

Positive Effects of Solution-Focused Short-Term Therapy Combined with Routine Nursing Care on the Psychological State and Quality of Life of Patients with Geriatric Syndromes

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ABSTRACT Patients with geriatric syndromes often show limited improvement in psychological state and quality of life after routine care alone. This study applies a structured solution-focused brief therapy intervention combined with routine nursing care, guiding patients to focus on personal strengths and achievable goals through six standardized sessions. The intervention is implemented by uniformly trained nursing staff according to an operating manual, ensuring procedural consistency and scalability. At the 4-week follow-up assessment, the GDS-15 scores of patients with geriatric syndromes stabilize at approximately 4.5, and the WHOQOL-BREF psychological domain score reaches 68. These results indicate that the combined intervention improves psychological status and quality of life without changing the routine nursing framework. By strengthening patient self-efficacy, goal construction, and functional participation, the intervention provides a replicable nursing pathway for geriatric syndrome management and offers practical evidence for structured psychosocial support in elderly care settings.

INDEX TERMS geriatric syndrome, solution-focused brief therapy, routine nursing care, psychological status, quality of life

I. INTRODUCTION

GERiatric syndromes are a complex group resulting from the interaction of multiple systemic functional decline, chronic disease accumulation, and psychosocial factors, encompassing issues such as falls, disability, cognitive impairment, depression, and polypharmacy. These syndromes significantly reduce the autonomy and subjective well-being of older adults, while increasing caregiving burdens and healthcare expenditures. With the accelerating global aging process, improving the effectiveness of comprehensive interventions for patients with geriatric syndromes has become an important research direction in geriatric medicine and nursing [1,2]. Interventions targeting their psychological state and quality of life are not only related to individual well-being but also have practical significance for optimizing long-term care systems [3,4]. The functional decline associated with geriatric syndromes—such as decreased self-care ability and increased risk of falls—is directly mitigated by advancements in technical and functional products. These materials, ranging from non-slip floor mats and pressure-reducing bedding to clothing

designed for easy donning and doffing and embedded with remote monitoring sensors, constitute a crucial component of the physical support ecosystem for older adults. Therefore, research that successfully improves patients' psychological motivation and functional participation, such as the structured intervention presented here, provides essential validation for the effectiveness and design requirements of the next generation of assistive and smart products in both clinical and home care settings.

Conventional nursing care primarily focuses on stabilizing physiological indicators and providing basic living assistance, lacking systematic intervention for psychological states. This makes it difficult to alleviate feelings of helplessness, low self-efficacy, and social isolation in elderly patients [5,6]. Even when some institutions provide basic psychological support, it often remains at the level of emotional comfort, without forming a structured and operational psychological intervention pathway [7,8]. While solution-focused brief therapy excels in its goal orientation and resource focus, it is often difficult to initiate effectively in the elderly population due to insufficient patient motivation,

vague goals, or limited cognition. When used alone, it easily leads to a dialogue deadlock of "no problem to solve" [9,10]. These problems limit the actual conversion effect of psychological intervention in the management of geriatric syndromes [11,12].

Existing studies have attempted to combine solution-focused brief therapy with other psychological techniques, such as cognitive behavioral therapy or mindfulness training. However, the former requires a high level of cognitive function, while the latter has a long training cycle and complex operation, making it difficult to integrate into daily care routines [13,14]. While motivational interviews can help improve elderly patients' willingness to change their behavior, they lack a clear problem-solving framework and are difficult to translate into concrete life-improvement actions [15,16]. Most current integrative interventions remain at the level of advocacy, lacking both standardized operating protocols adapted to the characteristics of geriatric syndromes and quality control mechanisms for the consistency of the intervention process, resulting in unstable effects and difficulty in replication [17,18]. Therefore, there is an urgent need for a structured intervention program that can both stimulate the intrinsic motivation of elderly patients and guide them to focus on feasible goals. To address the insufficient depth of routine nursing interventions in improving the psychological state and quality of life of patients with geriatric syndromes, this paper constructs a structured SFBT-MI (solution-focused brief therapy-motivational interviewing) integrated intervention protocol. This protocol uses core SFBT questions as the dialogue framework, embedding self-support strategies from motivational interviews at key points. Through six standardized interviews, it guides patients to identify strengths, quantify progress, and consolidate behavioral changes. The entire process is solidified into an operational script, implemented by uniformly trained and reliability-verified nursing staff, and its quality is monitored through audio transcription and topic coding. This design maintains the simplicity of SFBT while strengthening the mechanisms of motivation and behavioral transformation, providing a replicable and verifiable implementation path for psychosocial interventions for geriatric syndromes.

