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The impact of cognitive behavioral therapy (CBT) on compatibility dimensions, academic achievement, and smoking cessation

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ABSTRACT

This study examines the efficacy of Cognitive Behavioural Therapy (CBT) in enhancing compatibility dimensions (personal and emotional, health and physical, family, and social), reducing smoking behaviour, and its indirect impact on academic achievement among university students. Employing a longitudinal, quasi-experimental design, the research engaged 39 students at Al-Isra University who underwent CBT sessions, with assessments conducted at four intervals: pre-treatment, immediately post-treatment, and at one- and three-month follow-ups. Findings reveal that CBT significantly improved compatibility dimensions across all categories, affirming its potential to ameliorate personal and emotional well-being, physical health, and social and family dynamics. Concurrently, a marked reduction in smoking behaviour was observed, highlighting CBT's efficacy in smoking cessation. Contrary to expectations, enhancements in compatibility dimensions did not translate into measurable changes in academic achievement within the study's timeframe, suggesting the complexity of factors influencing academic performance. These outcomes underscore the multifaceted benefits of CBT in fostering well-being among university students and advocate for the integration of holistic psychological interventions within student support services. However, the lack of a direct correlation between compatibility improvements and academic success calls for a broader approach to enhancing student performance, encompassing academic and institutional support mechanisms alongside psychological interventions. This research contributes to the understanding of CBT's broad-spectrum benefits, emphasizing the need for comprehensive support strategies that address the psychological, social, and academic dimensions of student life. Future studies are encouraged to explore the long-term effects of CBT on academic outcomes and to examine the interplay of contextual and institutional factors in students' academic success.

Keywords: Cognitive Behavioural Therapy, CBT, compatibility dimension, academic achievement, smoking cessation

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1. Introduction

The learners in the constantly evolving higher education environment have to cope with a complex chain of challenges unrelated to the academic process only, and cover the individual, emotional, physical, family, and social spheres [1, 2]. Other risk factors contributing to the complexity of these

problems include a way of life that includes addictive habits such as smoking; these negatively influence one's social interactions in and out of school besides having adverse effects on one's health [3, 4]. In the present study, we seek to understand the possibility of change in CBT as a total approach aimed at modifying these various through integrated aspects of university student's lives while considering the interaction of these elements. The devised theory of this research study is that CBT can facilitate these changes and thereby create an environment that fosters academic learning disposition- personal and emotional, physically healthy, familial, and social compatibility [5-7]. While it is centered on the multiple benefits of CBT – compatibility increase, or smoking cessation, the potential consequential effects on performance are studied covertly by the author. The usage of CBT in this study is concerned with the goals of normal therapy and exploring whether the enhancement of mental and physical health will result in an improved learning environment in schools, universities, and colleges [8, 9]. Moreover, smoking is common among college students and is used as an effective method of dealing with stress. This has been considered a significant danger to academic performance together with health issues [10]. This research therefore investigates how increases in compatibility dimensions and decreases in smoking behavior could help academic performance when smoking cessation is integrated into CBT [11]. Studying these links is possible and necessary since it provides evidence in favor of the integration of focused behavioral interventions in academic settings to encourage better lifestyle choices and improve academic performance.

CBT has evolved and engaged in treating a wide range of psychiatric conditions by combining cognitive and behavioral techniques [8]. CBT has also been widely used successfully to manage other illnesses because of its versatility; it has been chosen by health practitioners for managing cases of substance misuse, eating disorders, anxiety, and depressive disorders. Depressed college students have also been managed using CBT, as well as those with social anxiety, and stress related to one's academic studies. Findings have shown that CBT is effective in leading to better overall quality of life and better academic performance [12, 13]; it has also been shown that CBT may reduce the student's stress and anxiety levels and enhance academic performance [14]. Psychotherapy, particularly CBT, is of immense value in the effort of smoking cessation [15, 16]. In [16], they established that the CBT therapies which involve stress management, problem-solving, self-monitoring, and coping skills training were found to increase the chance of smoking cessation [10]. These results are rather relevant to college students because stress and social factors influence smoking rates [15]. Compatibility dimensions: Include the social, family, physical, and emotional facets, as well as the personal and emotional facets. These are all crucial for people's overall health and ability to cope with the challenges they face in college, as well as in everyday life. Personal and Emotional Compatibility: relates to how a person responds to themselves and pertains to such aspects as their ability to withstand stress, mastery of emotions, and self-esteem. Health and Physical Compatibility: comprises one's physical state of health, as well as the related activities.

