Pugh Class.

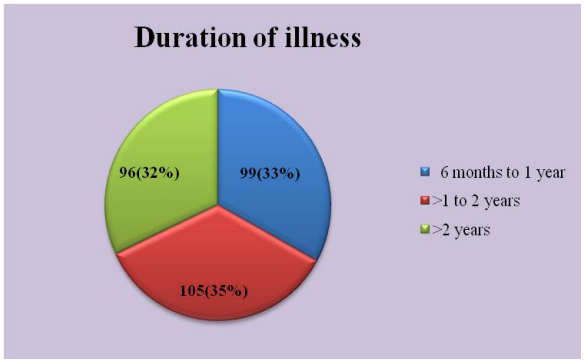

Figure 4: A Pie diagram showing frequency Percentage distribution patients with chronic liver disease by their duration of illness.

Section II:- Describes the finding related to Adherence to prescribed exercises among chronic liver disease patients.

2.1 Description of Prescribed exercise schedule of the patients

The frequency percentage distribution of Prescribed exercises of patients with chronic liver disease is depicted in figure 5.

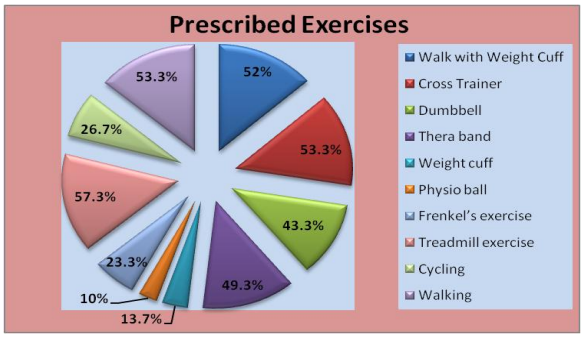

Figure 5: A Pie diagram showing the frequency percentage distribution of Prescribed exercises of patients with chronic liver disease.

2.2 Description of Adherence to their prescribed exercise schedule among patients with chronic liver disease

The data is presented in table 2.

Table 2: Frequency percentage distribution of patients as per their status of Adherence to their prescribed exercise schedule.

n= 300

Adherence	Frequency (f)	Percentage (f %)
As per the prescribed exercise schedule	170	56.7
Less often than the prescribed exercise schedule	130	43.3
Not doing at all	0	0

Data in table 2 shows that 56.7 percent of the patients were strictly doing the exercises as per the prescribed exercise schedule given by doctor and remain 43.3 percent of the patients were doing less often than the prescribed exercise schedule. No patients reports about not performing the exercises at all.

2.3 Range, Mean, Standard deviation, Quartile and IQR of Exercise Adherence score to prescribed exercise as reported by patients with chronic liver disease

This section describes the Range, Mean and SD of exercise Adherence score as reported by patients with chronic liver disease. Findings are presented in table 3.

Table 3: Range, Mean and Standard Deviation for Exercise Adherence scores as reported by patients with chronic liver disease.

n=300

Parameters	Range	Mean	SD
Exercise adherence score	7-24	14.57	4.20

Minimum possible score = 0
Maximum possible score= 24

Data in table 3 shows the exercise Adherence scores. The Exercise adherence scores ranged between 7 and 24. The Mean Exercise adherence score was 14.57 with SD of ±4.2. A higher score indicates better adherence.

2.4 Item wise Exercise Adherence score to prescribed exercise as reported by patients with chronic liver disease

This section describes the Item wise Mean of exercise Adherence score as reported by patients with chronic liver disease. Findings are presented in table 4.

Table 4: Item wise Exercise Adherence score as reported by patients with chronic liver disease.

n=300

Exercise adherence parameters	Mean	Mean Rank
Exercises as often as recommended	2.70	I
Do not forget to do exercises	2.10	VI
Do not exercise lesser than as recommended	2.37	IV
Fit exercise into regular routine	2.63	II
Do not feel weak to do any physical activity	2.47	III
Do most or all of the exercises	2.30	V

Minimum possible score for each items = 0
Maximum possible score for each items = 4

The Data shows that highest mean (2.70) is obtained for the item that patients "exercises as often as recommended by the health care professional" followed by 2.63 for the item "Fits the exercise into his regular routine". The lowest mean (2.10) was obtained for the item "Do not forget to do the exercises". The Exercise Adherence parameters are reported by the patients in following descending order:- 'Exercises as often as recommended', 'Fit exercise into regular routine', 'Do not feel weak', 'Do not exercise lesser than as recommended', 'Do most or all of the exercises', 'Do not frequently do exercises sometime'.

2.5 Frequency and percentage distribution of Exercise adherence to prescribed exercise as reported by patients with chronic liver disease

The frequency percentage of Exercise Adherence is observed in figure 6.

