Health Leadership and Quality of Life. 2022; 1:107
doi: 10.56294/hl2022107

ORIGINAL

Enhancing Quality of Life and Health Behavior Adherence in Coronary Artery Bypass Graft Patients

Mejorar la calidad de vida y el cumplimiento de las conductas de salud en pacientes con injerto de derivación aortocoronaria

Uma Bhardwaj[1], Ram Garg[2], Soumya Ranjan Mahapatra[3], Malathi.H[4]

[1]Noida International University, Department of Biotechnology and Microbiology. Greater Noida, India.
[2]Arya College of Pharmacy. Jaipur, India.
[3]IMS and SUM Hospital, Siksha 'O' Anusandhan (Deemed to be University), Department of Cardiology. Bhubaneswar, India.
[4]JAIN (Deemed-to-be University), Department of Biotechnology and Genetics. Bangalore, India.

Cite as: Bhardwaj U, Garg R, Mahapatra SR, Malathi H. Enhancing Quality of Life and Health Behavior Adherence in Coronary Artery Bypass Graft Patients. Health Leadership and Quality of Life. 2022; 1:107. https://doi.org/10.56294/hl2022107

Submitted: 07-08-2022 **Revised:** 23-10-2022 **Accepted:** 11-12-2022 **Published:** 12-12-2022

Editor: PhD. Prof. Neela Satheesh

ABSTRACT

Coronary artery disease patients who have been exposed to CABG surgery have greatly improved cardiac function and chances of survival. However, recovery is mainly dependent on postoperative quality of life and compliance with prescribed health behaviors, such as diet, exercise, and medication. To enhance quality of life, enhance adherence to prescribe health practices, improve long-term recovery, and decrease the risk of complications. The method was based on data collection from 153 CABG patients at two points in time: before and after treatment. The intervention provided structured support for motivating changes towards a healthy lifestyle. The statistical analysis consisted of adjusted R^2, regression analysis, and paired t-tests for assessing the outcome related to health behavior adherence and quality of life (QoL) at both pre and post-treatment phases. Post-treatment data revealed an improvement in quality of life among patients and commitment to healthy behaviors. Statistical analysis confirmed the effectiveness of the intervention, showing significant changes in both aspects. This intervention was successful in enhancing QoL significantly and fostering health behaviors in CABG patients. This evidence reveals that the provision of support following surgery plays an essential role in enabling health recovery. Thus, the improvement in outcomes of patients following CABG should focus on interventions encouraging lifestyle modifications by the health provider.

Keywords: the Coronary Artery Bypass Graft (CABG); Quality of Life; Surgery Recovery; Heart Disease Recovery; Behavior Changes.

RESUMEN

Los pacientes con enfermedad arterial coronaria que se han sometido a cirugía CABG han mejorado mucho su función cardiaca y sus posibilidades de supervivencia. Sin embargo, la recuperación depende principalmente de la calidad de vida postoperatoria y del cumplimiento de las conductas sanitarias prescritas, como la dieta, el ejercicio y la medicación. Para mejorar la calidad de vida, aumentar el cumplimiento de las prácticas sanitarias prescritas, mejorar la recuperación a largo plazo y disminuir el riesgo de complicaciones. El método se basó en la recogida de datos de 153 pacientes de CABG en dos momentos: antes y después del tratamiento. La intervención proporcionó apoyo estructurado para motivar cambios hacia un estilo de vida saludable. El análisis estadístico consistió en R^2 ajustada, análisis de regresión y pruebas t pareadas para evaluar los resultados relacionados con la adherencia a la conducta de salud y la calidad de vida (CdV) en las fases previa y posterior al tratamiento. Los datos posteriores al tratamiento revelaron una mejora en la calidad de vida de los pacientes y un compromiso con las conductas saludables. El análisis estadístico confirmó la eficacia de la intervención, mostrando cambios significativos en ambos aspectos. Esta intervención consiguió

© 2022; Los autores. Este es un artículo en acceso abierto, distribuido bajo los términos de una licencia Creative Commons (https://creativecommons.org/licenses/by/4.0) que permite el uso, distribución y reproducción en cualquier medio siempre que la obra original sea correctamente citada

mejorar significativamente la calidad de vida y fomentar conductas saludables en los pacientes de CABG. Estas pruebas revelan que la prestación de apoyo tras la intervención quirúrgica desempeña un papel esencial para permitir la recuperación de la salud. Así pues, la mejora de los resultados de los pacientes tras una CABG debería centrarse en intervenciones que fomenten modificaciones del estilo de vida por parte del profesional sanitario.

Palabras clave: Injerto de Derivación Aortocoronaria (CABG); Calidad de Vida; Recuperación de la Cirugía; Recuperación de la Cardiopatía; Cambios de Conducta.