II. DESIGN AND IMPLEMENTATION OF INTEGRATED INTERVENTION PROGRAMS

A. THEORETICAL BASIS AND INTERVENTION MODEL CONSTRUCTION

The essence of geriatric syndromes is not a single disease, but a multidimensional vulnerability state formed by the intertwining of declining physiological reserves, weakened psychological adjustment ability, and social function decline [19,20]. Traditional intervention models often regard psychological problems as an adjunct to physiological decline, neglecting their active regulatory role in the progression of syndromes. To this end, the theoretical basis for the intervention is constructed upon the three-dimensional vulnerability model of "cognition-emotion-function", regard-

ing limited cognitive resources, negative emotional cycles, and declining daily living abilities as mutually reinforcing pathological loops. Under this framework, simple problem-oriented or supportive care is insufficient to break this loop, and an active intervention path based on goal construction and resource activation is needed. Solution-Focused Brief Therapy (SFBT), with its future-oriented, strengths-focused, and step-by-step change logic, aligns with the elderly patients' preference for simple and practical interventions; however, the elderly often find it difficult to effectively participate in SFBT dialogues due to low motivation levels and vague goals. Motivational interviews emphasize enhancing the willingness to change behavior through autonomous support and conflict exploration, which can compensate for the shortcomings of SFBT in the initial motivation arousal stage [21,22]. This paper structurally embeds the core communication strategies of MI into the interview logic of SFBT, forming an integrated intervention model with "motivation-embedded exception exploration" as its innovative core. This model no longer regards SFBT and MI as parallel superposition of techniques, but activates the patient's willingness to change through MI's open-ended questions and positive feedback, and then guides them to identify exceptional experiences, quantify progress perceptions, and plan feasible actions within the SFBT framework [23,24]. The system model structure is shown in Figure 1.

Figure 1 illustrates the multidimensional linkage between the three-dimensional vulnerability input and the SFBT-MI integrated interview in patients with geriatric syndromes. The core motivation-resource-behavior loop runs through the goal construction, resource activation, and exception reinforcement stages, forming a dynamic psychological and behavioral reconstruction mechanism. The input module reflects the patient's cognitive, emotional, and functional vulnerability characteristics; the interview module presents the intertwined logic of SFBT core questions and MI motivational strategies; the output part reflects the synergistic improvement of psychological state, quality of life, and self-efficacy, constructing a systematic intervention path from intrinsic motivation to externalized behavior [25,26].

B. STANDARDIZED DESIGN OF INTERVENTION PROTOCOLS

Standardization of intervention protocols is key to ensuring that psychological interventions are replicable and assessable in elderly care settings. This paper transforms the integration logic of SFBT and MI into a structured interview script, covering six 45-minute individualized interviews, each strictly following a goal-oriented dialogue sequence [27,28]. The interview process follows a vertical main line of "goal clarification - resource activation - exception reinforcement," while horizontally embedding MI's motivational strategies, forming a combination of fixed question modules and flexible response rules. In the goal clarification stage, a modified miracle question is used: "If