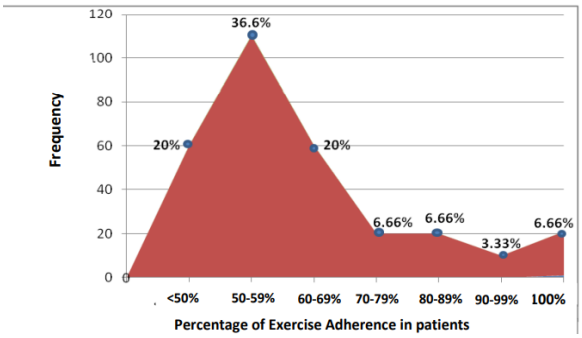

Figure 6: An Area graph showing the frequency and frequency percentage(f%)distribution of Percentage of Exercise Adherence among Chronic liver disease.

2.6 Range, Mean and Standard deviation of exercise Adherence score as reported by relatives of patients with chronic liver disease

This section describes the Range, Mean and SD exercise adherence score as reported by relatives of patients with chronic liver disease. Findings are presented in table 5.

Table 5: Range, Mean and SD Exercise adherence score as reported by relatives of patients with chronic liver disease.

n=300

Parameters	Range	Mean	SD
Exercise adherence Scores	8-24	15.17	3.26

Minimum possible score= 0
Maximum possible score= 24

Data shows the exercise adherence scores expressed by relatives of patient. The Exercise adherence scores ranged between 8 and 24. The mean Exercise adherence score was 15.17 with are SD ±3.26. A higher score indicates better adherence.

2.7 Item wise Exercise adherence score to prescribed exercise as reported by relatives of patients with chronic liver disease

The Data shows that highest mean (2.90) is obtained for the item that patients "S/He does exercises as often as recommended" followed by 2.80 for the item "S/He fit the exercise into their regular routine". The lowest mean 2.17 was obtained for the item "S/He does not forget to do exercises". The Exercise Adherence reported by relatives of patients are in the following descending order:-'S/He does exercises as often as recommended', 'S/He fit the exercise into their regular routine', 'S/He does most or all of the prescribed exercises', 'S/He does not feel weak', 'S/He does exercise lesser than as recommended' 'S/He does not forget do exercises'.

2.8 Interclass correlation of exercise adherence to prescribed exercise as reported by patients and their relatives

In order to determine the agreeability between the patient and his/her relative regarding the adherence to the prescribed exercises, interclass correlation between the adherence score of the patients and their relatives was computed.

This subsection describes the Interclass correlation and 95% confidence Interval and p value of adherence score as reported by patients and their relatives. The findings are presented in table 6.

Table 6: Interclass correlation of exercise adherence as reported by patients and their relatives.

n=300+300

Group	Adherence score			95% CI		p value
	Mean	SD	ICC	Lower bound	Upper bound	
Patients	14.57	4.20	0.605	14.09	15.04	<0.01*
Relatives of Patients	15.57	3.26				

*p=<0.01 Significant

Data shows that the mean adherence score of patients and mean adherence score of patients as reported by their relatives is 14.57 ± 4.2 and 15.57 ± 3.26 respectively. The ICC for the two means is found to be 0.605 (95% CI= 14.09 – 15.04) which is significant at p<0.01*. A significant p value denotes that there exists a significant correlation between the exercise adherence score of patients and Patients' exercise adherence score as reported by their relatives. It can thus be interpreted that the Adherence as reported by the patients is correlated to the adherence score as reported by their relatives. The researcher thus interprets that the exercise adherence score among patients is not biased due to self reporting by the patients. There is high agreeability with the relatives also, regarding the adherence score of patients.

Section III:- This section deals with the Level of Motivation among patients with chronic liver disease.

3.1 Range, Mean, Standard deviation and Quartiles of Motivation score to prescribed exercise among patients with chronic liver disease

Table 7: Range, Mean, Standard Deviation and Quartiles of Motivation score of patients with chronic liver disease.

n=300

Parameters	Range	Mean	SD	Median	Q_1	Q_3	IQR
Motivation score	18-36	25.57	4.53	24	22	29	7

Minimum possible score = 0
Maximum possible score= 40

Data shows the level of motivation among patients with chronic liver disease. The level of motivation ranged between 18 and 36. The mean of Motivation score was 25.57 with SD ±4.53. The Median, Q_1, and Q_3 of Motivation among patients are 24, 22 and 29 respectively with Inter quartile range of 7. The Median, Q_1, and Q_3 of Motivation score among patients with chronic level of motivation depicted in figure 7.

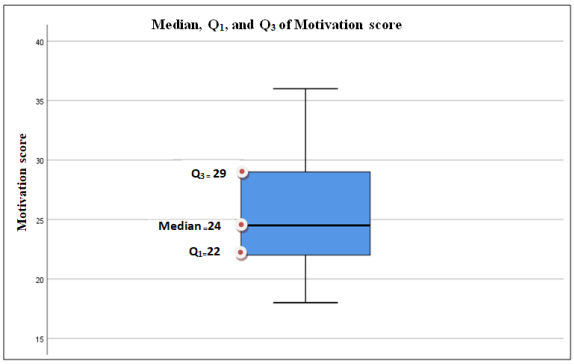

Figure 7: The Box plot diagram showing the Median, Q_1, and Q_3 of Motivation score among patients with Chronic liver disease.

3.2 Frequency and frequency percentage distribution of level of motivation to prescribed exercise among chronic liver disease.