Family Compatibility: comprises family relationships and the various triangles.

Social Compatibility: This component focuses on how individuals and the general society relate with other people.

The study also seeks to determine the relationship between academic success and an increase in compatibility aspects among the students. It is believed that CBT-enhanced improvements in the physical and psychological well-being of the learners, their families, and their interactions with others, as well as any interactions or relationships with others within the education environment, may be more conducive to better performance. This research is grounded on the realization that school achievement is associated with some facets of students' lives and that each compatibility factor may affect students' functionality during their academic **lives.** The compatibility aspects are also included in CBT, although the authors stressed that CBT is quite broad in its concepts of treating mental disorders and other aspects of the subject's quality of life [17]. Thus, by modifying the cognitive and behavioral processes that contribute to problems in one or more facets of life, CBT drives comprehensive changes not only at the symptom level but also at the life-sphere level of individual and communal existence, personal-emotional-physical-familial-social efficacy, or effectiveness. The literature review also expounds on the details of smoking among college students which is one of the leading vices affecting many students [10]. This habit is most times occasioned by the stress and pressure that college students go through because of their studies [15]. Smoking behavior was selected for focus due to the adverse effects smoking has on health and academic performance, as well as the spikes in engagement with CBT as a potential

smoking cessation aid [18]. The reasons for including academic accomplishment within the framework of this research approach are: first, it acknowledges the centrality of academic success to a student's well-being by defining success as parity with achievement [19]. Second, it provides a different perspective to answer questions regarding possible secondary consequences of CBT on academic achievement, as well as the intermediary positions of smoking decrease and compatibility characteristics improvement [13]. This is based on the assumption that approaches that improve the general quality of life foster the appropriate learning atmosphere for success. Lastly, holism is a necessity in the understanding and approach to the students' welfare since the university environment is not only dynamic but also involves a lot of contacts and interfacing with family issues. This study acknowledges that who fits where in terms of familial and societal expectations can impact students' decisions in complicated ways. The research also aims at establishing the broader significance of enhanced social and family relationships as regards to students' learning and achievement by assessing the effects of CBT in such aspects. In this way, it promotes a more refined perspective of the aspects that promote achievement and creates space for general approaches to learning that address the individual needs of college students.

1.1. Theoretical framework

The present study utilizes the CBT framework to examine its impact on the following aspects of university students' lives - academic performance, family relations, health/physical condition, personal/emotional compatibility, and smoking [20].

Key components of the CBT framework: Cognitive restructuring is the process when certain unfavorable and distorted perceptions and beliefs, which promote unhealthy behaviors such as smoking and psychological distress, are identified and challenged [21]. Behavioral Activation and Modification: CBT aims to encourage better behavior and engagement in worthwhile activities [22, 23]. In the context of this study, this may refer to ways of increasing social interaction and physical activity to enhance health and physical fitness and compatibility, as well as social compatibility. Stress management and training in coping skills: CBT helps people learn how they should deal with stress so that they can develop proper methods of handling stress. Relapse prevention: Preparing people for any relapses is one of the most important components of cognitive behavioral therapy (CBT), hence, a vital aspect of its application in academic settings. Even as CBT is used in the treatment of psychiatric disorders, academic settings could also benefit from the use of CBT[24, 25].

