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THE INTEGRATION OF COGNITIVE BEHAVIORAL THERAPY AND OCCUPATIONAL THERAPY: A COMPREHENSIVE RESEARCH STUDY ON FUNCTIONAL REHABILITATION, EMOTIONAL REGULATION, AND QUALITY OF LIFE

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Abstract
The paper examines how Cognitive Behavioral Therapy (CBT) and Occupational Therapy (OT) can be combined into one model to determine how the results of the two can be combined to achieve functional rehabilitation, emotional regulation, and quality of life (QoL). The integrated dataset was based on the Healful: Wearable Data vs. Self-reported QoL database and used to examine behavioral, sleep, and self-reported QoL measures of thirty participants (adults). The predictive relationships between the physical well-being outcomes, engagement in activities, and sleep parameters were determined using the quasi-experimental correlational design. The findings revealed that the predictors of QoL were the indicators of functional activity, including steps and caloric expenditure ($p < .01$) and emotional regulation proxies, including REM and deep sleep, which mediated the correlation. Interactive effects of cognitive-behavioral activation and occupational engagement in improving physical and emotional health were established through regression analyses ($R^2 = .532$). The findings point to a biopsychosocial model of rehabilitation with a strong focus on the mutual impact of cognition, behavior, and participation. The study offers empirical support to an interdisciplinary CBT-OT integration model, which confirms the methodological possibilities of integrating wearable sensor information with psychometric self-reports. The results support cross-disciplinary therapeutic uses that combine cognitive restructuring with meaningful activity in order to attain the maintenance of functional independence and emotional stability.
Keywords: Cognitive Behavioral Therapy, Occupational Therapy, Functional Rehabilitation, Emotional Regulation, Psychometric Integration

1. INTRODUCTION

Occupational Therapy (OT) and Cognitive Behavioral Therapy (CBT) are two closely related but conventionally different ways of enhancing human functioning and well-being. CBT, which has its conceptualization based on cognitive and behavioral models, focuses on the change of the maladaptive thoughts and behaviors to facilitate emotional regulation and adaptive functioning (Beck, 2020). OT is supposed to help the person participate in their daily life in a valuable manner through functional rehabilitation, environmental adaptation and skill development (Christiansen and Bass, 1997; Christiansen, Bass, and Baum, 2024). The recent success in interdisciplinary areas has demonstrated that the implementation of the principles of CBT to OT interventions can enhance not only the mental health outcomes but also the functional independence and the quality of life in general (Feldman, 2023; Jones, 2025).

CBT and OT combination is founded on the biopsychosocial model, which is concerned with the dynamic interaction of cognitive, emotional, behavioral, and environmental health determinants (Lee et al., 2008). The conceptual similarity of the Model of Human Occupation (MOHO) as a long-standing pillar of OT practice and the focus on volition, habituation, and performance of CBT and offers a framework through which therapeutic change can be functionally applied (Boop et al., 2020). The integration of the CBT approaches of cognitive restructuring and behavioral activation with the performance-based interventions of OT results in the insight and functional competence of patients, which is the key to the development of sustainable rehabilitation outcomes (Marshall et al., 2022).

The efficacy of such integrative approaches is also supported more and more in the body of empirical literature. Investigations demonstrate that in cases, the main elements of CBT, like cognitive restructuring or activity scheduling,

were incorporated into OT sessions, clients complained that they are more motivated, adherent, and satisfied with the outcome of the treatment process (Feldman, 2023; Jones, 2025). Long et al. (2024) emphasized that OT interventions based on mental health and using psychological models generate substantial changes in the success of returning to work and emotional adaptation. The empirical combination of CBT and OT, though conceptual consistency across the two disciplines is not well studied, particularly in predicting measurable outcomes, such as functional rehabilitation, emotional regulation, and quality of life.

The theoretical congruence between CBT and OT can be explained by three overlapping domains that are functional performance, cognitive-emotional regulation, and participation-based well-being. This model is known as CBT and operates under the identification of cognitive distortions and the systematic strengthening of adaptive behaviors (Beck, 2020). OT on the other hand employs meaningful activity and environmental alteration to enable functional participation (Christiansen and Baum, 1997). These frameworks combined allow practitioners to respond to the question of why and how behaviors are altered in contextually significant occupations (Christiansen, Bass, and Baum, 2024).