Data shows that the frequency, frequency percentage of patients by their level of motivation. In this 33.3 percent of the patients are least motivated, followed by 16.6 percent of the patients being low motivated and 13.3 percent of the patients were at Average level. Nearly 23.3 percent of patients were fairly motivated and 13.3 percent of the patients were highly motivated. It shows that nearly one third of the patients are least motivated. It also shows that the 33.3% of patients in least motivated category and 16.6 % in low motivated category, together comprised of nearly half the numbers 49.9% of patients. The frequency percentage distribution of Level of Motivation to prescribed exercise among patients with chronic liver disease that are depicted in 3 D pie figure 8.

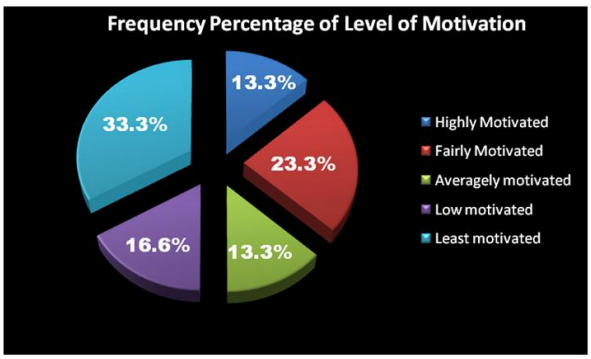

Figure 8: 3 D Pie diagram showing the frequency percentage distribution of Level of Motivation to prescribed exercise among chronic liver disease.

3.3 Item wise Motivation score among patients with chronic liver disease

The Data shows that highest mean (3.00) is obtained for the item that patients "Feel confident about doing my exercises" followed by 2.90 for the item "I do my exercises to improve my health". The lowest mean (2.03) was obtained for the item "I adjust the way I do my exercises to suit myself". It is also observed that Q_3 for the items 'I don't have time to do my exercises', 'Other commitments prevent me from doing my exercises', 'Don't do my exercises when I am tired', 'Feel confident about doing my exercises', 'My family and friends encourage me to do my exercises', 'I do my exercises to improve my health', 'I do my exercises because I enjoy them', 'I adjust the way I do my exercises to suit myself', 'I stop exercising when my pain is worse', 'I'm not sure how to do my exercises', were 3,3,3,4,3,4,3,3,3 and 3 respectively. The item wise distribution of Motivation scores to prescribed exercise among chronic liver disease is depicted in figure 9.

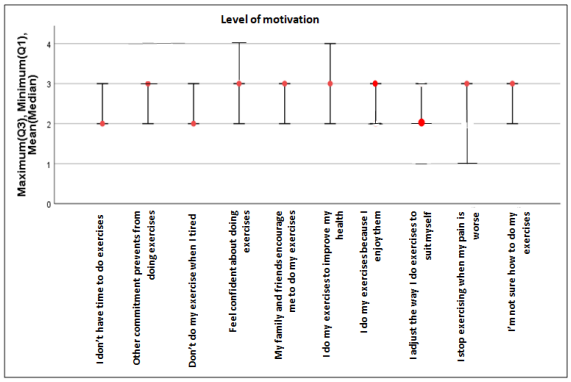

Figure 9: The Line graph diagram showing the Quartile scoring distribution of Level of Motivation to prescribed exercise among chronic liver disease.

Section IV: This section deals with the Exercise Benefits and Barriers among patient with chronic liver disease.

4.1 Range, Mean and Standard deviation of Exercise Benefits score to prescribed exercise among patients with chronic liver disease

Table 8: Range, Mean and Standard Deviation of Exercise Benefits score among patients with chronic liver disease.

n=300

Parameters	Range	Mean	SD
Exercise benefits score	55-112	88.33	14.63

Minimum possible score= 29
Maximum possible score= 116

Data shows the Exercise benefits scores among patient with chronic liver disease. The scores ranged between 55 and 112. The mean of Exercise benefits was 25.57 with SD ±4.53. A higher score indicates that prescribed exercises are beneficial for chronic liver disease patients.

4.2 Item wise Exercise Benefits score to prescribed exercise among patients with chronic liver disease

The Data shows highest mean was 3.33 that was obtained for two items i.e. "Enjoys exercises", and Exercise improves feeling of well being".

This was followed by mean (3.23) for items "Increases stamina; mean (3.20) for items "Improves self concept" and Improves overall body functioning".

The common exercise benefits are reported by the patients are in the following descending order:- Enjoy exercise; Improve feeling of well being; Increase stamina; Improve self concept; Improve overall body functioning; Improve mental health; Prevent heart attack; Muscles tone is improve; Increase level of physical fitness; Had contact with friends and person; Improves sleep better at night; will live longer; Increase mental alertness; Feel relaxed; Decrease feelings of stress and tension; Improve disposition; Carry out normal activities

without becoming tired; Improve flexibility; Improve physical endurance; Improves the way my body looks; Prevent high blood pressure; Improve functioning of cardiovascular system; Increase muscles strength; Gives a sense of personal accomplishment; Improves the quality of work; Entertainment; Increase my acceptance by others; Have contact with friends and persons I enjoy; Meet new people. The Item wise mean benefits scores to prescribed exercise among chronic liver disease illustrated in figure 10.

