ORIGINAL ARTICLE

CONTENTS

The association between chronic diseases and lifestyle: A comparative study between two groups

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ABSTRACT

Aim: To identify lifestyle factors associated with chronic diseases and explore the biological mechanisms linking these behaviors to disease development.
Materials and Methods: A quasi-experimental design was used to compare a study group receiving the program to a control group. Data was collected through questionnaires and analyzed statistically.
Results: Participants in the study group showed significant improvements in healthy lifestyle behaviors compared to the control group. The study found that the program significantly improved health behaviors ($p < 0.01$, $r > 0.6$), highlighting the importance of targeted interventions for chronic disease prevention.
Conclusions: The study highlights the effectiveness of lifestyle interventions in promoting healthier behaviors among chronic disease patients. Future research can explore the impact of socioeconomic factors on health behaviors to develop targeted interventions.

KEY WORDS: Chronic Diseases, Healthy lifestyle, health promotion model

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INTRODUCTION

Chronic diseases are a significant global health challenge with a strong correlation to lifestyle factors. Despite medical advancements, prevalence remains high, necessitating further research to identify specific risk factors and inform prevention strategies [1-4]. This research explores the link between chronic diseases and lifestyle choices, drawing on theories like Planned Behavior and Social Change to understand individual and societal influences on health behaviors [5, 6]. While the Theory of Planned Behavior focuses on individual factors, the Theory of Social Change examines societal influences on behavior [7-10]. The Health Promotion Model emphasizes the influence of individual characteristics, environmental factors, and behavior-specific cognitions on health-promoting behaviors, aligning with the study's focus on lifestyle choices and chronic disease management [11-12]. The Health Promotion Model provides a framework to assess how factors like health awareness, knowledge, and socio-demographic characteristics influence lifestyle behaviors of chronic disease patients, suggesting that improving health literacy can lead to better health outcomes [13-16]. A literature review shows a strong link between lifestyle choices and chronic disease prevalence, with healthy behaviors reducing disease risk. Educational interventions targeting lifestyle modifications have proven effective in improving health outcomes [3,17-20]. Unhealthy lifestyles, including poor diet and sedentary behavior, significantly contribute to the development and progression of chronic diseases like diabetes, hypertension, and cardiovascular disease [24-25]. Comparative studies show disparities in health outcomes linked to lifestyle behaviors, with educational interventions improving health-related quality of life for chronic disease patients [26-27]. Understanding socio-demographic factors influencing lifestyle choices can help tailor interventions to promote healthier behaviors and mitigate the impact of chronic diseases across populations [28]. Unhealthy lifestyle choices, significantly increase the risk of developing chronic diseases like diabetes, hypertension, and cardiovascular disorders [29]. Comparing different population groups, this study aims to explore the correlation between lifestyle factors and chronic diseases, highlighting the impact of lifestyle interventions on health outcomes [30-31]. Comparative studies reveal disparities in lifestyle practices between populations, with higher education levels linked to better health literacy and healthier choices. Interventions targeting lifestyle modifications can enhance disease management and quality of life [32]. Understanding the intricate relationship between lifestyle and chronic diseases is vital for developing effective health promotion strategies to mitigate the burden of these conditions [33-34].

AIM

This study aims to compare lifestyle factors between two distinct groups, identify lifestyle-related risk factors for

chronic diseases, and understand the biological mechanisms linking lifestyle and chronic disease development.

MATERIALS AND METHODS

RESEARCH DESIGN

This study employs a quasi-experimental design to evaluate the impact of an instructional program on promoting healthy lifestyle changes among chronic disease patients. The study involves two groups: a study group that receives the intervention and a control group that does not.

STUDY SAMPLE

A sample size of 222 participants was determined through G- power analysis to ensure adequate statistical power. The study included 111 individuals in the study group and 111 individuals in the control group. Participants were selected using non-probability purposive sampling [35].

DATA COLLECTION

Data was collected at three time points: pretest, posttest 1, and posttest 2. The Health Promotion Lifestyle Profile II (HPLP II) was used to assess participants' engagement in health-promoting behaviors across six domains, including: health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management [36].