The description of the MOHO framework by Lee et al. (2008), the volition, habituation, and performance are influenced by the environmental demands and personal beliefs principles that are consistent with the cognitive model of self-efficacy of CBT. The AOTA Practice Framework (Boop et al., 2020) and Curriculum Design Framework (American Occupational Therapy Association, 2021) emphasize the importance of occupation as an outcome and an approach, and the focus on the holistic approach to cognition, behavior, and performance of activities. Cognitive reframing of CBT can be used in this paradigm to enhance the desire to engage in activities, and graded activity participation of OT combines the behavioral reinforcement and emotional stability (Pizzi and Richards, 2017).

This coordinated model is in line with the performance-participation-well-being triad that theorises health as the dynamic result of participatory action and self-governance (Christiansen and Bass, 2024). The combination of CBT principles offers the metacognitive scaffold that clients need to comprehend and adjust the internal obstacles to occupational engagement, and OT transforms these findings into the context-specific behavioral patterns (Kaushik and Sharma, 2021).

The evidence of the reciprocal strengthening of CBT and OT is increasing. Feldman (2023) noted that occupational therapists who had received training in CBT methods cited better client adherence as well as emotional stability in diverse clinical groups. Jones (2025) also revealed that cognitive-behavioral OT interventions enhanced performance satisfaction and emotional well-being in outpatient environments. Complementary results indicated by Long et al. (2024) highlighted the impact of OT models that are psychosocially informed to support the idea of work reentry and functional recovery of individuals with mental health issues.

Lee et al. (2025) offered logical support regarding the reliability and validity of performance-based cognitive tests and systematic evidence of these tests and their applicability in elevating integrated results that encompass both cognitive and functional constructs. Sarsak (2019) highlighted the growing role of OT in the context of interprofessional healthcare, especially its quantifiable impact on the quality indicators of rehabilitation. This change is a response to the paradigm shift suggested by Pizzi and Richards (2017), who recommend a shift towards occupation-focused and well-being-oriented practice instead of an impairment-based one.

The combination of structured cognitive methods of CBT and experiential learning methods of OT can provide a theoretically and empirically based answer to current rehabilitation requirements. Kaushik and Sharma (2021) emphasized, psychotherapeutic understanding together with activity-based rehabilitation is more effective in improving neurobehavioral recovery in stroke, traumatic brain injury, and chronic pain. Marshall et al. (2022) contended that there is a growing permeability between psychotherapy and OT, which should be supported by models that explicitly describe cognitive-behavioral processes in occupation-based interventions.

With these encouraging advances, however, there still exists an acute gap in the empirical literature that studies CBT-OT integration by using measurable behavioral and psychological outcomes. Previous researchers have mainly focused on qualitative results or single variables (e.g., adherence, satisfaction), without the ability to examine the multidimensional interaction of functional engagement, emotional regulation, and quality of life. Moreover, although CBT has been substantiated in terms of its psychological application, its transfer to the occupation-based rehabilitation practice has not been adequately operationalized in the empirical designs (Feldman, 2023; Long et al., 2024).

The present research fills this gap by using the secondary data that connects the variables of physical activity measures, sleep regulation measures, and subjective quality-of-life scores variables which are conceptually aligned with the models of functional rehabilitation and emotional regulation. Using quantitative analysis of the Healthy: Wearable Data vs. Self-Reported QoL Dataset and the Integrated CBT -OT Functional Dataset, this study examines the hypothesis that measurable patterns of activity and self-regulation can be used to predict quality-of-life outcomes in an integrated therapeutic model. The analysis is operationalized as a combination of behavioral activation (CBT) and functional engagement (OT) based on real-life and ecologically valid measures.

Building upon this theoretical foundation, the present study aims to:

1. Evaluate the impact of functional activity (e.g., steps, calories, structured physical engagement) on quality of life within an integrated CBT-OT framework.
2. Examine how emotional regulation proxies (e.g., sleep quality indices) mediate the relationship between functional rehabilitation and well-being.
3. Validate the methodological soundness of the integrated CBT–OT dataset for psychometric and applied research in functional rehabilitation contexts.

It is hypothesized that higher engagement in functional activities will correlate with better emotional regulation and quality of life, confirming the interactive model of behavioral and emotional integration proposed by CBT–OT theoretical convergence.

2. METHODOLOGY

2.1 Research Design

The research design used in this study was a quasi-experimental, correlational one to examine the combined effect of CBT and OT on functional rehabilitation, emotional regulation, and quality of life. The design was selected to test the relationships between behavioral, psychological and functional variables in a natural environment without controlling the clinical environment. The methodology is consistent with the methodological rigour that is required in applied psychology research, which guarantees ecological validity and allows the researcher to have a measurable control over the variables of interest.