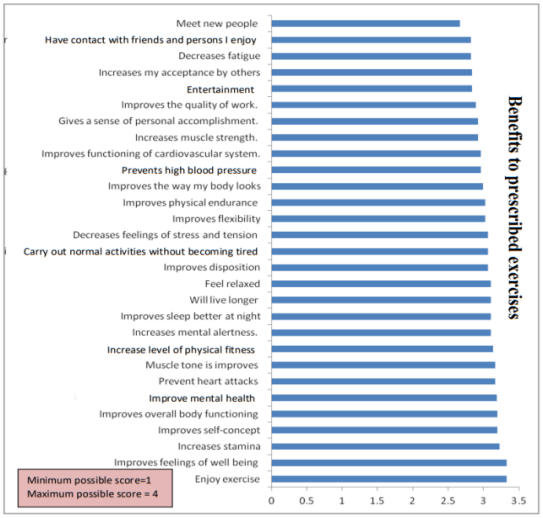

Figure 10: A 2D Bar diagram showing the Item wise Mean Benefits score to prescribed exercise among chronic liver disease

4.3 Range, Mean and Standard deviation of Exercise Barriers score to prescribed exercise among patients with chronic liver disease

Table 9: Range, Mean and Standard Deviation exercise barriers score of patients with chronic liver disease.

n=300

Parameters	Range	Mean	SD
Exercise barriers	28-52	43.00	5.35

Minimum possible score= 14
Maximum possible score= 56

Data shows the Exercise barriers scores among patients with chronic liver disease. The Exercise barriers scores ranged between 28 and 52. It is observed the Mean±SD for patients for Exercises barriers score was 43±5.35. The greater the score the, greater the perception of barriers to exercise.

4.4 Item wise of Exercise Barriers score to prescribed exercise among patients with chronic liver disease

The Data shows highest mean was 3.57 obtained for the item is "Too embarrassed to exercise" followed by mean (3.37) for item "It costs too much to exercise; mean (3.33) for item "family member do not encourage.

The common Exercise barriers are reported by the patients are in the following descending order:- Too embarrassed to exercise; It costs too much to exercise; Family member do not encourage; No encourage from spouse; People in exercise clothes look funny; Takes too much time from family; Inconvenient schedules; Too few places to exercise; Places for me to exercise are too far away; Takes too much of time; Takes too much time from family relationship; Fatigued by exercise; Exercise is hard work; Exercise tires me. The Item wise mean Barriers score to prescribed exercise among chronic liver disease depicted in figure 11.

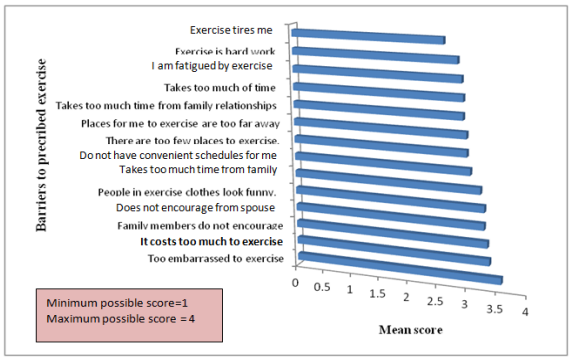

Figure 11: A 2 D Bar diagram showing the Item wise Mean Barriers score to prescribed exercise among chronic liver disease.

Section V:- Association between Exercise adherence, Level of Motivation, Benefits and Barriers scores with the socio demographic and clinical variables of the chronic liver disease patients.

The Adherence and level of motivation to prescribed exercise was seen better in widow/divorced than as seen in married or unmarried patients. Adherence is significantly correlated with the motivation score (r=0.54, p<0.0001), Benefits (r=0.31, p=<0.0001) and Barriers (r=0.26, p=<0.0001).

Section VI :- This section deals with the Correlation between Adherence with Level of motivation, Benefits and Barriers to prescribed exercise among patients with chronic liver disease.

Table 10: Correlation between Adherence, Level of Motivation, benefits and Barriers to exercise among patients with Chronic liver disease.

n=300

	Adherence r (p value)	Motivation Score r (p value)	Benefits r (p value)	Barrier r (p value)
Adherence	1	0.54 (0.000)**	0.31 (0.000)**	0.26 (0.000)**

**p<0.01 significant

There is a significant positive correlation between adherence and motivation score. Likewise there is a significant positive low correlation between Exercise adherence with Benefit and Barrier.