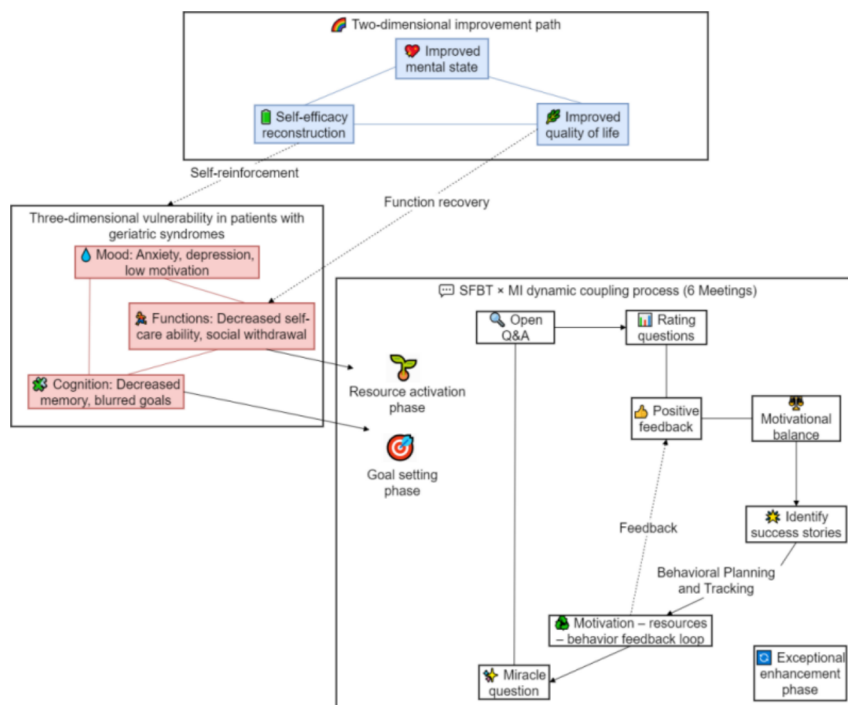


FIGURE 1. System model structure

you wake up tomorrow and one aspect of your mood or life is better, what will it be?" to guide patients to express non-pathological desires; in the resource activation stage, subjective progress is quantified through rating questions: "If 0 points represents the most powerless and 10 points represents the most confident, what score are you on now? What puts you at this score?" and MI's positive feedback techniques are embedded to reinforce subtle positive signals; in the exception reinforcement stage, patients are guided to identify past experiences of successfully coping with similar situations, and small behavioral experiments are designed [29,30]. To quantify the progress of objectives and the intensity of motivation, a progress index is applied as an in-conference evaluation indicator, and its calculation is shown in Formula (1):

$$PI_t = \frac{S_t - S_0}{10 - S_0} \times 100\% \quad (1)$$

S_0 is the baseline score (score from the initial interview question); S_t is the current score at the t -th interview ($t=1,2,\dots,6$); PI_t reflects the patient's subjectively perceived improvement rate, ranging from 0% to 100%, and is used to dynamically adjust the intensity of individualized intervention. When the increase in PI_t is less than 5% for two consecutive times, the MI decision balance table is triggered to guide the patient to weigh the pros and cons of maintaining the status quo versus attempting change, in order to overcome the motivational plateau. The entire protocol is implemented by solidifying language templates, limiting the order of technology use, and setting feedback trigger conditions.

C. INTERVENTION IMPLEMENTATION AND PROCESS QUALITY CONTROL

The rigor of the intervention implementation relies on the dual guarantee of standardized operation and process quality control. All nursing staff involved in the intervention receive two weeks of intensive training, covering the pragmatic norms of SFBT core questions, the timing of embedding MI communication skills, communication adaptation strategies for the elderly, and word-by-word rehearsals of the protocol script [31,32]. After the training, each person completes three mock interviews, which are independently scored by two certified supervisors according to the intervention fidelity coding manual. The Cohen's κ inter-coder consistency coefficient is calculated, and the formal intervention stage can only be entered when $\kappa \geq 0.80$. During the formal intervention, each interview is recorded in its entirety and transcribed into text within 48 hours. Thematic analysis is used for process verification [33,34]. The coding system includes three dimensions: use of SFBT techniques (miracle questions, rating questions, exception finding), implementation of MI strategies (open-ended questions, positive feedback, decision balance table guidance), and protocol deviation events (problem-oriented follow-up questions, subjective suggestions). Each dimension is assigned a frequency of occurrence and a quality score (1–5 points). The technical integrity score is calculated using a weighted formula, as shown in Formula (2):

$$IS = \frac{\sum_{i=1}^n w_i \cdot q_i}{\sum_{i=1}^n w_i} \quad (2)$$

n is the number of coding dimensions ($n = 3$ in this

study); w_i is the weight of the i -th dimension (based on its core setting in the theoretical model, SFBT technology $w_1 = 0.5$, MI strategy $w_2 = 0.3$, protocol compliance $w_3 = 0.2$); q_i is the quality score of this dimension [35]. This weighting reflects the design logic of the SFBT-MI integrated model and the relative importance of each dimension. SFBT technology forms the core framework of standardized interviews and the main line of goal advancement, therefore it is given the highest weight. MI strategy, as an embedded motivation reinforcement means for key dialogue nodes, has the next highest weight. IS ≥ 4.0 is considered a high-fidelity implementation. All transcribed texts are processed by two coders in a double-blind manner, and disagreements are resolved by third-party arbitration.