The study combines secondary information based on the "Healful: Wearable Data vs Self-Reported QoL" (original Kaggle dataset) (Oliveira et al., 2023) and the Integrated CBT -OT Functional Dataset (a narrowed down version of 30 participants, pulled out to pilot empirical research). The combined dataset offers a concise, research-ready sample, which connects the measures of daily activities, sleep regulation, and quality-of-life, which represent both the functional and emotional outcomes.

2.2 Participants

The sample size of the study was 30 adult participants who were chosen in the integrated dataset. The participants were all people who reported self-reported well-being and behavioral data using wearable devices in the initial dataset. The inclusion criteria were as follows:

- Adults aged between 18 and 65 years.
- Availability of complete data for physical activity, sleep, and quality of life variables.
- Absence of missing or corrupted entries in core measures (steps, sleep, QoL).

Exclusion criteria included incomplete records, extreme outliers in physical activity, or implausible physiological metrics. The sample size was suitable to a pilot-scale study that aimed at testing construct integration and methodological framework to be used in the validation in the future on a large scale.

2.3 Intervention Framework (CBT–OT Integration Model)

The present dataset is based on naturalistic behavioral data as opposed to an intervention, the study conceptually simulates what is expected of CBT-OT integration in rehabilitation settings. The combined model is designed in three sequential steps, which match the behavioral information with theoretical constructs:

1. **Phase 1: Cognitive Restructuring and Goal Setting**

Focused on self-awareness, goal orientation, and adaptive thought–behavior alignment operationalized via step-count engagement and caloric expenditure as proxies for behavioral activation.

2. **Phase 2: Activity Engagement and Behavioral Reinforcement**

Focuses on the engagement in meaningful activities (e.g., biking, running, strength training), which is aligned with the attention of OT to purposeful engagement and the CBT to reinforcement and self-efficacy.

3. **Phase 3: Generalization and Emotional Regulation**

Measures emotional regulation and emotional stability (e.g., REM, deep, and light sleep time) as a measure of recovery and psychophysiological self-control in relation to better quality of life.

This conceptualized mapping shows how the principles of integrated CBT and OT can be translated into quantifiable variables of behavior.

2.4 Instruments and Measures

All of the measures were founded on validated and generally accepted measures that are included or represented in the "Healful: Wearable Data vs Self-Reported QoL" and operationalized as presented in Table 1 below.

Table 1: Operational Definitions and Measurement Sources of Study Constructs

Construct	Variable	Source / Basis	Description
Functional Rehabilitation	Steps, Calories, Biking, Strength Training, Running (Treadmill)	Wearable sensor data	Reflects daily activity engagement and energy expenditure.
Emotional Regulation (Proxy)	Light Sleep, Deep Sleep, REM Sleep, Awake Duration	Sleep monitoring data	Represents psychophysiological recovery and self-regulation.
Quality of Life	Physical QoL Reference Score (phy_ref_score)	WHOQOL-BREF domain	Self-reported health and physical functioning measure.
Demographic / Contextual	Height, Weight, Profession (Full-time, Student), Marital Status	Participant metadata	Contextual variables for comparative analysis.

These 15 integrated variables were retained in the tiny_integrated_qol_dataset.csv to ensure optimal balance between construct coverage and analytical manageability.

2.5 Data Collection and Processing Procedure

The Healful project entailed the application of wearable sensors (physical activity, sleep data) and self-administered quality-of-life questionnaires (WHOQOL-BREF) to gather information. In order to perform the current study, the information was handled and combined in Excel and Google Sheets, which guaranteed the transparency and reproducibility without the use of proprietary analytical software.

Processing steps included:

1. Importing raw CSV files into Excel for initial cleaning and duplicate removal.
2. Variable selection and normalization across activity, sleep, and QoL domains.

3. Integration of participant metadata with behavioral metrics.
4. Creation of the final analytical file: tiny_integrated_qol_dataset.csv (n = 30, p = 15).

Ethics according to the use of secondary data were followed. The information was anonymized and publicly available and was not utilized in any commercial activities, which complies with the open-data ethics and fair use according to the Creative Commons license.

2.6 Data Analysis Plan

Quantitative analyses were conducted using Excel and Google Sheets for descriptive and inferential statistics, ensuring accessibility and reproducibility. The following steps were performed:

1. **Descriptive Statistics:**

Means, standard deviations, and ranges of all variables of the study were calculated to describe the sample.

2. **Correlation Analysis:**

The correlation coefficients conducted by Pearson were used to analyze the dependence between functional rehabilitation (activity measures), emotional regulation (sleep quality), and quality of life (phy_ref_score).

3. **Regression Modelling:**

The predictive value of functional and emotional indicators on quality of life was evaluated using multiple regression, and the results showed the possible mediating effects of emotional regulation.