DISCUSSION

Discussion related to Adherence to prescribed exercises among chronic liver disease patients

Adherence to prescribed exercise in chronic condition is poor. In this present study Complete (100 percent) adherence to prescribed exercise was observed by 20(6.66%) patients followed by 90-99 percent adherence was observed by 10(3.33%) patients. The Exercise Adherence of 80-89 percent adherence was found in 20(6.66%) patients. 70-79 percent adherence in 20(6.66) patients. In 60-69 percent of Adherence in 60(20%) of the patients. As high as 36.6% of patients reported 50-59% of exercise adherence. Like wise a large percentage i.e. 20% of patients reported adherence less than 50 percent. The findings are similar to study conducted by Engström and Öberg (2005) who found that only 24% of follow up patients actually completed their exercise programs with full adherence. The findings are dissimilar to study conducted by Naomi Beinart et al (2016) on the development and initial psychometric evaluation of a measure assessing adherence to prescribed exercise, where 71 percent of the patients in adherence to prescribed exercise among chronic disease.

Discussion related to Level of motivation to prescribed exercises among patients with chronic liver disease

In the Present study 33.3 percent of the patients indicate that they are least motivated, 16.6 percent of the patients are low motivated, 13.3 percent of the patients in Averagely motivated. A 23.3 percent patients are fairly motivated followed by 13.3 percent of the patients are highly motivated. That indicates that a large number (49.9%) are either least motivated or low motivated. The findings were inconsistent with a study conducted by Md Mizanur Rahman et al. (2019) conducted a cross sectional study on Understanding Levels and Motivation of Physical Activity for Health Promotion among Chinese Middle-Aged and Older Adults, where Close friends and family members of one's home and community have potential influence in physical activity and recreational and cultural activity participants are highly motivated and luckier than others to fulfill the goal of physical activity levels.

Discussion related to Benefits to prescribed exercise among patients with chronic liver disease

In this present study, patients reported benefits of exercises as "Enjoys exercises", and Exercise improves feeling of well being". Other reported as benefits include items "Increase stamina", "Improve self concept" and "Improves overall body functioning". The findings are similar to study conducted by Ney. M. (2017) on Patient-perceived barriers to lifestyle interventions in cirrhosis, where Perceived benefits and enablers to exercise. They reported two benefits namely, "Exercise increase level of my physical fitness" and "I have improved feeling of well being".

Discussion related to Barriers to prescribed exercise among patients with chronic liver disease

In this study, Barriers that are reported by the patients are "Too embarrassed to exercise" followed by mean (3.37) for item "It costs too much to exercise", and "family member do not encourage. The findings are similar to study conducted by Ney M.(2017) on Patient-perceived barriers to lifestyle interventions in cirrhosis, Where they reported Barriers are are "Exercise tires me and "I am fatigued by exercise".

Discussion related to association between Adherence score to prescribed exercise with the socio demographic and clinical variables

In the present study, a significant association was found between Adherence score of the chronic liver disease patients and their marital status ($F = 5.63$ and $p = 0.004$). The findings are similar to study conducted by Soukayna Mourad (2018) on Patient's adherence to prescribed home exercises: Barriers and interventions, where the following factors were reported to have a significant effect on adherence: age, Marital status, fatigue, understanding and memorizing exercises, and time. However the researcher in the present study did not find any association of Adherence with age. This could be because majority of the patients in Mourad's study were young (in the age group of 26-44 years), where as in present study nearly half the number of patients aged between 41 years to 60 years.

In the present study, researcher did not find any association between Adherence and CTP class, Duration of illness, BMI, Presence of sarcopenia, Distance of residence to ILBS. The findings are dissimilar to a study conducted by Fred L Miller (2014) on Exercise dose, exercise adherence, and associated health outcomes in the TIGER study, where Adherence was associated with Body mass index, Duration of illness, Sarcopenia, resting HR, and cholesterol.

Discussion related to association between Motivation score to prescribed exercise with the socio demographic and clinical variables

There is a significant association found between Motivation score of the chronic liver disease patients and their marital status ($F = 3.61$ and $p = 0.02$). However no association found for age and gender. These are dissimilar findings to the study conducted by Kayla Gillespie (2015) on Exercise Motivation, Where is significant association was found between motivation to exercise with gender & age.

In this present study, a significant association was found between Motivation score of the chronic liver disease patients and the duration of illness ($F = 3.11$ and $p = 0.040$. However no association was found with BMI. The study findings conducted by Kayla Gillespie (2015) on Exercise Motivation, where a significant association was found between motivation to exercise with weight & BMI.

Discussion related to association between Exercise Benefits score to prescribed exercise with the socio demographic and clinical variables

In the present study, the socio demographic variables- Age, Gender, Marital status, Qualification and Working status were not associated with Exercise Benefits score. The similar findings were seen in a study conducted by Laurie A. Malone et al. (2012) aimed to assess the perceived benefits and barriers to exercise among persons with physical disabilities or chronic health conditions within action or maintenance stages of exercise. No significant mean differences in Benefits scores were found between disability types, genders, age groups, or physical activity levels in that study.

In the present study, the clinical variables- Child-Turcotte-Pugh class, duration of illness, Body mass index, Presence of sarcopenia were not found to be associated with Exercise Benefits score. The similar findings were reported in a study conducted by Laurie A. Malone et al. (2012) aimed to assess the perceived benefits and barriers to exercise among persons with physical disabilities or chronic health conditions within action or maintenance stages of exercise. No significant mean differences was reported between Benefits scores with CTP class or Duration of illness by Malone et al.