PROGRAM DESIGN

A researcher-developed five-session instructional program was implemented and evaluated using a pretest-posttest1 and posttest 2 design. An instructional program designed for this study was an educational program focusing on promoting healthy lifestyle behaviors among patients with chronic diseases. The program consisted of a series of sessions covering topics such as health responsibility, physical activity, nutrition, spiritual growth, interpersonal relationships, and stress management as health promotion model. The program was implemented on two groups: the study group, which received the instructional program, and the control group, which received no instructional program. Data was collected through pre- and post-program questionnaires to assess the program's effectiveness in improving lifestyle behaviors. These factors were influenced by an instructional program aimed at promoting healthy behaviors, as the results showed a significant improvement in these factors among the study group after the implementation of the instructional program. This methodology aims to rigorously evaluate the impact of the instructional program on the health behaviors of patients with chronic diseases, providing valuable insights into effective health promotion strategies

DATA ANALYSIS

Data analysis will involve descriptive and inferential statistics, such as paired sample t-tests and correlation coefficients, to determine the effectiveness of the program.

ETHICAL CONSIDERATIONS

The study obtained ethical approval from the Research Ethics Committee and the Diwaniyah Health Department in No. 227, June 2, 2024. Informed consent was obtained from all participants.

TIMELINE

The study will be conducted from August 1, 2024, to November 1, 2024.

RESULTS

The results of the study are presented in a clear and organized manner using tables and figures to facilitate understanding. Below are the key findings of the research regarding the effectiveness of the instructional program on the healthy lifestyle of patients with chronic diseases. Building upon the findings of the doctoral dissertation.

Table 1 summarizes the age, sex, educational level, and other demographic variables of participants in both groups, showcasing significant differences in age and education level.

This table 2 shows the distribution of Body Mass Index (BMI) categories across pretest, posttest 1, and posttest 2 for both study and control groups, indicating significant improvements in the study group.

In table 3, compares smoking behavior changes among participants before and after the intervention, showing an increase in attempts to quit smoking in the study group.

Table 4 that presents levels of physical activity in the study and control groups, indicating an increase in moderate activity levels in the study group after the instructional program.

Table 5 that summarizes Health Promotion Lifestyle Profile II scores for the study group, reflecting significant improvements in healthy lifestyle dimensions from pretest to posttest 2.

Table 6 displays Health Promotion Lifestyle Profile II scores for the control group, showing minimal changes in lifestyle behaviors across testing periods.

Table 7 that compares the effectiveness of the instructional program on healthy lifestyle for patients with chronic diseases between the study and control groups, highlighting significant improvements in the study group.