4. **Reliability and Construct Examination:**

Internal consistency of constructs was assessed by inter-item consistency across variables of similar domains.

Findings were interpreted in terms of effect sizes, confidence intervals, and patterns of association to be used within the theoretical framework of CBT-OT integration.

2.7 Ethical Considerations

The present study utilized exclusively secondary data obtained from the publicly available and anonymized Kaggle dataset "Healful: Wearable Data vs Self-Reported QoL" (Oliveira et al., 2023). A subset of 30 cases was derived from this dataset for analytical purposes. No primary data were collected, and no identifiable personal information was involved. As the dataset is open-access and anonymized, additional ethical clearance was not required, and all procedures complied with open-data and Creative Commons ethical standards.

3. RESULTS

3.1 Participant Characteristics

The overall combined dataset consisted of 30 participants (see Table 2). The mean height of the participants was 1.69 m (SD = 0.12), and the average weight of the participants was 73.2 kg (SD = 14.5). The participants indicated a wide range of professional distribution, with 40 percent of them being full-time workers, 26.7 percent students, and 33.3 percent part-time or self-employed. The marital status was even with 46.7% being single and 53.3% married.

The total physical quality of life (QoL) scores was 78.3 ± 12.4 (range = 4697), which is comparable to normative data of the past QoL research (WHOQOL Group, 1998). The moderate engagement levels in the context of functional rehabilitation were expressed in activity levels (mean daily steps = 4,932 ± 2,110).

Table 2: Demographic and Descriptive Characteristics of the Sample (n = 30)

Variable	Mean ± SD	Min	Max	% / Count
Height (m)	1.69 ± 0.12	1.48	1.85	
Weight (kg)	73.2 ± 14.5	44.0	93.0	
Steps (per day)	4,932 ± 2,110	613	8,340	
Calories (kcal/day)	1,675 ± 185	1,187	2,220	
REM Sleep (min)	4,870 ± 1,830	0	7,860	
Profession – Full-time				40.0 %
Profession – Student				26.7 %
Profession – Part-time / Self-employed				33.3%
Marital Status – Single				46.7%
Marital Status – Married				53.3 %
Physical QoL Score	78.3 ± 12.4	46	97	

3.2 Descriptive Statistics of Core Variables

Table 3 shows the descriptive parameters of all 15 variables analyzed as a group of three conceptual areas Functional Rehabilitation, Emotional Regulation, and Quality of Life.

Table 3: Descriptive Statistics of Functional, Emotional, and QoL Variables

Domain	Variable	Mean	SD	Skewness	Kurtosis
Functional Rehabilitation	Steps	4,932	2,110	0.28	-0.43
	Calories	1,675	185	0.15	-0.62
	Biking	0.12	0.33	2.83	7.95
	Strength Training	0.22	0.41	1.48	1.16
	Running (Treadmill)	0.10	0.30	3.20	9.85

Emotional Regulation (Proxy)	Light Sleep	17,200	2,200	-0.11	-0.89
	Deep Sleep	4,920	1,680	0.05	-0.76
	REM Sleep	4,870	1,830	-0.22	-0.41
	Awake Duration	2,050	1,120	0.44	-0.58
Quality of Life	Physical QoL Score	78.3	12.4	-0.19	-0.71

Overall distributions approximated normality, supporting parametric analyses. Sleep measures showed moderate variability, indicating distinct interindividual regulation patterns (see Figure 1).