III. DESIGN AND DATA COLLECTION

A. DESIGN AND SUBJECTS

This study employs a prospective, single-blind, parallel randomized controlled trial design. Patients meeting the diagnostic criteria for geriatric syndromes are randomly assigned to either the experimental group (receiving SFBT-MI integrated intervention) or the control group (receiving only routine care) in addition to routine nursing care. Inclusion criteria include: age ≥ 65 years; meeting the diagnostic criteria for geriatric syndromes defined by at least three of the Fried frailty phenotypes; possessing basic communication skills; voluntarily signing an informed consent form. This study was approved by the Ethics Committee of The Third Affiliated Hospital of Gansu University of Chinese Medicine, and was performed in accordance with the principles of the Declaration of Helsinki. Exclusion criteria include: major depressive disorder (GDS-15 ≥ 11 requiring psychiatric medication), acute psychotic disorder, having received systematic psychotherapy within the past 3 months, or having severe hearing or speech impairments that can affect the implementation of the interview. Computer-generated block randomization sequences (block length 4 or 6) are used, with allocation in a 1:1 ratio. Randomization is performed by an independent statistician, and the assessors blind the group assignments. The sample size is based on GDS-15 (Geriatric Depression Scale-15) as the primary outcome measure, considering a 15% dropout rate, ultimately including 120 patients (60 in each group).

B. ASSESSMENT TOOLS AND DATA COLLECTION

Data collection focuses on two core dimensions: psychological state and quality of life. Internationally recognized and Chinese-verified standardized scales are used, and blinded assessments are conducted at three fixed time points: baseline (within 24 hours after randomization), intervention end (within 7 days after the 6th interview), and follow-up (4 weeks after the intervention). Psychological state is measured using the GDS-15 and SAS (Self-Rating Anxiety Scale); quality of life is assessed using the WHOQOL-BREF (World Health Organization Quality of Life-Brief Version); daily functioning is quantified using the Barthel

Index. All scales are completed face-to-face by uniformly trained assessors unaware of grouping information, and the same assessor completes three assessments for each subject to control for bias. Scale scores are converted according to standard rules: GDS-15 total score 0–15 (≥ 6 indicates a risk of depression). The SAS raw score is converted to a standardized score using Formula (3):

$$SAS_{\text{standard}} = \left(\frac{\text{Original score}}{80} \right) \times 100 \quad (3)$$

The SAS score is 80, representing the most probable raw score. A standardized score ≥ 50 indicates the presence of anxiety symptoms. WHOQOL-BREF scores range from 0 to 100 (higher scores are better), and the Barthel Index ranges from 0 to 100 (≥ 60 indicates basic self-care). Table 1 summarizes the dimensional composition, scoring logic, reliability parameters (using authoritative Chinese norm data), and specific application points of each assessment tool in this study, providing methodological reference for result interpretation. Data entry employs a dual-person independent verification mechanism, and missing values are handled according to the principle of carrying over the last observation.

TABLE 1. Summary of parameters for core assessment tools

Tool	Dimensions	Number of items	Rating range	Reliability α	Critical value
GDS-15	4	15	0–15	0.82	≥ 6
SAS	4	20	25–100	0.79	≥ 50
WHOQOL-BREF	4	26	0–100	0.88	High scores are preferred
Barthel index	1	10	0–100	0.9	≥ 60

Table 1 presents the parameters of the four core scales used in the study, establishing a measurement framework in terms of the number of dimensions, item composition, scoring range, reliability coefficient, and critical criteria. The scales cover four dimensions: emotion, anxiety, quality of life, and daily functioning, forming a dual-domain assessment system encompassing both psychological and functional aspects.

IV. RESULTS

A. CHARACTERISTICS OF CHANGES IN THE DIMENSION OF PSYCHOLOGICAL STATE

To reveal the dynamic impact of psychological intervention on the emotional state of patients with geriatric syndromes at different stages, this section analyzes the scale assessment results at nine time points (T0 to T8) based on the intervention duration. The time points are defined as follows: T0 is the baseline assessment; T1 to T6 correspond to assessments within one week after the first to sixth standardized interviews, respectively; T7 is the assessment one week after the end of the entire intervention; and T8 is the follow-up assessment four weeks after the intervention. Longitudinal changes in GDS-15 and SAS standardized scores were tracked to reflect differences in depression and anxiety levels

between the intervention and control groups. Data were obtained from standardized interviews after the intervention and assessments at multiple time points. Time series fitting was used to observe the evolution of psychological state as the intervention progressed. The distribution of results is shown in Figure 2.