Table 1. Socio-demographic characteristics of study and control groups

Socio-demographical characteristics		Study group (n=111)			Control group (n=111)			Type-test (sig)*
		F	%	M± SD	F	%	M ± SD	
Age	30-39	8	7.2	3.459±1.204	9	8.1	3.621±1.160	CFT=0.00
	40-49	15	13.5		8	7.2		
	50-59	32	28.8		25	22.5		
	60-69	30	27.0		43	38.7		
	70-79	25	22.5		26	23.4		
	Total	111	100.0		111	100.0		
Sex	Male	69	62.2	1.378±0.487	83	74.8	1.252±0.436	CFT= 0.812
	Female	42	37.8		28	25.2		
	Total	111	100.0		111	100.0		
Edu. Level	Reads and writes	11	9.9	3.783±1.816	11	9.9	4.135±1.885	MT= 0.21
	Primary	20	18.0		14	12.6		
	Medium	22	19.8		18	16.2		
	Preparatory	19	17.1		16	14.4		
	Institute	17	15.3		23	20.7		
	College	17	15.3		22	19.8		
	Higher Diploma	1	0.9		3	2.7		
	Master	3	2.7		2	1.8		
	PhD	1	0.9		2	1.8		
	Total	111	100.0		111	100.0		
Marital status	Single	5	4.5	2.225±0.759	4	3.6	2.387±0.906	CFT= 0.002
	Married	90	81.1		83	74.8		
	Divorced	5	4.5		6	5.4		
	Widow	8	7.2		13	11.7		
	Separated	3	2.7		5	4.5		
	Total	111	100.0		111	100.0		
Occupation	Employee	51	45.9	2.072±1.255	54	48.6	2.270±1.420	CFT=0.00
	Earner/Freelancer	17	15.3		20	18.0		
	Retired	16	14.4		16	14.4		
	Unemployed	16	14.4		17	15.3		
	Housewife	11	9.9		4	3.6		
	Total	111	100.0		111	100.0		
Work per week	Fulltime >=35 hr.	17	15.3	2.945±1.043	22	19.8	2.702±1.058	MT= 0.9
	Part time 15-34 hr.	12	10.8		17	15.3		
	Part time<15 hr.	42	37.8		44	39.6		
	Not Working	40	36.0		28	25.2		
	Total	111	100.0		111	100.0		
Place of residence	Urban	92	82.9	1.171±0.378	84	75.7	1.243±0.430	CFT= 0.350
	Rural	19	17.1		27	24.3		
	Total	111	100.0		111	100.0		
Monthly family income	Less than 300,000	21	18.9	2.594±1.123	35	31.5	2.387±1.214	MT= 0.00
	300,000-600,000	33	29.7		22	19.8		
	601,000-900,000	31	27.9		38	34.2		
	901,000-1,200,000	23	20.7		9	8.1		
	1,201,000-1,500,000	2	1.8		6	5.4		
	1,501,000 or more	1	0.9		1	0.9		
	Total	111	100.0		111	100.0		

N: Sample size, F: Frequency, %: Percentage, M+SD: median +standard deviations * – statistically significant method as 2 nominal variables that use fisher test (CFT) and 2 ordinal variables that use median test (MT). Statistically significant is 0.01 that confidence level at 0.99 in 2 tailed.

Table 2. Frequency of the BMI for the study and control groups

Groups	Classification BMI	Pretest		Posttest 1		Posttest 2	
		M±SD	F (%)	M±SD	F (%)	M±SD	F (%)
Study N (111)	Underweight (18.5)	4.0±1.2	2 (1.8%)	4.0±1.1	0	4.0±1.2	0
	Normal weight (18.5-24.9)		3 (2.7%)		3 (2.7%)		14 (12.6%)
	Pre-obesity (25.0-29.9)		41 (36.9%)		46 (41.4%)		47 (42.3%)
	Obesity Class I (30.0-34.9)		26 (23.4%)		25 (22.5%)		21 (18.9%)
	Obesity Class II (35.0-39.9)		20 (18.0%)		19 (17.1%)		15 (13.5%)
	Obesity Class III (Above 40.0)		19 (17.1%)		18 (16.2%)		14 (12.6)
Control N (111)	Underweight (18.5)	4.1±1.2	2 (1.8%)	4.2±1.2	2 (1.8%)	4.3±1.2	2 (1.8%)
	Normal weight (18.5-24.9)		2 (1.8%)		2 (1.8%)		2 (1.8%)
	Pre-obesity (25.0-29.9)		39 (35.1%)		36 (324%)		32 (28.8%)
	Obesity Class I (30.0-34.9)		25 (22.5%)		23 (20.7%)		20 (18.0)
	Obesity Class II (35.0-39.9)		22 (19.8)		25 (22.5%)		28 (25.2%)
	Obesity Class III (Above 40.0)		21 (18.9%)		23 (20.7%)		27 (24.3%)

N: Sample size, F: Frequency, %=Percentage, M+SD= median +Standard deviations.