1.1.1. Social cognitive theory (SCT)

Important SCT components that apply to this study are:

Reciprocal Determinism: This concept of SCT focuses on how people's behavior or actions influence their environment, as well as themselves [26].

Observational Learning: Under SCT, learning may take place by observing other persons' actions and adapting them to one's daily life (Luszczynska & Schwarzer, 2020).

Self-Efficacy: Another theory related to SCT is Bandura's self-efficacy, which is the belief in one's capabilities to carry out the required behavior to attain certain performance outcomes [27].

1.1.2. Transtheoretical model of change (TTM)

According to the Transtheoretical Model of Change (TTM) proposed by Prochaska and DiClemente (1983), the process of deliberate behavior changes entails pre-contemplation, contemplation, preparation, action, and maintenance. TTM explains how individuals may proceed through different stages of smoking cessation and embrace better habits [28]. Important features of TTM that apply to this research include phases of Change: In light of students' readiness to quit smoking and improve their health, TTM phases of change are a map for interventions. Processes of Change: To go through the phases, people use 10 processes of change that the TTM has identified [29]. Decisional Balance: This TTM component involves evaluating the advantages and disadvantages of changing behavior.

2. Research objectives

1. To evaluate the efficacy of CBT on compatibility dimensions, academic achievement, and smoking cessation:
2. To analyze the relationship between improvements in compatibility dimensions, smoking behavior reduction, and academic achievement.

Hypotheses
H1: CBT treatment has a significant positive impact on compatibility dimensions.

H2: CBT treatment has a significant positive impact on smoking behaviour change.

H3 CBT treatment has a significant positive impact on academic achievement.

3. Method

3.1. Research design

This study employed a longitudinal, quasi-experimental design to examine the impact of Cognitive Behavioural Therapy (CBT) on smoking behaviour, and compatibility dimensions among university students. The intervention's effects were assessed at four time points: baseline (pre-treatment), immediately post-treatment, one-month post-treatment, and three months post-treatment.

3.2. Participants

The study involved 39 university smoking students. Participants were recruited from Al-Isra University through flyers, social media announcements, and referrals from the university counseling centre. Inclusion criteria included being 18 years of age or older, enrolled full-time at the university, and having smoked at least five cigarettes per day for the past year. Exclusion criteria included current engagement in other smoking cessation programs or psychological treatments.

3.3. Intervention

The CBT intervention was designed specifically for smoking cessation and enhancement of compatibility dimensions. The program consisted of 8-week sessions, each lasting approximately 60 minutes. Sessions incorporated cognitive restructuring to address maladaptive thoughts related to smoking and compatibility dimensions, behavioural strategies to promote healthier habits, and skills training in stress management, problem-solving, and emotional regulation.

3.4. Measures

Smoking Behaviour: Measured with the Fagerström Test for Nicotine Dependence (FTND) and cigarettes per day (CPD) as a self-report. Compatibility Dimensions: Assessed utilizing ad hoc and standardized parameters specifically for each dimension; Personal and Emotional Compatibility Scale, Health and Physical Compatibility Scale, Family Compatibility Scale, and Social Compatibility Scale. Academic Achievement: Assessed using the participants' self-report of the GPA and through the participants' records which were provided to the researchers under the consent of the participants.

3.5. Data collection

The online survey questionnaires were administered at the said time points whereas the FTND was administered on a face-to-face basis. For the analyses, changes in smoking behavior, compatibility dimension, and academic achievement were examined by repeated measures of ANOVA. Descriptive and correlational analyses in the form of Pearson product-moment correlations were also used to check the relationships between changes in compatibility dimensions, smoking status, and academic performance of the students.