Discussion related to association between Exercise Barrier score to prescribed exercise with the socio demographic and clinical variables

In the present study, the socio demographic variables- Age, Gender, Marital status, Qualification, Working status and Monthly income were not found associated with Exercise Barriers score. The similar findings were seen in a study conducted by Laurie A. Malone (2012) on Perceived benefits and barriers to exercise among persons with physical disabilities or chronic health conditions within action or maintenance stages of exercise, there is no significant association between barrier score with the age and gender.

In the present study, the clinical variables- Child-Turcotte-Pugh class, Duration of illness, Body mass index, Presence of sarcopenia and Distance from residence to ILBS were not found associated with Exercise Barriers score. The similar findings were reported in a study conducted by Laurie A. Malone (2012) on Perceived benefits and barriers to exercise among persons with physical disabilities or chronic health conditions within action or maintenance stages of exercise, there is no significant association between barrier score with the Duration of illness, weight and CTP class.

Discussion related to Correlation between Adherence with Motivation, Benefits and Barriers scores to prescribed exercise among patients with chronic liver disease

In the present study, Adherence is significantly correlated with the Motivation score, Benefits and Barriers to Prescribed exercise in chronic liver disease patients, ($p<0.01$). The findings are similar to study conducted by Abrogoua, Kamean, N'guessan and kablan (2012). They reported that Adherence is significantly correlated with the Motivation score among patients, ($p<0.01$). Level of motivation is correlated with the Adherence of prescribed exercise among chronic liver disease patients, ($p<0.01$). Similar finding were shown in the study conducted by Laurie A. Malone et al. (2012), Where Benefits of prescribed exercise is correlated with the Adherence, ($p<0.001$). Similar findings were found in a study conducted by Ney. M. (2017), where Barriers is significantly correlated with Benefits of prescribed exercise among chronic liver disease patients, ($p<0.01$).

CONCLUSION

As high as 36.6 percent of patients reported only 50-59 percent of exercise adherence. Nearly half the number of the patients were either low motivated or least motivated. The Adherence and Motivation was seen better in widow/divorced than as seen in married or unmarried patients. Most of the patients reported prescribed exercise as beneficial. The patients reported that the most common barriers perceived by them were "Feeling embarrassed to exercise", "Too much to cost" and "family member do not encourage". Patients with high motivation reported better Exercise Adherence. The adherence is reported better in patients who report exercises as beneficial.

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REFERENCES

1. American College of Sports Medicine Position Stand. Exercise and physical activity for older adults. (1998). Medicine and science in sports and exercise, 30(6): 992–1008.
2. Anderssen, S. A., & Strømme, S. B. (2001). Fysisk aktivitet og helse--anbefalinger [Physical activity and health--recommendations]. Tidsskrift for den Norske laegeforening : tidsskrift for praktisk medicin, ny raekke, 121(17): 2037–2041.
3. Anjum, F., & Sonia, S. (2019). Identify Barriers And Their Association With Adherence to Physiotherapy Treatment Among Rural And Urban Geriatric Population in Patiala District. International Journal of Physiotherapy, 6(1): 01-08. https://doi.org/10.15621/ijphy/2019/v6i1/180065
4. Argent, R., Daly, A., & Caulfield, B. (2018). Patient Involvement With Home-Based Exercise Programs: Can Connected Health Interventions Influence