INTRODUCTION

Patients suffering from severe heart disease require Coronary Artery Bypass Graft (CABG) surgical procedures because their coronary arteries have developed obstructive blockages or constricted supply points near the heart.[1] The heart does not get enough oxygenated blood because of blocked arteries which leads to respiratory problems and chest pain while substantially raising heart attack risks.[2] Doctors remove healthy blood vessels from patient territories to establish bypass routes that go around blocked arteries during CABG operations.[3]

The procedure improves blood flow to the heart and simultaneously reduces chest pain symptoms. Survival rates improve through CABG because this procedure protects patients from heart attacks while improving their heart's overall functioning.[4] Subjects who receive CABG surgery benefit from restored blood flow because it enhances their heart's natural efficiency to extend their life quality. The advantages that CABG surgery provides exceed its surgical operation.[5] A patient's recovery success requires their total dedication to making lifestyle improvements through drug adherence and proper heart-healthy nutrition and regular exercise regimen.[6] Success with long-term recovery requires these important health behaviors because they protect patients from complications. Although surgeons can commonly offer some sort of advice, there is a need for more personalized support to help patients make lifestyle changes that are healthier and long-lasting lifestyle.[7] It should help CABG patients adopt healthier habits, supporting their recovery and reducing the risk of other health complications.[8] At the National Heart Institute in Kuala Lumpur, Verifying the Malay version of the SF-36 summated scales of evaluation for those who have undergone CABG requires an investigation.[9] From July through December 2017, 599 patients answered surveys. Excellent discriminant validity across patients with varying levels of health status was one of the data's numerous outstanding features. The physical functionality measure, though, demonstrated problems with interpretation. With Cronbach alpha values ranging from 0,73 to 0,90, the dependability of internal consistency has been determined to be quite high.

The effect of pre-operative signs of depression on the duration of hospital stay (LOS) following CABG in Jordan is examined in the experiment.[10] Depression levels were assessed two weeks before, and one month after following the procedure in this research, which included 227 recipients from five medical centers. High-earning and statin usage, which contributed to 22,4 % of the variation, lowered LOS, however assessments of depression and female gender-obtained risk. The length of stay (LOS) in patients after CABG was examined in the investigation pertaining to depressed symptoms.[11] Two hundred and twenty people from three hospitals in Jordan participated in the investigation. In comparison to male patients, female patients had longer LOS and more depressed symptoms, according to the results. For each unit of elevated depression-related symptoms, perceived control reduced LOS by 0,28 days, demonstrating a protective impact.

Patients with coronary disease experienced enhanced heart-disease based HRQoL when residing among greenery. The research englobed 861 patients who attended with an average age of 65,5 years and 59,2 % came from low-income backgrounds.[12] The global HRQoL rating showed a positive relationship with low-income status even after considering age demographic and social economic factors in the analysis. This association produced an OR value of 1,42 compared to wealthy patients. Research analyzed how Cardiac Rehabilitation interventions impact different health-related quality of life (HRQOL) elements.[13] The qualitative analysis of 11747 patients in 41 randomized controlled trials (RCTs) delivered insights about exercise-related treatments and psychological care along with non-exercise interventions. The experimental study confirmed CR intervention produces pleased substantive therapeutic effects.

The interweaving of SVG blockage with angioplasty complications combined with myocardial infarction as well as cardiac arrest produced the SVG failure examined.[14] The trial evaluated the primary outcome of SVG blockage for one year by including a total of 499 patients who received at least one Saphenous Vein Graft (SVG). Research results indicate a SVG filtration rate of 9,6 % in the mediation group with a control population rate at 10,1 % (selected). Ticagrelor treatment failed to prevent SVG blockage in CABG patients during one-year follow-up. 2655 CABG patients demonstrated improved vascular graft blockage prevention through the innovative no-touch method over the conventional approach according to trial results. Studies demonstrated that the no-touch method achieved better results regarding vein transplant blockage rates at three to twelve months while also reporting fewer cases of coronary return at twelve months investigation.[15] Clinical results

showed that no-touch technique led to a higher rate of surgical interventions necessary for leg injuries.

Key contribution:

- Improved Quality of Life (QOL): Significant improvements in the QOL of CABG patients post-treatment.
- Enhanced adherence to health behaviors: Such patients adhered better to the prescribed health behaviors, including drugs, diet, and physical activity.
- Effectiveness of intervention: Well-structured support encouraging healthy lifestyle change resulted in improved long-term recovery.
- Focus on Support Post-Surgery: The intervention requires the health providers to establish post-surgery strategies that would influence lifestyle changes toward better long-term health and recovery.

Aim of the research: to improve the quality of life (QOL) of Coronary Artery Bypass Graft (CABG) patients and their adherence to prescribe healthy lifestyles. It can enhance long-term recovery and reduce the risk of complications.

METHOD

The research methods section obtains data from 153 CABG patients spanning two distinct periods before and after receiving therapy. Structured support is offered as part of this intervention which delivers healthy lifestyle choices to patients. Research data collection through statistical analysis assessed QoL along with patients' adherence to healthy behaviors at each assessment phase.