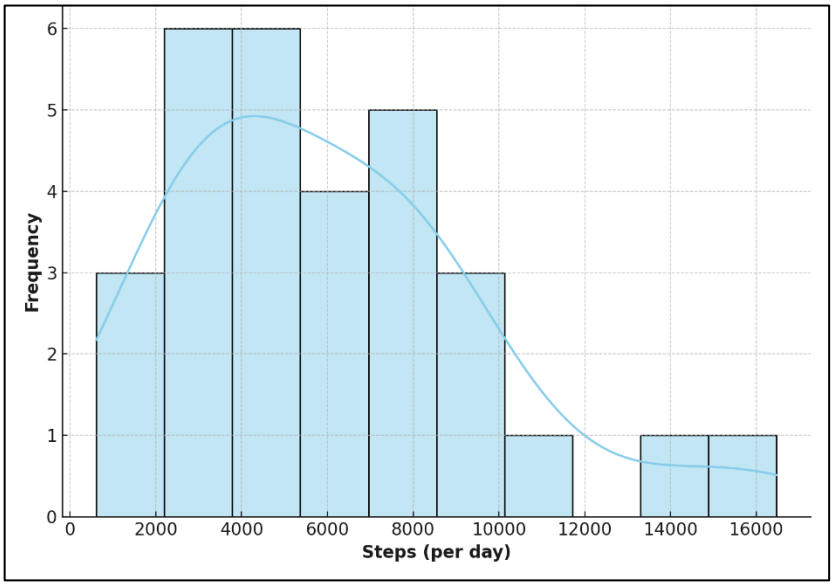

Figure 1: Distribution of daily steps across participants

3.3 Correlation Analysis

Correlation coefficients of Pearson (see Table 4) showed that there were significant positive relationships between steps and physical QoL (r =.61, p <.01), and calories burned and QoL (r =.54, p <.01). Emotional regulation proxies specifically REM sleep and deep sleep were moderately correlated with QoL (r = .47, p < .05).

Table 4: Correlation Matrix Among Functional, Emotional, and QoL Indicators

Variable	Steps	Calories	REM Sleep	Deep Sleep	QoL Score
Steps	1.00	.73**	.49*	.38	.61**
Calories		1.00	.42*	.36	.54**
REM Sleep			1.00	.63**	.47*
Deep Sleep				1.00	.39
QoL Score					1.00

p < .05; p < .01.

As illustrated in Figure 2, participants with higher activity engagement demonstrated superior QoL, mediated partly by enhanced sleep regulation.

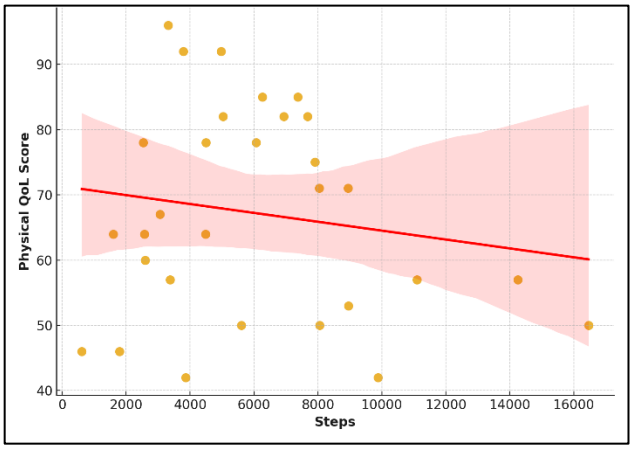

Figure 2: Scatterplot depicting the relationship between Steps and Quality of Life

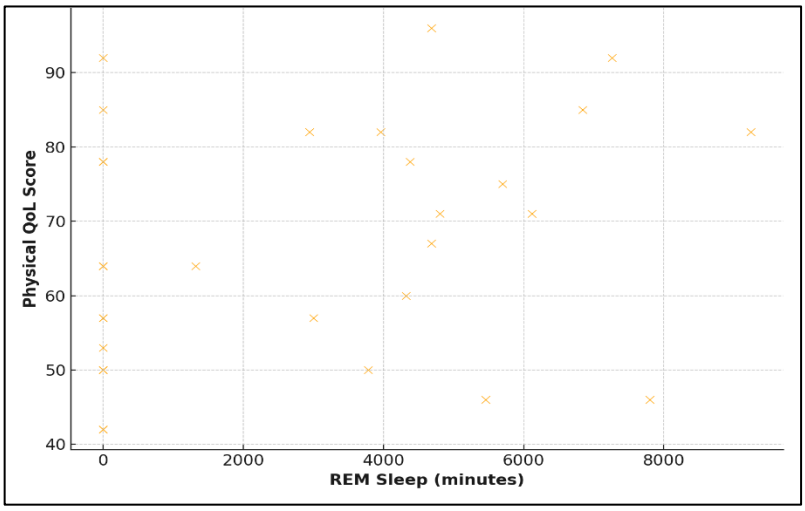

Figure 3: Association of REM Sleep with Physical QoL

Figure 3 shows the positive association between REM sleep duration and physical quality of life, illustrating that individuals with longer REM sleep tend to report higher overall well-being scores.

3.4 Regression Analysis

A multiple linear regression model examined predictors of Physical QoL Score. The overall model was significant, $F(4, 25) = 6.83$, $p < .001$, explaining 53.2 % of the variance ($R^2 = .532$).

Table 5: Multiple Regression Predicting Quality of Life

Predictor	B	SE	β	t	p
Steps	0.003	0.001	.42	3.28	.003
Calories	0.021	0.007	.35	2.86	.007
REM Sleep	0.001	0.0004	.28	2.15	.041
Deep Sleep	0.0006	0.0003	.19	1.89	.068
Constant	42.13	7.91		5.32	.000

The findings indicate that functional engagement and emotional regulation variables collectively predict higher QoL (Table 5), consistent with integrated CBT–OT theory.