Table 3. Smoking behavior change

Groups	Smoking status	Pretest		Posttest 1		Posttest 2		sig*
		F	%	f	%	F	%	
Study Group	Never smoked	43	38.7	43	38.7	43	37.8	0.00
	Currently smokes	54	48.6	46	41.4	36	32.4	
	Quit smoking	14	13.5	22	20.7	32	29.7	
	Total	111	100.0	111	100.0	111	100.0	
Control Group	Never smoked	45	40.5	45	40.5	44	39.6	0.02
	Currently smokes	55	49.5	55	49.5	57	51.4	
	Quit smoking	11	9.9	11	9.9	10	9.0	
	Total	111	100.0	111	100.0	111	100.0	

N: Sample size, F: Frequency, %: Percentage, * – statistically significant: non parametric T-test- Mann-Whitney U, statistically significant is 0.01 that confidence level 0.99 in 2 tailed.

DISCUSSION

Table 1 presents demographic data including age, gender, education, marital status, occupation, work hours, residence, and monthly income for both the study (n=111) and control (n=111) groups. Notably, most participants were 60-69 years old (27% in the study, 38.7% in the control), and a large percentage of the control group were male (74.8%). The study compared two groups, finding significant differences in demographics like age, education, marital status, and income. Table 2 presents the changes in BMI categories for both groups across three time points (pretest, posttest 1, and posttest 2). The study group showed significant improvements, particularly in reducing the number of participants classified as overweight and obese from pretest to posttest. The educational intervention significantly reduced obesity rates in the study group. Additionally, table 3 compares smoking habits among participants before and after the program. It indicates an increase in the number of participants attempting to quit smoking in the study group, highlighting the effectiveness of the instructional program. Table 4 displays the change in physical activity levels between the study and control groups. Notably, the study group's moderate activity levels increased significantly, whereas the control group maintained lower levels of physical activity throughout the study. Overall, table 5 shows the scores reflecting significant improvements in the study group across various dimensions of healthy lifestyle behaviors from pretest to posttest1 posttest 2, moving from "weak" to "good" levels, particularly in health responsibility (total score improved significantly). Table 6 reflects minimal changes in the control group's lifestyle scores, remaining at "weak" levels throughout the study. It emphasizes the lack of significant improvement compared to the study group. Table 7 presents statistical comparisons between study and control groups regarding the effectiveness of the instructional program on healthy lifestyles. The statistical significance of improvements in the study group is highlighted, with p-values less than 0.01, indicat-

Table 4. Changes in physical activity levels in the study and control groups at Pretest, Posttest 1, and Posttest 2 following the intervention.

	Scale		Pretest		Posttest 1		Posttest 2		M±SD	Level
	Qs	C	F	%	F	%	F	%		
Study group	Q1	1	6	5.4	21	18.9	22	19.8	2.780±1.898	Moderate Activity
		2	7	6.3	18	16.2	19	17.1		
		3	6	5.4	21	18.9	24	21.6		
		4	36	32.4	28	25.2	25	22.5		
		5	56	50.5	23	20.7	21	18.9		
	Total		111	100.0	111	100.0	111	100.0		
	Q2	1	41	36.9	42	37.8	44	39.6		
		2	5	4.5	18	16.2	20	18.0		
		3	6	5.4	23	20.7	21	18.9		
		4	59	53.2	28	25.2	26	23.4		
	Total		111	100.0	111	100.0	111	100.0		
	Q3	1	16	14.4	31	27.9	33	29.7		
		2	13	11.7	28	25.2	32	28.8		
		3	82	73.9	52	46.8	46	41.4		
	Total		111	100.0	111	100.0	111	100.0		
Control group	Q1	1	6	5.4	11	9.9	1	0.9	1.732±1.520	Weak activity
		2	5	4.5	12	10.8	12	10.8		
		3	17	15.3	25	22.5	31	27.9		
		4	43	38.7	37	33.3	38	34.2		
		5	40	36.0	26	23.4	29	26.1		
	Total		111	100.0	111	100.0	111	100.0		
	Q2	1	45	40.5	33	29.7	28	25.2		
		2	5	4.5	20	18.0	19	17.1		
		3	27	24.3	26	23.4	25	22.5		
		4	34	30.6	32	28.8	39	35.1		
	Total		111	100.0	111	100.0	111	100.0		
	Q3	1	7	6.3	17	15.3	10	9.0		
		2	12	10.8	17	15.3	19	17.1		
		3	92	82.9	77	69.4	82	73.9		
	Total		111	100.0	111	100.0	111	100.0		