Research Design

A research design employing pre-and post-treatment measurement explored the impact of structured support frameworks on QoC and health behavior adherence among CABG surgery patients. Data collection occurred in two stages: before the intervention (baseline) and after the intervention. During the experiment researchers focused on vital Dependent variables that included physical health alongside mental health alongside social well-being together with overall satisfaction with care. The study measured the effect of medication adherence and dietary changes together with physical activity levels and lifestyle modifications serving as Independent variables. The research compared pre-intervention and post-intervention data to evaluate whether structured support produced enhanced recovery alongside superior long-term health results.

Quality of Life (QoL)

- Physical Health (PH): Including pain management, energy levels, and mobility.
- Mental Health (MH): Focusing on emotions, sleep quality, and cognitive function.
- Social Well-Being (SW): Ensuring support and engagement.
- Overall Satisfaction (OS): Satisfaction with care and self-reported health status.

Health Behavior Adherence

- Medications Adherence (MA): appropriate dosage, persistence, and timing.
- Heart-Healthy Diet (HHD): Adherence to dietary recommendations for heart health.
- Physical Activity (PA): Regularity, duration, and intensity of workouts.
- Lifestyle Modifications (LM): Quitting smoking or cutting back on alcohol.

Participants and Procedure

A total of 153 individuals were diagnosed with coronary artery disease and scheduled for CABG surgery. Table 1 and figure 1 show the demographics of participants. Patients were recruited from cardiac care hospitals. The surveys employ a 1–5 Likert scale to assess respondents' quality of life and commitment to a healthy lifestyle. The eligibility criteria to participate in the research were as follows:

Inclusion criteria

- Adults between the ages of 40 and 75.
- Ability to comprehend and follow instructions.
- Treated with CABG surgery for coronary artery disease.
- Ability to comprehend and follow instructions.
- Prepared to give informed consent and participate in the research.

Exclusion criteria

- Inability to communicate or severe cognitive impairment.
- Severe disorders such as cancer or terminal illness.
- Participate in another cardiovascular clinical trials.

https://doi.org/10.56294/hl2022107

Table 1. Demographic Characteristics of CABG patients

Demographic Variable	Category	Number of Participants (n=153)	Percentage (%)
Age	40-50 years	45	29,40
	51-60 years	53	34,60
	61-70 years	40	26,10
	71-75 years	15	9,80
Gender	Male	105	68,60
	Female	48	31,40
Smoking Status	Current smoker	47	30,70
	Former smoker	45	29,40
	Non-smoker	61	39,90
Drinking	Current Drinking	42	27,50
	Former Drinking	38	24,80
	Non-Drinking	73	47,70
Diabetes History	Yes	72	47,10
	No	81	52,90
Hypertension History	Yes	94	61,50
	No	59	38,50
Body Mass Index (BMI)	Underweight (<18,5)	5	3,30
	Normal (18,5-24,9)	52	34,00
	Overweight (25-29,9)	62	40,50
	Obese (≥30)	34	22,20
Physical Activity Level	Sedentary	30	19,60
	Lightly active	50	32,70
	Moderately active	60	39,20
	Very active	13	8,50
Social Support	High	95	62,10
	Moderate	40	26,10
	Low	18	11,80
Mental Health	Good	110	71,90
	Fair	35	22,90
	Poor	8	5,20
Diet	Healthy	98	64,10
	Unhealthy	55	35,90