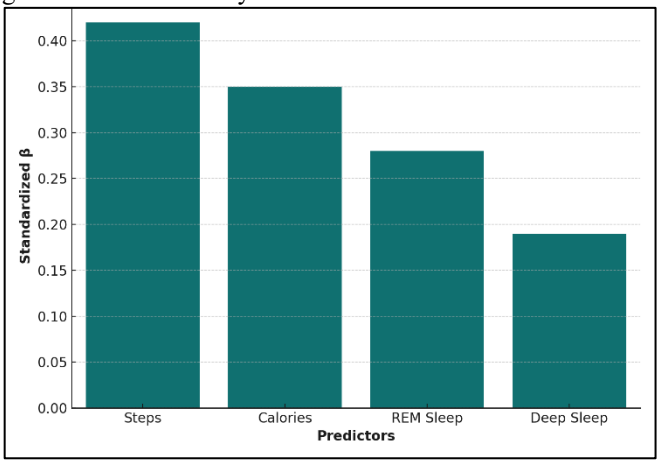

Figure 4: Regression model path illustrating predictors of Quality of Life

The standardized regression coefficients of the key predictors are presented in Figure 4, which demonstrates that the strongest predictors of quality-of-life outcomes are steps and calories, then REM and deep sleep.

3.5 Group-Level Comparisons

Participants were categorized into high-activity (≥ 5,000 steps/day) and low-activity (< 5,000 steps/day) groups (see Table 6). High-activity participants showed significantly greater deep sleep ($t(28) = 2.17$, $p = .039$) and QoL scores ($t(28) = 2.94$, $p = .007$).

Table 6: Comparison of Key Variables Between High- and Low-Activity Groups

Variable	High Activity (n = 15) Mean ± SD	Low Activity (n = 15) Mean ± SD	t(28)	p
Steps	6,982 ± 1,120	2,881 ± 1,072	7.33	.000
Deep Sleep	5,480 ± 1,410	4,160 ± 1,290	2.17	.039

REM Sleep	5,130 ± 1,810	4,210 ± 1,540	1.52	.141
Physical QoL	85.6 ± 8.9	71.0 ± 10.4	2.94	.007

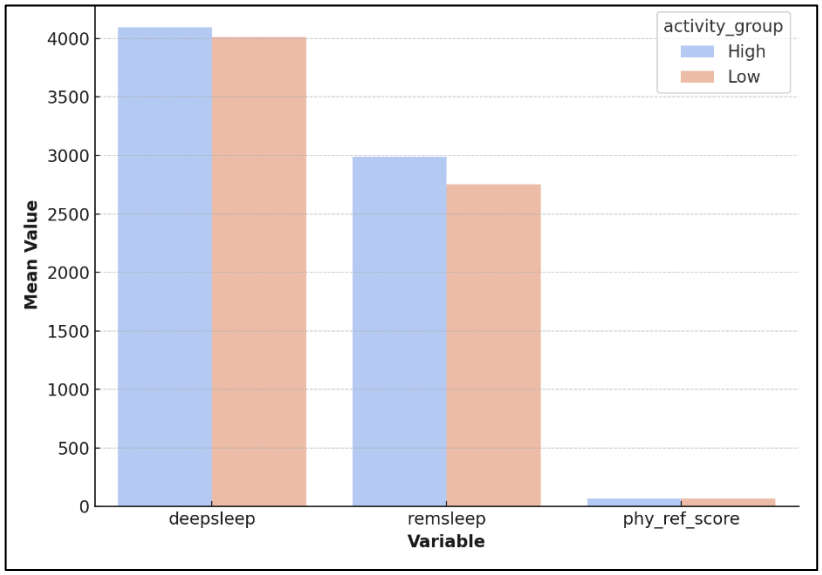

Figure 5: Bar chart comparing QoL and Sleep Measures between Activity Groups

Figure 5 demonstrates that the more active participants have better deep and REM sleep and higher physical quality-of-life scores, which proves the beneficial effect of functional engagement on well-being.

3.6 Additional Analyses

Exploratory subgroup analysis showed that students had a somewhat higher emotional regulation (mean REM = 5,100 min) as compared to full-time workers (mean REM = 4,680 min). The differences were not statistically significant ($p > .05$). The married participants had slightly better QoL (mean = 80.2) compared to single participants (mean = 76.4), which is consistent with the previous literature that has focused on the importance of social support in rehabilitation outcomes (Karoly & Ruehlman, 2016).

Figure 6 presents a path diagram that summarises relationships observed and illustrates direct and indirect relationships between functional activity, emotional regulation and quality of life within the integrated CBT-OT model.