Adherence. JMIR mHealth and uHealth, 6(3): e47. https://doi.org/10.2196/mhealth.8518
5. Bassett, S., & Phty, D. (2003). The assessment of patient adherence to physiotherapy rehabilitation. New Zeal J Physiother, 31: 60-66.
6. Bebeley, Samuel & Liu, Yang & Wu, Yi-Gang. (2017). Physical Exercise Self-Efficacy for College Students' Level of Motivation in Physical Activity. International Journal of Science and Research (IJSR), 6: 81-85.
7. Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. Public health reports (Washington, D.C, 1974; 100(2): 126–131.
8. Cavill, N., Kahlmeier, S., & Racioppi, F. (2006). Physical activity and health in Europe: evidence for action. Copenhagen, Denmark: World Health Organization Europe.
9. Cawood, A. L., Elia, M., & Stratton, R. J. (2012). Systematic review and meta-analysis of the effects of high protein oral nutritional supplements. Ageing research reviews, 11(2): 278–296. https://doi.org/10.1016/j.arr.2011.12.008
10. Chan D and Can F (2010). Patients' adherence/compliance to physical therapy home exercises. Fizyoter Rehabil, 21(3): 132-139.
11. Chao, D., Foy, C. G., & Farmer, D. (2000). Exercise adherence among older adults: challenges and strategies. Controlled clinical trials, 21(5 Suppl): 212S–7S. https://doi.org/10.1016/s0197-2456(00)00081-7.
12. Costello, E., Kafchinski, M., Vrazel, J., & Sullivan, P. (2011). Motivators, barriers, and beliefs regarding physical activity in an older adult population. Journal of geriatric physical therapy, 2001; 34(3): 138–147. https://doi.org/10.1519/JPT.0b013e31820e0e71
13. D'Amico, G., Morabito, A., Pagliaro, L., & Marubini, E. (1986). Survival and prognostic indicators in compensated and decompensated cirrhosis. Digestive diseases and sciences, 31(5): 468–475. https://doi.org/10.1007/BF01320309
14. DiPietro L. (2001). Physical activity in aging: changes in patterns and their relationship to health and function. The journals of gerontology. Series A, Biological sciences and medical sciences, 56 Spec No 2: 13–22. https://doi.org/10.1093/gerona/56.suppl_2.13
15. DiPietro, L., Dziura, J., Yeckel, C. W., & Neufer, P. D. (2006). Exercise and improved insulin sensitivity in older women: evidence of the enduring benefits of higher intensity training. Journal of applied physiology (Bethesda, Md, 1985; 100(1): 142–149. https://doi.org/10.1152/japplphysiol.00474.2005.
16. Drewnowski, A., & Evans, W. J. (2001). Nutrition, physical activity, and quality of life in older adults: summary. The journals of gerontology. Series A, Biological sciences and medical sciences, 56 Spec No 2, 89–94. https://doi.org/10.1093/gerona/56.suppl_2.89.
17. Duncan, L. R., Hall, C. R., Wilson, P. M., & Jenny, O. (2010). Exercise motivation: a cross-sectional analysis examining its relationships with frequency, intensity, and duration of exercise. The international journal of behavioral nutrition and physical activity, 7: 7. https://doi.org/10.1186/1479-5868-7-7.
18. French, S. D., Green, S. E., O'Connor, D. A., McKenzie, J. E., Francis, J. J., Michie, S., Buchbinder, R., Schattner, P., Spike, N., & Grimshaw, J. M. (2012). Developing theory-informed behaviour change interventions to implement evidence into practice: a systematic approach using the Theoretical Domains Framework. Implementation science: IS, 7: 38. https://doi.org/10.1186/1748-5908-7-38.
19. Hannukainen, J. C., Borra, R., Linderborg, K., Kallio, H., Kiss, J., Lepomäki, V., Kalliokoski, K. K., Kujala, U. M., Kaprio, J., Heinonen, O. J., Komu, M., Parkkola, R., Ahotupa, M., Lehtimäki, T., Huupponen, R., Iozzo, P., & Nuutila, P. (2011). Liver and pancreatic fat content and metabolism in healthy monozygotic twins with discordant physical activity. Journal of hepatology, 54(3): 545–552. https://doi.org/10.1016/j.jhep.2010.07.029.
20. Heiwe, S., & Jacobson, S. H. (2011). Exercise training for adults with chronic kidney disease. The Cochrane database of systematic reviews, 10: CD003236. https://doi.org/10.1002/14651858.CD003236.pub2.
21. Johnson, N. A., Sachinwalla, T., Walton, D. W., Smith, K., Armstrong, A., Thompson, M. W., & George, J. (2009). Aerobic exercise training reduces hepatic and visceral lipids in obese individuals without weight loss. Hepatology (Baltimore, Md.), 50(4): 1105–1112. https://doi.org/10.1002/hep.23129.
22. Jones, J. C., Coombes, J. S., & Macdonald, G. A. (2012). Exercise capacity and muscle strength in patients with cirrhosis. Liver transplantation: official publication of the American Association for the Study of Liver Diseases and the International Liver Transplantation Society, 18(2): 146–151. https://doi.org/10.1002/lt.22472
23. Kolt, G. S., & McEvoy, J. F. (2003). Adherence to rehabilitation in patients with low back pain. Manual therapy, 8(2), 110–116. https://doi.org/10.1016/s1356-689x(02)00156-x
24. Kraemer, W. J., & Ratamess, N. A. (2005). Hormonal responses and adaptations to resistance exercise and training. Sports medicine (Auckland, N.Z.), 35(4), 339–361. https://doi.org/10.2165/00007256-200535040-00004
25. Lyngcoln, A., Taylor, N., Pizzari, T., & Baskus, K. (2005). The relationship between adherence to hand therapy and short-term outcome after distal radius fracture. Journal of hand therapy : official journal of the American Society of Hand Therapists, 18(1): 2–9. https://doi.org/10.1197/j.jht.2004.10.008