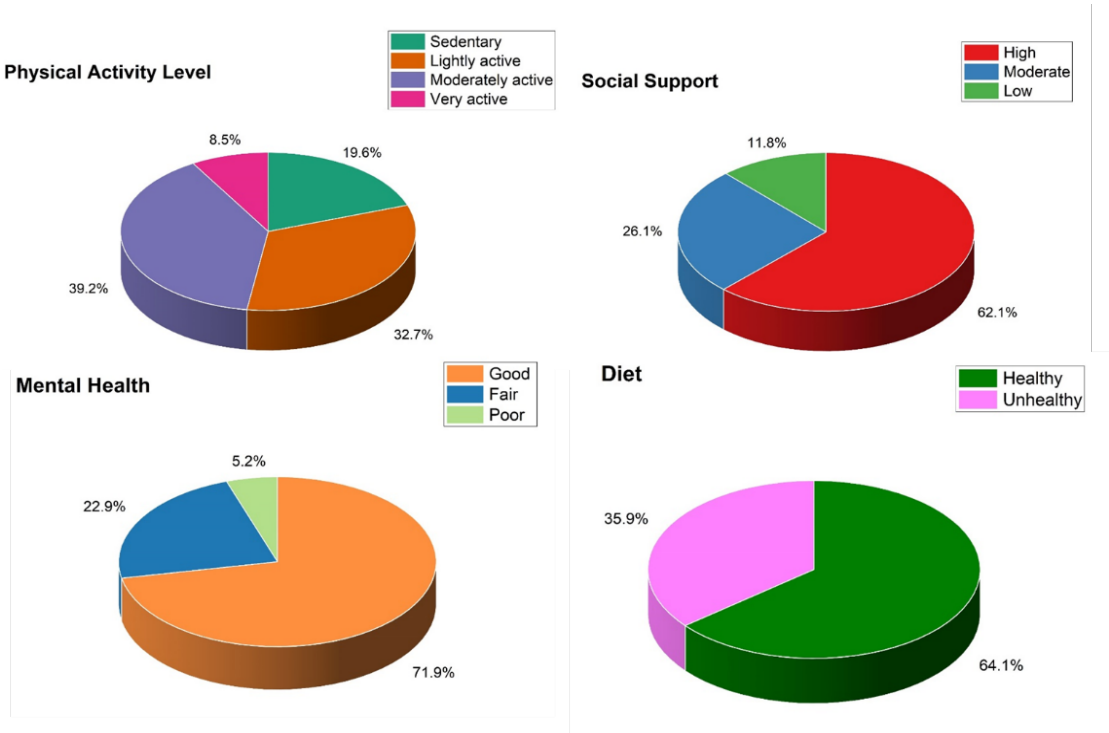

Figure 1. Demographic of Respondents

https://doi.org/10.56294/hl2022107

Procedure for Collecting Data

Data was collected at two different times: Before the surgery (pre-treatment) and after the intervention program (post-treatment). The primary data points included:

- Quality of Life (QoL): used to measure both mental and physical health using standardized instruments, such as the SF-36 (Short Form Health Survey)
- Health Behavior Adherence: Assessed using patient self-report questionnaires that focused on adherence to medication schedules, dietary recommendations, and physical activity guidelines.

At both stages, patients filled out these questionnaires, and their responses were documented for further analysis.

Statistical analysis

The data accumulated using SPSS software was assessed using several statistical techniques:

- Paired T-test: paired t-tests were employed to compare the mean differences in quality of life and health behavior adherence scores between pre-treatment and post-treatment data. This test evaluated the statistical significance of the improvements observed after the intervention.
- Adjusted R^2: the metric is utilized to evaluate the degree to which the data is fitted to the regression model and to determine the amount of variance in the outcomes (quality of life and health behavior adherence) that can be attributed to the intervention.
- Regression Analysis: to explore the connection between the observed changes and the intervention in quality of life and health behavior adherence. A multiple regression model was employed to account for potential confounding factors, including age, gender, and any pre-existing comorbidities.

Effect sizes were calculated to evaluate the results' practical importance, and all statistical analyses were conducted with a significance threshold of $\alpha = 0,05$.

RESULTS

Paired T-test

Table 2. The result of the Paired T-test of CABG patients

Metric	Metric	MD	SD	SE	95 % CI Lower	95 % CI Upper	T-Statistic	df	P-Value
Quality of Life (QoL)	(PH)	0,9	1,5	0,12	0,66	1,14	7,5	152	< 0,001
	(MH)	0,8	1,2	0,1	0,58	1,02	8	152	< 0,001
	(SWB)	0,5	1,3	0,11	0,33	0,67	4,5	152	0,001
	(OS)	0,7	1,4	0,11	0,5	0,9	6,4	152	< 0,001
Health Behavior Adherence	(M)	0,3	1,1	0,09	0,14	0,46	3,5	152	0,002
	(D)	0,9	1	0,08	0,74	1,04	11,3	152	< 0,001
	(PA)	0,5	1,3	0,11	0,3	0,7	4,5	152	0,001
	(LM)	0,7	1,2	0,1	0,5	0,85	7	152	< 0,001

Note: MD (Mean Difference); SE (Standard Error); df (Degree of Freedom); SD (Standard Deviation)