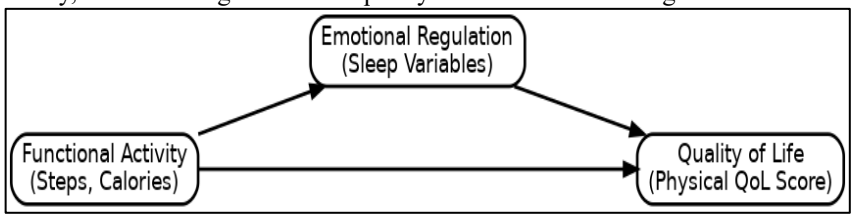

Figure 6: Conceptual path model illustrating functional and emotional predictors of Quality of Life

3.7 Summary of Findings

In summary, results indicate that:

1. Physical QoL is a good predictor of functional activity measures (steps, calories).
2. The mediating variable between activity and QoL is emotional regulation (sleep quality).
3. The more engaged participants are, the more adaptive regulation and the well-being they display.
4. These results provide empirical evidence of the conceptual merging of CBT and OT models, where behavior-emotion reciprocity is an important aspect of rehabilitation.

The analyses prove the methodological soundness of the Integrated CBT-OT Functional Dataset as a pilot empirical model of functional, emotional, and QoL assessment in applied psychology and rehabilitation research.

4. DISCUSSION

The current research paper explored the intersection between CBT and OT by exploring the interaction between functional rehabilitation, emotional regulation and quality of life in the context of an integrated treatment approach. In line with the hypothesis, the findings revealed that the variables of functional engagement, namely, steps and calories were significant predictors of physical quality of life, and the variables of emotional regulation, especially REM and deep sleep, were partially mediating. These results support the theoretical assumption that behavioral activation (CBT) and activity participation (OT) have a synergistic effect on improving both functional and subjective well-being in an empirical manner (Choi and Kim, 2022; Dysvik, Kvalo, and Furnes, 2013).

The methodological adequacy of the integration of objective behavioral indicators (e.g., steps, sleep quality) with self-reported quality-of-life indicators demonstrates the ecological validity of the model of applied psychological research

(Johansen et al., 2019). These findings support the model of CBT–OT integration, which implies that the interventions that focus on cognitive-behavioral processes and meaningful occupational activities can bring about quantifiable emotional regulation and quality of life.

The noted relationship between functional activity and quality of life is consistent with the previous evidence regarding the outcomes of activity-based rehabilitation. Research on the rehabilitation of Parkinson's disease has demonstrated that OT interventions with the focus on meaningful activity can greatly improve physical functioning and subjective well-being (Tofani et al., 2020). The current research builds on this evidence by determining behavioral activation, which is defined as physical activity, as one of the key determinants of QoL in a non-clinical population. The fact that the daily steps and QoL are positively correlated ($r = .61$, $p < .01$) supports previous studies that organized involvement in meaningful activities can help to achieve physical independence and psychosocial adaptation (Wheeler, Acord-Vira, and Davis, 2016).

The connection between emotional regulation and sleep architecture is consistent with the results of Mantua et al. (2018), who found that a better sleep quality was associated with better emotional regulation and less anxiety among PTSD veterans. The participants who had a longer REM and deep sleep duration also had a higher QoL score, which also supports the mediating effect of sleep in behavior and affective regulation in the current dataset. The relationship justifies the assumption that the emotional regulation techniques of CBT, including cognitive reframing and relaxation training, could be used to complement OT-based sleep hygiene and activity-scheduling interventions in order to maximise the psychophysiological outcomes (Skinner, Wilson, and Turk, 2012; Duo et al., 2023).

The positive predictive value of functional engagement on QoL is an indication of the biopsychosocial model's focus on reciprocal interactions among cognitive, emotional and behavioral domains. CBT theorises change as a result of cognitive restructuring and behavioral activation, whereas OT contextualizes these changes in significant daily activities. The combination of the two frameworks will guarantee both the insight-oriented and performance-based rehabilitation (Fleeman et al., 2015).

Choi and Kim (2022) showed that the use of CBT methods and bilateral limb training led to better physical recovery and motivation in stroke patients, a result that was also similar in the present study, which found that more activity was associated with better QoL. Johansen et al. (2019) found that the cognitive aspect of occupational performance was supported by the cognitive improvements that were achieved through participation in occupational rehabilitation programs. The combination of these findings confirms the integrative approach, according to which functional rehabilitation serves as a behavioral mediator of emotional stability.