Figure 2 showed that the GDS-15 score in the intervention group steadily decreased from T0 and stabilized between 4.0 and 5.0 at T8, while the control group experienced a slower decline and even showed an increase. The SAS standard score in the intervention group remained around 42.8 at T8, while the control group showed only moderate improvement. The decrease in both indicators in the intervention group was mainly due to the motivation reinforcement and resource activation mechanisms in the SFBT-MI integrated

intervention, which enabled patients to gradually form a stable positive cognitive framework and reduce emotional rumination during the sessions, thereby lowering anxiety and depression scores. The sustained effect of motivation maintenance and behavioral feedback loops delayed the resurgence of psychological fluctuations, indicating that the intervention maintained good emotion regulation effects in both the short term and the follow-up period.

To verify the statistical differences in changes in psychological state and quality of life dimensions between the intervention and control groups, repeated measures ANOVA was used to compare the temporal changes in GDS-15 and SAS scores at baseline, intervention end, and follow-up. As shown in Table 2.

Table 2. Repeated measures ANOVA results of GDS-15 and SAS scores in the two groups of patients

Indicator	Group	Baseline (Mean±SD)	Post-Intervention (Mean±SD)	Follow-up (Mean±SD)	Main Effect of Time F(p)	Group × Time Interac- tion F(p)	Partial η^2
GDS-15	Intervention Group (n=60)	8.2 ± 1.9	4.5 ± 1.3	4.8 ± 1.4	45.23(< 0.001)	6.24(0.003)	0.18
GDS-15	Control Group (n=60)	8.0 ± 2.1	6.8 ± 1.7	7.1 ± 1.8	—	—	—
SAS	Intervention Group (n=60)	58.5 ± 8.2	43.2 ± 6.5	42.8 ± 6.8	38.76(< 0.001)	5.87(0.004)	0.16
SAS	Control Group (n=60)	57.9 ± 8.5	52.4 ± 7.3	53.1 ± 7.6	—	—	—

The intervention group showed a significantly greater decrease in GDS-15 scores from baseline to follow-up than the control group, with a significant interaction effect between group and time ($F = 6.24$, $p < 0.01$, partial $\eta^2 = 0.18$). A similar interaction effect was observed in SAS scores, with an $F = 5.87$, $p < 0.01$, and partial $\eta^2 = 0.16$.

B. RESPONSE PATTERNS OF THE MULTIDIMENSIONAL STRUCTURE OF QUALITY OF LIFE

This study systematically tracked the changes in WHOQOL-BREF scores across four health-related quality of life domains in the intervention and control groups, assessing the potential impact of the intervention on each dimension of individual quality of life through longitudinal measurements. Data was collected at baseline and follow-up, covering the four domains of physical health, mental health, social relationships, and environmental adaptation. Statistical analysis was performed on the data distribution and variability across different groups to support subsequent comparisons. Strict control was maintained over data collection conditions to ensure score consistency and reliability. Data processing included mean calculation and standard deviation assessment, as shown in Figure 3.

As shown in Figure 3, the intervention group's scores increased from 60 to 72.5 in the physical domain, 58 to 68 in the psychological domain, 54 to 66 in the social domain, and 62 to 74.5 in the environmental domain. In contrast, the control group's scores increased from 60 to 62 in the physical domain, 57 to 60 in the psychological domain, 56 to 58 in the social domain, and 62 to 63 in the environmental domain. The overall improvement in scores in the intervention group was significantly higher than that

in the control group. This is likely because the intervention enhanced the subjects' physical and mental adjustment abilities and environmental adaptation strategies, resulting in higher levels of improvement across all dimensions. The smaller changes in the control group reflect the limited influence of natural fluctuations and daily life factors on scores in the absence of specific intervention. Therefore, it can be concluded that the intervention measures have a significant effect on improving subjects' scores in all domains of quality of life.

C. CORRELATION BETWEEN DAILY FUNCTIONING AND PSYCHOLOGICAL IMPROVEMENT

To explore the dynamic relationship between functional recovery and psychological improvement in patients with geriatric syndromes, this section used bivariate linear correlation analysis of the Barthel Index and GDS-15 scores based on assessment data from the post-intervention phase. The statistical consistency between functional status and psychological changes was quantified using the correlation coefficient and the fitted slope. The data fitting results are shown in Figure 4.