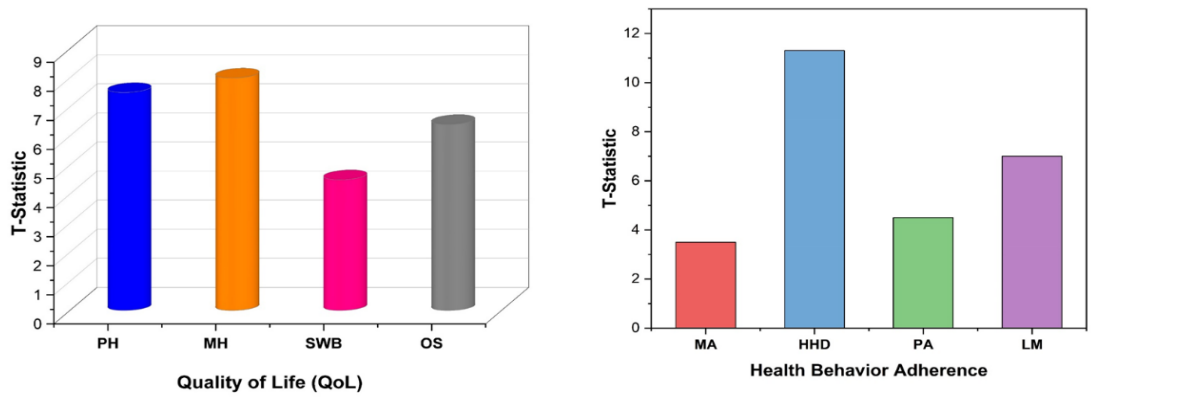

Figure 2. Outcome of intervention of QoL and Health Behaviors Adherence

The results of the paired t-test, table 2, and figure 2 indicate notable improvements across several metrics following the intervention. Physical Health (PH) increased from 6,2 to 7,1 (MD = 0,9, t = 7,5, p < 0,001). The improvement in Mental Health (MH) from 4,5 to 5,3 (MD = 0,8, t = 8,0, p < 0,001). The Social Well-Being (SWB) experienced scores improved less from 5,7 to 6,2 (MD = 0,5, t = 4,5, p = 0,001). Overall Satisfaction (OS) also improved from 6,0 to 6,7 (MD = 0,7, t = 6,4, p < 0,001). Considering Adherence to health behaviors also showed positive changes: Medications (M) increased from 4,9 to 5,2 (MD = 0,3, t = 3,5, p = 0,002), Diet (D) improved from 4,2 to 5,1 (MD = 0,9, t = 11,3, p < 0,001), Physical Activity (PA) went from 5,4 to 5,9 (MD = 0,5, t = 4,5, p = 0,001), and Lifestyle Modifications (LM) improves from 4,8 to 5,5 (MD = 0,7, t = 7,0, p < 0,001). These findings highlight significant advancements in both Quality of life and adherence to health behaviors.

Multiple Regression Analysis

Table 3. The result of Multiple Regression Analysis of CAGB patients

Metrics	Unstandardized Coefficients (B)	Standardized Coefficients (ß)	p -value	t -value	95 % Confidence Interval (Lower)	95 % Confidence Interval (Upper)
MA	0,05	0,12	0,042	2,08	0,01	0,1
HHD	0,15	0,22	0,015	2,52	0,04	0,26
PA	0,2	0,28	0,005	3,05	0,1	0,3
LM	0,12	0,18	0,06	1,91	-0,01	0,24
PH	0,25	0,32	0,002	3,45	0,12	0,38
MH	0,18	0,28	0,01	2,74	0,08	0,29
SWB	0,1	0,15	0,08	1,92	-0,02	0,22
OS	0,3	0,35	0,001	4,11	0,15	0,45

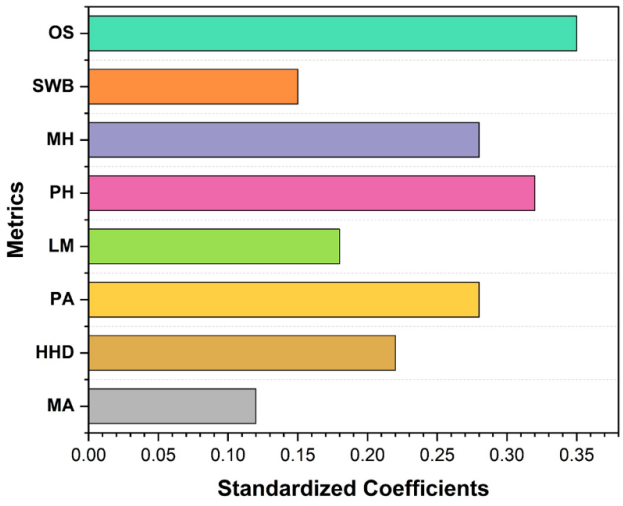

Figure 3. Outcome of Multiple Regression Analysis of CAGB patient

Table 3 and figure 3 show a multiple regression analysis that investigates independent factors (MA, HHDM PA, PA, LM) impact four health behavior adherence (PH, MH, SWB, and OS) in patients with coronary artery disease. The unstandardized coefficients (B) indicate the extent to which each factor influences changes in these health outcomes. The MA variable (B = 0,05, ß = 0,12, p = 0,042) shows a small statistically significant effect on health outcomes. MA (B = 0,15, ß = 0,22, p = 0,015) and PA (B = 0,20, ß = 0,28, p = 0,005) demonstrate stronger effects, with PA having the most substantial impact. LM (B = 0,12, ß = 0,18, p = 0,060) has a weaker effect, barely surpassing the significance threshold. In terms of the dependent variables, PH (B = 0,25, ß = 0,32, p = 0,002) and OS (B = 0,30, ß = 0,35, p = 0,001) reveal the most significant correlations with the independent variables, highlighting the importance of lifestyle factors in shaping these outcomes. MH (B = 0,18, ß = 0,28, p = 0,010) and SWB (B = 0,10, ß = 0,15, p = 0,080) also exhibit moderate effects, with SWB being the least significant.