26. Miller, F. L., O'Connor, D. P., Herring, M. P., Sailors, M. H., Jackson, A. S., Dishman, R. K., & Bray, M. S. (2014). Exercise dose, exercise adherence, and associated health outcomes in the TIGER study. Medicine and science in sports and exercise, 46(1): 69–75. https://doi.org/10.1249/MSS.0b013e3182a038b9
27. Mourad, S., Eddine, H.K., Karaki, H., & Hassan, K.H. (2018). Patientâs adherence to prescribed home exercises: Barriers and interventions. Genetics and Molecular Research, 17.
28. Mummery, W. K., Kolt, G., Schofield, G., & McLean, G. (2007). Associations between physical activity and other lifestyle behaviors in older New Zealanders. Journal of physical activity & health, 4(4): 411–422.
29. Myers, J., Prakash, M., Froelicher, V., Do, D., Partington, S., & Atwood, J. E. (2002). Exercise capacity and mortality among men referred for exercise testing. The New England journal of medicine, 346(11): 793–801. https://doi.org/10.1056/NEJMoa011858.
30. Nelson, M. E., Rejeski, W. J., Blair, S. N., Duncan, P. W., Judge, J. O., King, A. C., Macera, C. A., & Castaneda-Sceppa, C. (2007). Physical activity and public health in older adults: recommendation from the American College of Sports Medicine and the American Heart Association. Medicine and science in sports and exercise, 39(8): 1435–1445. https://doi.org/10.1249/mss.0b013e3180616aa2.
31. Newman-Beinart, N. A., Norton, S., Dowling, D., Gavriloff, D., Vari, C., Weinman, J. A., & Godfrey, E. L. (2017). The development and initial psychometric evaluation of a measure assessing adherence to prescribed exercise: the Exercise Adherence Rating Scale (EARS). Physiotherapy, 103(2), 180–185. https://doi.org/10.1016/j.physio.2016.11.001
32. Ney, M., Gramlich, L., Mathiesen, V., Bailey, R. J., Haykowsky, M., Ma, M., Abraldes, J. G., & Tandon, P. (2017). Patient-perceived barriers to lifestyle interventions in cirrhosis. Saudi journal of gastroenterology : official journal of the Saudi Gastroenterology Association, 23(2): 97–104. https://doi.org/10.4103/1319-3767.203357
33. Norton, L. H., Norton, K. I., & Lewis, N. R. (2015). Adherence, Compliance, and Health Risk Factor Changes following Short-Term Physical Activity Interventions. BioMed research international, 2015; 929782. https://doi.org/10.1155/2015/929782
34. Okezue, O.C., Nwafor, G.C., Ezeukwu, O.A., John, J.N., & Uchenwoke, C. (2019). Adherence to Home Exercise Programmes and its Associated Factors among Patients Receiving Physiotherapy.
35. Plonczynski D. J. (2000). Measurement of motivation for exercise. Health education research, 15(6), 695–705. https://doi.org/10.1093/her/15.6.695
36. Rahman, M. M., Liang, C. Y., Gu, D., Ding, Y., & Akter, M. (2019). Understanding Levels and Motivation of Physical Activity for Health Promotion among Chinese Middle-Aged and Older Adults: A Cross-Sectional Investigation. Journal of healthcare engineering, 2019; 9828241.
37. Sarafino PS (2005). Health Psychology: Biopsychosocial interactions. 5th edition. New Jersey; John Wiley & Sons Inc, 236-265.
38. Schuppan, D., & Afdhal, N. H. (2008). Liver cirrhosis. Lancet (London, England), 371(9615): 838–851. https://doi.org/10.1016/S0140-6736(08)60383-9.
39. Shaikh, A., & Dandekar, S.P. (2019). Perceived Benefits and Barriers to Exercise among Physically Active and Non-Active Elderly People. Disability, CBR and Inclusive Development, 30: 73-83.
40. Stickler, K. (2015). Adherence to Physical Therapy: A Qualitative Study.
41. Teixeira, P. J., Carraça, E. V., Markland, D., Silva, M. N., & Ryan, R. M. (2012). Exercise, physical activity, and self-determination theory: a systematic review. The international journal of behavioral nutrition and physical activity, 9: 78. https://doi.org/10.1186/1479-5868-9-78.
42. US Department of Health and Human Services. Physical Activity and Health: A Report of the Surgeon General (1999). Atlanta, GA: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention;. http://www.cdc.gov/nccdphp/sgr/contents.htm.
43. Watson, E. L., Kosmadakis, G. C., Smith, A. C., Viana, J. L., Brown, J. R., Molyneux, K., Pawluczyk, I. Z., Mulheran, M., Bishop, N. C., Shirreffs, S., Maughan, R. J., Owen, P. J., John, S. G., McIntyre, C. W., Feehally, J., & Bevington, A. (2013). Combined walking exercise and alkali therapy in patients with CKD4-5 regulates intramuscular free amino acid pools and ubiquitin E3 ligase expression. European journal of applied physiology, 113(8): 2111–2124. https://doi.org/10.1007/s00421-013-2628-5.
44. Wilcox, S., Bopp, M., Oberrecht, L., Kammermann, S. K., & McElmurray, C. T. (2003). Psychosocial and perceived environmental correlates of physical activity in rural and older african american and white women. The journals of gerontology. Series B, Psychological sciences and social sciences, 58(6): P329–P337. https://doi.org/10.1093/geronb/58.6.p329.
45. Zenith, L., Meena, N., Ramadi, A., Yavari, M., Harvey, A., Carbonneau, M., Ma, M., Abraldes, J. G., Paterson, I., Haykowsky, M. J., & Tandon, P. (2014). Eight weeks of exercise training increases aerobic capacity and muscle mass and reduces fatigue in patients with cirrhosis. Clinical gastroenterology and hepatology: the official clinical practice journal of the American Gastroenterological Association, 12(11): 1920–6.e2. https://doi.org/10.1016/j.cgh.2014.04.016.