3.6. Data analysis

All the data collected during the study were analyzed statistically for the mean and standard deviation. One-way ANOVA was performed independently for all the measures used as the outcome variables; this is to allow for easy comparison of the mean scores at the four different time points: pre-treatment, immediate post-treatment, one-month post-treatment, and three months post-treatment. For smoking behaviour, Fagerström Test for Nicotine Dependence (FTND) scores and self-reported daily cigarette consumption. For each compatibility dimension, separate repeated measures ANOVAs were conducted to evaluate changes in personal and emotional, health and physical, family, and social compatibility scores. For academic achievement, changes in self-reported GPA were analyzed to determine the intervention's impact on academic performance.

Correlational Analysis: To explore the relationships between changes in compatibility dimensions, smoking behaviour, and academic achievement, Pearson correlation coefficients were calculated. This analysis aimed to identify potential associations that might indicate indirect effects of the intervention on academic performance through improvements in compatibility dimensions and reductions in smoking behaviour.

4. Results and discussion

4.1. CBT and compatibility dimension

H1: The study hypothesized that CBT would significantly improve measures of personal attitudes and emotional regulation.

Table 1. CBT and personal and emotional compatibility

Period	Mean	Std. Deviation
Pre-Treatment	51.41	5.775
Post Treatment	28.54	5.656
One Month Post Treatment	47.00	8.454
Three Months of treatment	49.23	6.631

The analysis supports the hypothesis that CBT-based smoking cessation treatment leads to significant improvements in personal and emotional compatibility. The greatest change occurred immediately after the treatment, with some rebound effect observed at one- and three months post-treatment. The repeated measures ANOVA revealed significant effects of time on personal and emotional compatibility scores (Wilks' Lambda = 0.118, F (3, 36) = 90.049, p < .000, Partial Eta Squared = .882).

Table 2. ANOVA analyses

Source	Time	Type III Sum of Squares	Mean Square	F	Sig.	Partial Eta Squared
Time	Linear	277.212	277.212	19.807	.000	.343
	Quadratic	6143.853	6143.853	254.488	.000	.870
	Cubic	6461.571	6461.571	95.769	.000	.716

4.2. H2 CBT, health, and physical compatibility

The study aimed to investigate whether CBT would lead to significant enhancements in health and physical compatibility due to behavioral changes and improved health practices. The repeated measures ANOVA indicated significant effects of time on health and physical compatibility (Wilks' Lambda = 0.129, F (3, 36) = 81.143, p < .000, Partial Eta Squared = .871). The assumption of sphericity was violated as shown by Mauchly's Test (W = .043, p < .000), leading to corrections using Greenhouse-Geisser estimates. Further analysis of within-subjects contrasts revealed significant linear, quadratic, and cubic trends

Table 3. CBT, health, and physical compatibility

Tests of Within-Subjects Contrasts						
Measure: MEASURE_1						
Source	Time2	Type III Sum of Squares	df	Mean Square	F	Sig.
Time2	Linear	353.365	1	353.365	60.764	.000
	Quadratic	7798.776	1	7798.776	215.221	.000
	Cubic	6577.212	1	6577.212	181.383	.000

4.3. H3: CBT and family compatibility

The hypothesis posited that CBT would lead to significant improvements in family compatibility by enhancing communication and coping strategies, thereby reducing family-related stress. ANOVA results indicated significant changes in family compatibility scores over time:

- Multivariate Tests: Significant effects of time were observed on family compatibility (Wilks' Lambda = 0.135, F (3, 36) = 76.898, p < .000, Partial Eta Squared = .865).
- Sphericity Assumptions: Mauchly's Test indicated a violation of sphericity (W = .134, p < .000), necessitating corrections with Greenhouse-Geisser estimates (Epsilon = .588).
- Within-Subjects Effects:
    - Sphericity Assumed F (3, 36) = 167.668, p < .000.
    - Greenhouse-Geisser Correction F (1.765, 67.060) = 167.668, p < .000.
- Within-subjects contrasts showed significant linear, quadratic, and cubic trends:
    - Linear: F (1, 38) = 109.714, p < .000
    - Quadratic: F (1, 38) = 161.595, p < .000
    - Cubic: F (1, 38) = 183.952, p < .000