Adjusted R^2

Table 4 and figure 4 illustrate how different factors influence recovery after CABG surgery. PH has an adjusted R^2 of 0,52, meaning it accounts for 52 % of the variation in recovery, with a strong statistical significance (p < 0,001).

https://doi.org/10.56294/hl2022107

Table 4. The result of Adjusted R^2 of CABG patients

Category	Metrics	Adjusted R^2	p-value	Standard Error (SE)	95 % CI for R^2	Model Predictor Contribution (%)
Health Behavior Adherence	MA	0,58	<0,001	0,06	[0,54, 0,62]	25,1
	HHD	0,5	<0,001	0,07	[0,45, 0,55]	21,6
	PA	0,43	<0,01	0,08	[0,38, 0,48]	18,6
	LM	0,46	<0,01	0,08	[0,41, 0,51]	20
Quality of Life (QoL)	PH	0,52	<0,001	0,07	[0,48, 0,56]	22,5
	MH	0,48	<0,001	0,08	[0,43, 0,53]	20,7
	SW	0,4	<0,01	0,09	[0,34, 0,46]	17,2
	OS	0,45	<0,001	0,08	[0,40, 0,50]	19,4

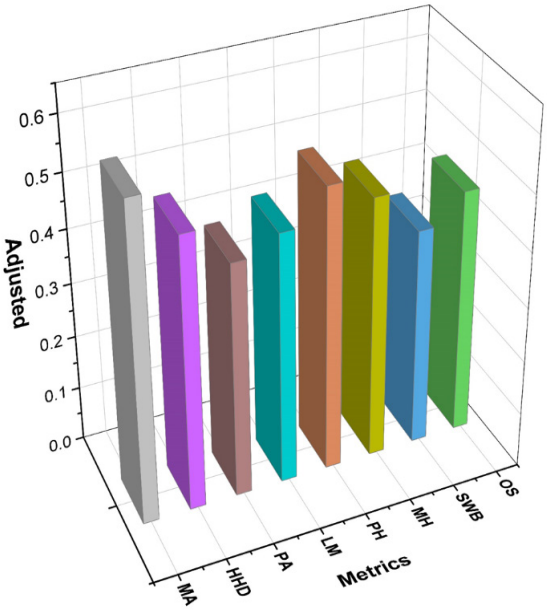

Figure 4. Outcome of Adjusted R^2 of CABG patients

MH shows an adjusted R^2 of 0,48, which explains 48 % of the variation, while SW has an adjusted R^2 of 0,40, accounting for 40 % of the variation. Notably, MA has an adjusted R^2 of 0,58, explaining 58 % of the variation and contributing 25,1 % to the overall model. Other factors, such as HHD and PA, have adjusted R^2 values of 0,50 and 0,43, respectively, indicating their moderate significance. The 95 % CI for all variables is narrow, suggesting reliable estimates, and the SE indicates that the predictions are fairly accurate.

DISCUSSION

The results indicate notable enhancements in quality of life (QoL) and adherence to health behaviors following the intervention. The paired t-test demonstrated that PH improved from 6,2 to 7,1 ($p < 0,001$), MH rose from 4,5 to 5,3 ($p < 0,001$), and OS increased from 6,0 to 6,7 ($p < 0,001$). Improvements were also seen in adherence health behaviors: MA went from 4,9 to 5,2 ($p = 0,002$), HHD improved from 4,2 to 5,1 ($p < 0,001$), PA increased from 5,4 to 5,9 ($p = 0,001$), and LM rose from 4,8 to 5,5 ($p < 0,001$). Regression analysis revealed that PH (B = 0,20, β = 0,28, p = 0,005) and HHD (B = 0,15, β = 0,22, p = 0,015) had the most significant effects on health outcomes. The adjusted R^2 values showed that MA explained 58 % of the variation in outcomes, while HHD explained 50 % and PA explained 43 %. These results show that changes in health behaviors are critical to improving quality of life after CABG surgery.

CONCLUSIONS

Intervention greatly improved the quality of life and adherence to health behaviors in patients undergoing CABG surgery, indicating the important role that post-surgery support plays in ensuring long-term recovery. Improvements in lifestyle in the areas of medication intake at all times, exercise at frequent intervals, and sticking to diet prescriptions are the important facets that are supposed to emerge due to intervention. Statistical analysis proved that these changes indeed enhanced quality of life and commitment to health practices. These

findings highlight the need for healthcare providers to employ interventions that promote sustainable lifestyle changes in support of patients post-CABG surgery. An organized approach to post-operative care can significantly minimize the risk of complications, thus leading to better patient outcomes and recovery. This underlines the need for post-surgery care strategies that are personalized to satisfy each patient's requirements.

The drawback of relying solely on self-report data is that patient bias can significantly affect the outcome of the health behavior adherence. Future research could focus on the use of digital monitoring devices to allow continuous and more precise tracking of the patient's behaviors.