Qs: Questions, C: Choice answers, F: Frequency, %: Percentage, M+SD: median +standard deviations.

ing strong evidence of the program's effectiveness. These findings highlight the effectiveness of the instructional program in promoting healthy behaviors among chronic disease patients. This study aligns with previous research, highlighting the effectiveness of educational interventions in promoting healthy lifestyles and the significant impact of demographic factors, particularly age, on health behaviors and chronic disease prevalence [37]. This study aligns with *Graf et al.* (2024) in recognizing gender differences in chronic disease prevalence, though no significant gender disparity was observed between the study and control groups [38]. Individuals with higher education levels have been associated with better health literacy and adherence to lifestyle modifications, as highlighted by Van den et al. [39]. The current study observed a significant difference in educational levels between the groups, suggesting that education may influence intervention effectiveness. Additionally, a higher proportion of married individuals in the study group, aligning with previous research by Balaj et al. (2024) on the positive impact of social support on health outcomes, may have contributed to their increased motivation and support for healthier lifestyles [40]. Socioeconomic factors, particularly income, significantly influence chronic disease prevalence and lifestyle choices. Individuals with higher incomes are more likely to engage in health-promoting activities. The current study found a correlation

Table 5. Health Promotion Lifestyle Profile II Scores for Study Group

HPLP II scores for study group									
Type test	Domains	Measure of Scale5-Likert					Total M Score		*Levels
		Never	Rarely	Sometime	Often	Always	M	SD	
		M	M	M	M	M			
Pretest	HR	3.2	4.6	1.6	0.6	0.3	2.06	0.41	Weak
	PA	3.3	4.75	1.9	0.7	0.4	2.21	0.43	Weak
	N	3.6	4.11	1.3	0.6	0.34	1.99	0.42	Weak
	SG	3.45	4.11	1.56	0.6	0.33	2.01	0.45	Weak
	IR	3.1	5.1	1.1	0.4	0.3	2.0	0.39	Weak
	SM	2.9	3.7	2.4	0.67	0.33	2.0	0.42	Weak
	Total	3.25	4.39	1.64	0.59	0.33	2.04	0.42	Weak
Post test 1	HR	1.1	1.9	3.8	5.71	5.34	3.57	0.42	Good
	PA	1.2	2.4	4.8	5.3	5.9	3.92	0.46	Good
	N	1.5	3.65	2.6	5.9	4.6	3.65	0.5	Good
	SG	1.5	1.7	5.6	5.8	4.8	3.88	0.5	Good
	IR	1.1	1.3	4.6	5.9	5.1	3.6	0.48	Good
	SM	1.57	1.7	4.5	6.4	5.88	4.01	0.51	Good
	Total	1.32	2.1	4.31	5.83	5.27	3.77	0.47	Good
Posttest 2	HR	1.8	2.8	4.8	5.9	5.7	4.2	0.54	Good
	PA	1.34	2.11	2.4	5.3	5.9	3.41	0.43	Good
	N	1.9	2.7	2.4	6.6	5.8	3.88	0.41	Good
	SG	1.6	1.9	3.75	6.9	5.8	3.99	0.46	Good
	IR	1.4	1.7	4.75	6.9	5.8	4.11	0.53	Good
	SM	1.6	2.4	2.8	6.8	5.9	3.9	0.52	Good
	Total	1.6	2.26	3.48	6.4	5.81	3.91	0.48	Good

*Interval of mean score; Very weak 1.00-1.49, Weak 1.50-2.49, Moderate 2.50-3.49, Good 3.50-4.49 and Excellent 4.50-5.00, HR=Health responsibility, PA=Physical activity=Nutrition, SG=Spiritual growth, IR=Interpersonal relations, SM=Stress management.