Table 4. CBT and Family Compatibility

Tests of Within-Subjects Contrasts						
Measure: MEASURE_1						
Source	Time3	Type III Sum of Squares	df	Mean Square	F	Sig.
Time3	Linear	1094.585	1	1094.585	109.714	.000
	Quadratic	6827.077	1	6827.077	161.595	.000
	Cubic	9429.415	1	9429.415	183.952	.000
Tests of Between-Subjects Effects						
Measure: MEASURE_1						
Transformed Variable: Average						
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	
Intercept	303425.641	1	303425.641	2807.541	.000	
Error	4106.859	38	108.075			

4.4. H4: Fostering social compatibility through cognitive behavioural therapy

This study assesses the impact of Cognitive Behavioural Therapy (CBT) on social compatibility among individuals participating in a smoking cessation program. The hypothesis proposed that CBT would significantly enhance social compatibility, facilitating healthier social interactions and reducing dependence on smoking in social settings. Participants' social compatibility was evaluated at four key intervals: before treatment (Pre), immediately after treatment (After), one month after treatment (After1), and three months after treatment (After3). Repeated measures of ANOVA were employed to determine changes in social compatibility scores across these time points.

Descriptive statistics and repeated measures ANOVA findings indicated significant changes in social compatibility scores over time:

- Multivariate Tests: Significant time effects were found on social compatibility (Wilks' Lambda = 0.117, F (3, 36) = 90.358, p < .000, Partial Eta Squared = .883).
- Sphericity Assumptions: Mauchly's Test of Sphericity indicated a violation (W = .213, p < .000), leading to the application of Greenhouse-Geisser correction (Epsilon = .541).
- Within-Subjects Effects:

- Sphericity Assumed F (3, 36) = 193.686, p < .000.
- Greenhouse-Geisser Correction F (1.623, 61.682) = 193.686, p < .000.

- Within-subjects contrasts demonstrated significant linear, quadratic, and cubic trends:
  - Linear: F (1, 38) = 47.129, p < .000
  - Quadratic: F (1, 38) = 258.650, p < .000
  - Cubic: F (1, 38) = 178.662, p < .000

The data supports the hypothesis, showing that CBT significantly improves social compatibility. These improvements are most marked immediately after treatment and continue, albeit at a varying pace, over the follow-up periods. The significant quadratic and cubic trends suggest an initial dramatic improvement followed by adjustments as individuals integrate these new social behaviours over time. CBT effectively enhances social compatibility, helping individuals develop healthier social interactions and reducing their reliance on smoking in social settings. These improvements have considerable implications for long-term success in smoking cessation programs.

Table 5. Fostering social compatibility through cognitive behavioural therapy

Mauchly's Test of Sphericity

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Time4	.213	56.769	5	.000	.541	.562	.333

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept

Within Subjects Design: Time4

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of within-subjects contrasts

Measure: MEASURE_1

Source	Time4	Type III Sum of Squares	df	Mean Square	F	Sig.
Time4	Linear	577.232	1	577.232	47.129	.000
	Quadratic	9462.981	1	9462.981	258.650	.000
	Cubic	6918.371	1	6918.371	178.662	.000
Error(Time4)	Linear	465.418	38	12.248		
	Quadratic	1390.269	38	36.586		
	Cubic	1471.479	38	38.723		

4.5. H5: Assessment of cognitive behavioural therapy's effectiveness in smoking cessation

This report evaluates the effectiveness of Cognitive Behavioural Therapy (CBT) in guiding students through the Transtheoretical Model (TTM) stages of change, aiming to achieve significant reductions in smoking behaviour. The study hypothesized that CBT would markedly decrease smoking prevalence among participants. Participants' smoking behaviours were assessed at four intervals: before treatment, immediately after treatment, one month following treatment, and three months post-treatment. A repeated measures ANOVA was conducted to analyze changes in smoking behaviour across these time points.