BIBLIOGRAPHIC REFERENCES

1. Steinmetz C, Bjarnason-Wehrens B, Baumgarten H, Walther T, Mengden T, Walther C. Prehabilitation in patients awaiting elective coronary artery bypass graft surgery–effects on functional capacity and quality of life: a randomized controlled trial. Clinical rehabilitation. 2020 Oct;34(10):1256-67.

2. Açıkel ME. Evaluation of depression and anxiety in coronary artery bypass surgery patients: a prospective clinical study. Brazilian Journal of cardiovascular surgery. 2019 Aug 5;34:389-95.

3. Dos Santos TD, Pereira SN, Portela LO, Cardoso DM, Dal Lago P, dos Santos Guarda N, Moresco RN, Pereira MB, de Albuquerque IM. Moderate-to-high intensity inspiratory muscle training improves the effects of combined training on exercise capacity in patients after coronary artery bypass graft surgery: A randomized clinical trial. International journal of cardiology. 2019 Mar 15;279:40-6.

4. Hoyler MM, Tam CW, Thalappillil R, Jiang S, Ma X, Lui B, White RS. The impact of hospital safety-net burden on mortality and readmission after CABG surgery. Journal of Cardiac Surgery. 2020 Sep;35(9):2232-41.

5. Pahwa S, Bernabei A, Schaff H, Stulak J, Greason K, Pochettino A, Daly R, Dearani J, Bagameri G, King K, Viehman J. Impact of postoperative complications after cardiac surgery on long-term survival. Journal of cardiac surgery. 2021 Jun;36(6):2045-52.

6. Højskov IE, Moons P, Egerod I, Olsen PS, Thygesen LC, Hansen NV, La Cour S, Bech KH, Borregaard B, Gluud C, Winkel P. Early physical and psycho-educational rehabilitation in patients with coronary artery bypass grafting: A randomized controlled trial. Journal of Rehabilitation Medicine. 2019 Feb 1;51(2):136-43.

7. Højskov IE, Thygesen LC, Moons P, Egerod I, Olsen PS, Berg SK. The challenge of non-adherence to early rehabilitation after coronary artery bypass surgery: Secondary results from the SheppHeartCABG trial. European journal of cardiovascular nursing. 2020 Mar 1;19(3):238-47.

8. Rakhshan M, Toufigh A, Dehghani-Firouzabadi A, Yektatalab S. Effect of Cardiac Rehabilitation on Hope Among Cardiac Patients After Coronary Artery Bypass Graft Surgery. Risk Management and Healthcare Policy. 2020 Aug 25:1319-26.

9. Musa AF, Yasin MS, Smith J, Yakub MA, Nordin RB. The Malay version of SF-36 health survey instrument: testing data quality, scaling assumptions, reliability and validity in post-coronary artery bypass grafting (CABG) surgery patients at the National Heart Institute (Institut Jantung Negara—IJN), Kuala Lumpur. Health and Quality of Life Outcomes. 2021 Dec;19:1-1.

10. AbuRuz ME. Pre-operative depression predicted longer hospital length of stay among patients undergoing coronary artery bypass graft surgery. Risk management and healthcare policy. 2019 May 13:75-83.

11. AbuRuz ME, Momani A, Shajrawi A. The association between depressive symptoms and length of hospital stay following coronary artery bypass graft is moderated by perceived control. Risk Management and Healthcare Policy. 2021 Apr 13:1499-507.

12. Højskov IE, Thygesen LC, Moons P, Egerod I, Olsen PS, Berg SK. The challenge of non-adherence to early rehabilitation after coronary artery bypass surgery: Secondary results from the SheppHeartCABG trial. European journal of cardiovascular nursing. 2020 Mar 1;19(3):238-47.

13. Francis T, Kabboul N, Rac V, Mitsakakis N, Pechlivanoglou P, Bielecki J, Alter D, Krahn M. The effect of cardiac rehabilitation on health-related quality of life in patients with coronary artery disease: a meta-analysis. Canadian Journal of Cardiology. 2019 Mar 1;35(3):352-64.

https://doi.org/10.56294/hl2022107

14. Willemsen LM, Janssen PW, Peper J, Soliman-Hamad MA, van Straten AH, Klein P, Hackeng CM, Sonker U, Bekker MW, von Birgelen C, Brouwer MA. Effect of Adding Ticagrelor to Standard Aspirin on Saphenous Vein Graft Patency in Patients Undergoing Coronary Artery Bypass Grafting (POPular CABG) A Randomized, Double-Blind, Placebo-Controlled Trial. Circulation. 2020 Nov 10;142(19):1799-807.

15. Tian M, Wang X, Sun H, Feng W, Song Y, Lu F, Wang L, Wang Y, Xu B, Wang H, Liu S. No-touch versus conventional vein harvesting techniques at 12 months after coronary artery bypass grafting surgery: multicenter randomized, controlled trial. Circulation. 2021 Oct 5;144(14):1120-9.