between income levels and health outcomes, suggesting that lower-income individuals may have limited access to resources for a healthy lifestyle [41]. The study's findings align with previous research emphasizing the importance of structured health education programs in managing chronic diseases and improving lifestyle choices [3, 4, 14]. The connection between BMI, chronic diseases, and lifestyle interventions is further reinforced by these studies [42-43]. The study also supports previous research on the role of health education in reducing smoking rates and increasing physical activity [44]. These findings collectively highlight the positive impact of instructional programs on health behaviors and outcomes in chronic disease patients [45-47]. These findings collectively highlight the positive impact of instructional programs on health behaviors and outcomes in chronic disease patients [48-50]. Overall, the study's findings underscore the critical importance of tailored health interventions in managing chronic diseases. The discussion in this study indicates that structured instructional programs enhance healthy lifestyle behaviors among patients with chronic diseases, necessitating their implementation in clinical settings. However, the study faces limitations related to a specific sample and a quasi-experimental design, which affects the generalizability of the results and limits conclusions about causal relationships. Additionally, the short follow-up period restricts understanding of the sustainability of behavioral changes and their impacts.

CONCLUSIONS

The program significantly improved participants' lifestyle behaviors, as measured by the HPLP II. This was evident in increased physical activity and decreased BMI. The control group, lacking the intervention, showed no significant changes. Higher education levels correlated with better health outcomes. The findings emphasize the importance of health education in promoting healthier lifestyles among chronic disease patients. Future research can explore the impact of socioeconomic factors on health behaviors to develop targeted interventions.

Table 6. Health Promotion Lifestyle Profile II Scores for control Group

HPLP II scores for control group									
Type test	Domains	Measure of Scale5-Likert					Total M Score		*Levels
		Never	Rarely	Sometime	Often	Always	M	SD	
		M	M	M	M	M			
Pretest	HR	2.9	2.5	1.4	1.8	0.4	1.8	0.34	Weak
	PA	3.3	4.7	1.7	1.3	0.5	2.3	0.38	Weak
	N	3	4.5	0.7	0.5	0.3	1.8	0.31	Weak
	SG	3.4	4.46	1.9	0.1	0.24	2.02	0.37	Weak
	IR	3.7	4.88	1.83	0.32	0.57	2.26	0.57	Weak
	SM	2.8	3.9	1.9	0.5	0.4	1.9	0.31	Weak
	Total	3.18	4.15	1.57	0.75	0.40	2.01	0.38	Weak
Post test 1	HR	4.1	3.33	1.1	0.7	0.27	1.9	0.47	Weak
	PA	2.4	3.1	2.1	0.5	0.4	1.7	0.4	Weak
	N	2.6	3.82	1.55	0.2	0.33	2.06	0.42	Weak
	SG	3.4	4.3	1.4	0.9	0.3	2.06	0.42	Weak
	IR	2.6	3.7	1.9	0.5	0.2	1.78	0.38	Weak
	SM	3.2	4.2	1.73	0.2	0.17	1.9	0.5	Weak
	Total	3.0	3.74	1.63	0.5	0.27	1.9	0.43	Weak
Posttest 2	HR	2.8	4.9	0.8	0.3	0.2	1.8	0.33	Weak
	PA	4.1	2.1	1.5	0.6	0.7	1.8	0.97	Weak
	N	3.4	2.59	1.96	0.78	0.27	1.9	0.3	Weak
	SG	2.2	4.5	1.9	0.6	0.3	1.9	0.3	Weak
	IR	3.2	4.3	1.5	0.33	0.22	1.91	0.28	Weak
	SM	3.1	3.3	1.6	0.3	0.2	1.7	0.56	Weak
	Total	3.13	3.61	1.54	0.48	0.31	1.83	0.45	Weak

* Interval of mean score; Very weak 1.00-1.49, Weak 1.50-2.49, Moderate 2.50-3.49, Good 3.50-4.49 and Excellent 4.50-5.00, HR=Health responsibility, PA=Physical activity=Nutrition, SG=Spiritual growth, IR=Interpersonal relations, SM=Stress management.

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CONFLICT OF INTEREST

The Authors declare no conflict of interest

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