Descriptive statistics and repeated measures ANOVA results indicated significant changes in smoking behaviour over time:

- Multivariate Tests: Significant effects of time were observed on smoking behaviour (Wilks' Lambda = 0.193, $F(3, 36) = 50.060$, $p < .000$, Partial Eta Squared = .807).
- Sphericity Assumptions: Mauchly's Test of Sphericity indicated a violation ($W = .321$, $p < .000$), requiring corrections with Greenhouse-Geisser estimates (Epsilon = .645).
- Within-Subjects Effects:
    - Sphericity Assumed $F(3, 36) = 97.935$, $p < .000$.
    - Greenhouse-Geisser Correction $F(1.934, 73.473) = 97.935$, $p < .000$.
- Within-subjects contrasts demonstrated significant linear, quadratic, and cubic trends:
    - Linear: $F(1, 38) = 108.335$, $p < .000$
    - Quadratic: $F(1, 38) = 92.736$, $p < .000$
    - Cubic: $F(1, 38) = 54.570$, $p < .000$

The findings strongly support the hypothesis, showing that CBT effectively reduces smoking behaviour among participants. The significant changes across the time points indicate that CBT not only helps participants quit smoking but also supports them in maintaining reduced smoking levels post-treatment. The significant trends in linear, quadratic, and cubic contrasts suggest a consistent decrease over time with minor fluctuations. CBT is highly effective in reducing smoking behaviour by guiding participants through the stages of change as proposed by the TTM. This treatment has significant implications for smoking cessation programs, highlighting the importance of psychological interventions in supporting long-term behavioural change.

4.6. H6: Exploring the relationship between compatibility changes and smoking behaviour post-CBT

This segment of the research delves into Hypothesis 6, which posits that improvements in personal and emotional, health and physical, family, and social compatibility dimensions, facilitated by CBT, correlate with a reduction in smoking behaviour. This hypothesis suggests that the broad-spectrum benefits of CBT extend beyond immediate psychological well-being to influence health-related behaviours. Smoking cessation is influenced by a complex interplay of psychological, social, and environmental factors. Hypothesis 6 explores the idea that enhancements in various compatibility dimensions due to CBT might contribute to a decrease in smoking behaviour, highlighting the multifaceted impact of CBT. The study engaged 39 participants in a CBT program, assessing their compatibility dimensions and smoking behaviour at four critical points: before the intervention, immediately after, one month post-intervention, and three months post-intervention. This longitudinal approach aimed to capture the dynamic changes in both compatibility dimensions and smoking behaviour.

- Initial assessments provided a baseline for both compatibility dimensions and smoking behaviour, essential for tracking post-intervention changes.
- Post-CBT, participants exhibited significant improvements in personal and emotional, health and physical, family, and social compatibility, as evidenced by statistical analysis ($p < 0.05$ for all dimensions).
- Concurrently, a marked reduction in smoking behaviour was observed immediately post-intervention, with sustained decreases at one- and three months post-intervention ($p < 0.05$).

- Correlation analysis revealed a significant relationship between improvements in compatibility dimensions and reductions in smoking behaviour ($p < 0.05$), supporting the hypothesis that enhanced compatibility correlates with decreased smoking.

The findings affirm Hypothesis 6, indicating that CBT's broad impact on compatibility dimensions is associated with reduced smoking behaviour. These results underscore the value of holistic therapeutic approaches like CBT, which not only address specific psychological issues but also foster overall well-being, thereby contributing to healthier lifestyle choices, including smoking cessation. While the results are promising, the study's reliance on self-reported measures and the lack of a control group limits the ability to draw causal inferences. Future research should consider incorporating objective measures of smoking behaviour and control groups to further validate these findings. This analysis substantiates the interconnectedness between improvements in compatibility dimensions due to CBT and reductions in smoking behaviour, highlighting the comprehensive benefits of CBT. The findings advocate for the inclusion of CBT in smoking cessation programs, emphasizing the importance of addressing broader aspects of individual well-being in promoting sustainable health behaviour changes.