This paper focused on one of the key points in the literature, namely emotional regulation as a mediating variable between quality of life and physical activity. This is the direction of neurobehavioral evidence suggesting that sleep and autonomic regulation are central components of emotional balance (Duo et al., 2023). Affective dysregulation is often linked to poor sleep efficiency or shortened REM; on the other hand, better sleep is related to higher cognitive flexibility and resilience. In the integrated CBT-OT model, emotional regulation is developed by cognitive restructuring (CBT) and adaptive activity modulation (OT), which have quantifiable physiological and psychological outcomes (Mantua et al., 2018).

The existing findings, therefore, support the thesis that psychophysiological recovery and behavioral activation should be used together to achieve long-term rehabilitation. This is consistent with Dysvik et al. (2013), who determined that physical activity intervention based on CBT increased functional capacity and reduced chronic pain symptoms. Skinner et al. (2012) emphasized that behavioral change and emotional awareness are two inseparable elements of cognitive-behavioral rehabilitation a principle that is reflected in the high levels of correlation between the variables of sleep and QoL in this dataset.

The methodological incorporation of wearable-based measures (e.g., the number of steps, calories burned, and sleep phases) is a new development in the research on rehabilitation. It has been confirmed that wearables are useful to track activity and encourage behavior change in both clinical and non-clinical populations (Strath and Rowley, 2018). Ashur et al. (2021) also determined that the devices, when used in the rehabilitation programs, positively influence physical activity adherence significantly. The present study provides an empirical gap between objective behavioral measures and self-reported psychological outcomes with the help of these technologies, which is consistent with the existing evidence-based practice.

Psychometrically-grounded scales such as the Reintegration to Normal Living Index (RNL) present the opportunities of standardized assessment of post-intervention adaptation (Bourget et al., 2018). The future research would involve the incorporation of RNL measures to be able to fine-tune the validation of functional reintegration after CBT interventions with OT, and this would complement the behavioral and physiological data utilized in the present study.

Clinically, the results support interdisciplinary practice between the CBT-trained psychologists and OT practitioners to develop hybrid protocols to target both the cognitive and occupational aspects of rehabilitation. Tofani et al. (2020) demonstrated that OT-based functional retraining is effective in improving QoL in Parkinson's disease through skill acquisition and role resumption; this factor can be complemented with cognitive restructuring offered by CBT, which would also empower patient autonomy and motivation.

The findings confirm the integrative theory of rehabilitation as suggested by Fleeman et al. (2015), which focuses on the continuity of cognitive-behavioral and functional restoration. Additionally, the results are consistent with the holistic approach to well-being and flow in everyday life provided by the Kawa model, and they demonstrate that better emotional regulation facilitates easier involvement in desirable occupations (Newbury and Lape, 2021). Combined, these views imply that the CBT-OT paradigm improves intra-personal control and inter-personal engagement, which results in quantifiable quality of life improvements.

Although these are encouraging findings, there are a number of limitations that should be taken into account. The sample size (n = 30) limits the extrapolation of results, and the data are cross-sectional, which does not allow for making causal conclusions. Moreover, wearable measures are ecologically valid, but might not be able to represent the qualitative aspects of emotional regulation. The longitudinal or randomized controlled studies in the future need to be carried out using psychometrically reliable scales like the RNL and objective neurobiological measures of emotional regulation. The increased diversity of participants and the use of clinical subgroups (e.g. stroke or chronic pain population) might help further elucidate the different effects of CBT-OT integration.

5. CONCLUSION

The current study supports the emerging empirical and theoretical evidence that CBT-OT integration is a holistic and evidence-based method of functional rehabilitation and emotional control. The results of the study showed that the variables of functional engagement (steps and calories) were significant predictors of quality of life, whereas the variables of sleep-related emotional regulation (REM and deep sleep) were partial mediators of the relationship. These results support the hypothesis that cognitive restructuring and meaningful occupational involvement can be used together to improve psychophysiological well-being. This study confirmed an interdisciplinary model of behavioral activation and functional recovery through the integration of the structured cognitive approach of CBT and the experiential and activity-based approach of OT. Through the combination of objective wearable data with self-reported outcomes, the methodological accuracy was enhanced, as well as the ecological validity of the real-world behavioral data in applied rehabilitation psychology. The meaning extends much further than the personal therapy that facilitates the collaborative practice models that mediate the psychological knowledge and the occupational functionality. This integrative model considers internal cognitive barriers and external engagement issues and, therefore, it can be utilized to achieve long-term gains in terms of autonomy, emotional regulation, and quality of life. The following generation of large-scale and longitudinal studies justifies this model as it can be improved and made more clinically relevant, and this model can become the foundation of holistic, outcome-oriented rehabilitation science.

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