FINANCING

No financing.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHORSHIP CONTRIBUTION

Data curation: Uma Bhardwaj, Ram Garg, Soumya Ranjan Mahapatra, Malathi.H.
Methodology: Uma Bhardwaj, Ram Garg, Soumya Ranjan Mahapatra, Malathi.H.
Software: Uma Bhardwaj, Ram Garg, Soumya Ranjan Mahapatra, Malathi.H.
Drafting - original draft: Uma Bhardwaj, Ram Garg, Soumya Ranjan Mahapatra, Malathi.H.
Writing - proofreading and editing: Uma Bhardwaj, Ram Garg, Soumya Ranjan Mahapatra, Malathi.H.

ANNEXES

Variable	Statement	Scale (1-5)
Physical Health (PH)	1. Pain management is effective in daily activities.	1- Strongly Disagree 2- Disagree 3- Somewhat disagree 4- Neutral 5- Strongly Agree
	2. Energy levels are sufficient for completing daily tasks.	1- Strongly Disagree 2- Disagree 3- Somewhat disagree 4- Neutral 5- Strongly Agree
	3. Mobility is not limited to performing daily activities.	1- Strongly Disagree 2- Disagree 3- Somewhat disagree 4- Neutral 5- Strongly Agree
Mental Health (MH)	1. Emotional well-being is generally stable.	1- Strongly Disagree 2- Disagree 3- Somewhat disagree 4- Neutral 5- Strongly Agree
	2. Sleep quality is good and restful.	1- Strongly Disagree 2- Disagree 3- Somewhat disagree 4- Neutral 5- Strongly Agree
	3. Cognitive function is not impaired by daily tasks.	1- Strongly Disagree 2- Disagree 3- Somewhat disagree 4- Neutral 5- Strongly Agree
Social Well-Being (SW)	1. Social support from family and friends is sufficient.	1- Strongly Disagree 2- Disagree 3- Somewhat disagree 4- Neutral 5- Strongly Agree
	2. Social activities are engaging and frequent.	1- Strongly Disagree 2- Disagree 3- Somewhat disagree 4- Neutral 5- Strongly Agree
	3. There is a strong connection with others in the social circle.	1- Strongly Disagree 2- Disagree 3- Somewhat disagree 4- Neutral 5- Strongly Agree
Overall Satisfaction (OS)	1. Satisfaction with care received after surgery is high.	1- Strongly Disagree 2- Disagree 3- Somewhat disagree 4- Neutral 5- Strongly Agree
	2. Overall health status is better after surgery.	1- Strongly Disagree 2- Disagree 3- Somewhat disagree 4- Neutral 5- Strongly Agree
	3. Current health status meets expectations post-surgery.	1- Strongly Disagree 2- Disagree 3- Somewhat disagree 4- Neutral 5- Strongly Agree

https://doi.org/10.56294/hl2022107

Medication Adherence (MA)	1. Medications are taken as prescribed (on time and correct dosage).	1- Strongly Disagree 2- Disagree 3- Somewhat disagree 4- Neutral 5- Strongly Agree
	2. There are no issues with remembering to take medications.	1- Strongly Disagree 2- Disagree 3- Somewhat disagree 4- Neutral 5- Strongly Agree
	3. Medications are consistently taken according to the prescribed schedule.	1- Strongly Disagree 2- Disagree 3- Somewhat disagree 4- Neutral 5- Strongly Agree
Heart-Healthy Diet (HHD)	1. A heart-healthy diet is consistently followed.	1- Strongly Disagree 2- Disagree 3- Somewhat disagree 4- Neutral 5- Strongly Agree
	2. A sufficient amount of fruits, vegetables, and whole grains are consumed daily.	1- Strongly Disagree 2- Disagree 3- Somewhat disagree 4- Neutral 5- Strongly Agree
	3. High-fat or high-sodium foods are avoided consistently.	1- Strongly Disagree 2- Disagree 3- Somewhat disagree 4- Neutral 5- Strongly Agree
Physical Activity (PA)	1. Regular physical activity or exercise is incorporated into daily routine.	1- Strongly Disagree 2- Disagree 3- Somewhat disagree 4- Neutral 5- Strongly Agree
	2. Physical activity intensity is adequate for health improvement.	1- Strongly Disagree 2- Disagree 3- Somewhat disagree 4- Neutral 5- Strongly Agree
	3. At least 30 minutes of physical activity is performed consistently.	1- Strongly Disagree 2- Disagree 3- Somewhat disagree 4- Neutral 5- Strongly Agree
Lifestyle Modifications (LM)	1. Smoking or tobacco use is completely avoided.	1- Strongly Disagree 2- Disagree 3- Somewhat disagree 4- Neutral 5- Strongly Agree
	2. Alcohol consumption is limited or avoided.	1- Strongly Disagree 2- Disagree 3- Somewhat disagree 4- Neutral 5- Strongly Agree
	3. Efforts are made to maintain a healthy weight.	1- Strongly Disagree 2- Disagree 3- Somewhat disagree 4- Neutral 5- Strongly Agree

https://doi.org/10.56294/hl2022107