5. Discussion

The findings of this study clarified the multifaceted and diverse impacts of CBT on college students while prescribing its significance to the eradication of smoking, bracing compatibility factors, and a moderate improvement in academic performance. Such achievements have been due to the integration of CBT with other core theories such as the TTM as well as SCT which offers an overall plan for enhancing the students' welfare and efficiency within class. The observed increase in personal and emotional compatibility after CBT intervention suggests the need for changing the previously used dysfunctional patterns of thinking, which is a key element of the cognitive model. Implications of this study reveal that CBT helps to build a more accurate self-image in students by modifying cognitive distortions about self and emotions, thereby improving their levels of emotional coping. This is especially important for the university context since learners are exposed to different emotional and psychological challenges. This could be because personal and emotional compatibility leads to better ways of handling stress, and enhanced interpersonal relationships, which are critical for a proper learning atmosphere in an institution.

When examining the effects of CBT on such personal and emotional parameters as compatibility of partners among university students, it is necessary to distinguish the relationship between the level of students' academic stress and their psychological state. Regarding this, Al-Habies (2022) provides useful information to this research by examining study-related anxiety and analyzing its gender and year of study differences among EFL university students in Jordan. The results emphasized the universality of academic stress, as well as the vulnerability of the student's emotional state to it, which is why they underlined the importance of the CBT type of intervention.

5.1. Enhancements in health and physical compatibility

The observed improvement in the aspects of physical compatibility and health makes it possible to consider CBT a tool for improving the quality of lifestyle and physical health (Al-shatarat, Al-Kriemeen, & Jreisat, 2021). This does not contradict findings where it was proved that through CBT, clinical practice can enhance the patient's behavior in ways that improve physical well-being (O'Toole et al., 2024). Perhaps, CBT with behavioral activation and modification contributed to the students' improvement of physical health by encouraging them to exercise, have proper diets, and quit bad habits like smoking. This component of CBT is crucial considering that the link between cognitive functioning and physical health may impact academic achievement. Rigorous physical health and mental and psychological health are among the key areas that could be affected by CBT when learning at a university.

5.2. Indirect effect on academic performance

The outcome of the study did not support the initial hypothesis by establishing the relationship between academic accomplishment following CBT sessions and improvements in compatibility traits. This implies that while CBT improved social and family relationship compatibility, health and physical well-being, and personal and emotional well-being, academic performance which was targeted for improvement in this study witnessed no significant change during the period of the study. The above research disproves the initial theory of correlation between psychological health, social relationships, and academic achievement.

Though enhancing the status of well-being and social relations may be helpful, such changes are not necessarily transferred directly to the student's performance. This seems to indicate that many factors affect the performance of students and that the lack of a straightforward relationship between improvements in compatibility and academic achievement may be due to the complexity of the factors involved. This view concurs with other studies that showed the influence of many factors other than a person's psychological health on achievement, institutional support, habits, and the quality of the teaching received. Such a finding is not only counterintuitive, but it also underscores the importance of an enhanced strategy for addressing academic underachievement that takes into account academic and institutional supports besides professionally endorsed psychological interventions such as CBT. It suggests that while CBT has even been quite beneficial for increasing students' well-being level, there might be other necessary strategies to translate the achieved increase in well-being into academic performance.

6. Conclusion

CBT is effective in enhancing personal and emotional compatibility among individuals undergoing smoking cessation. This suggests that CBT not only aids in quitting smoking but also positively influences personal attitudes and emotional regulation. Future research should further explore the complex relationship between psychological well-being, social dynamics, and academic performance, perhaps extending the duration of follow-up to capture long-term academic outcomes. Additionally, incorporating qualitative measures and exploring the impact of contextual and institutional factors on academic achievement may provide a more comprehensive understanding of how best to support student's academic success

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