Figure 4 showed that the Barthel Index of the intervention group was concentrated in the range of 60 to 90, and the corresponding GDS-15 scores were concentrated in the range of 3.9 to 8, with a linear correlation coefficient r of -0.78. In the control group, the Barthel Index was mainly distributed in the range of 50 to 80, and the GDS-15 scores were concentrated in the range of 5.9 to 9.0, with a correlation coefficient r of -0.59. The stronger negative correlation between the Barthel Index and GDS-15 scores observed in the intervention group was associated with the

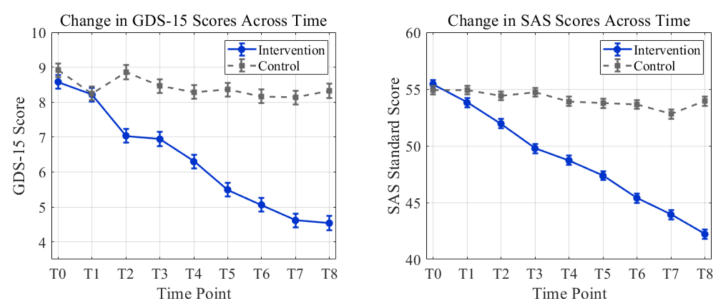


FIGURE 2. Changes in psychological state over time

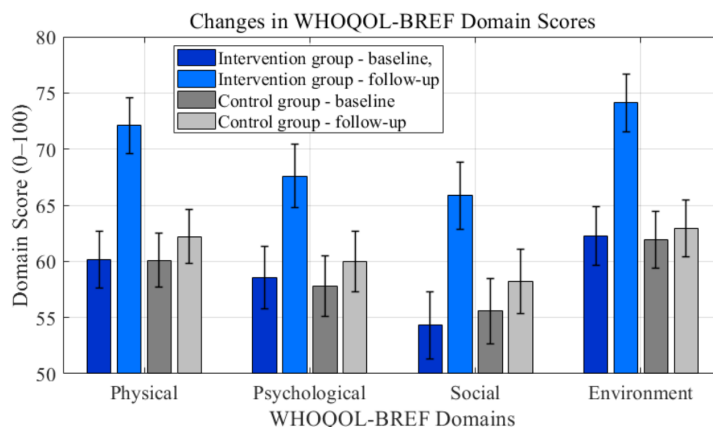


FIGURE 3. Changes in WHOQOL-BREF domain scores

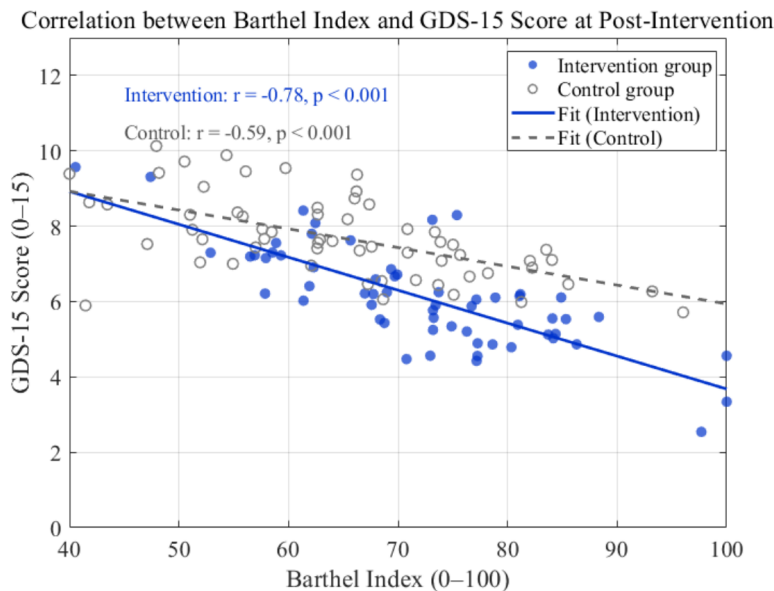


FIGURE 4. Barthel index and GDS-15 score

implementation of the SFBT-MI integrated intervention. The motivation enhancement and resource activation processes emphasized in this intervention model may be related to increased patient participation in daily life, reduced feelings of emotional exhaustion, and enhanced self-efficacy. These factors together constitute a closer synergistic relationship between functional and psychological states. The improve-

ment in self-care ability reduces the individual's dependency burden, forming an inhibitory effect on negative emotions, making the two statistically significantly negatively correlated, reflecting a synergistic improvement mechanism at the psychological and functional levels.

V. CONCLUSION

This paper constructed and implemented a structured SFBT-MI integrated intervention protocol based on a three-dimensional vulnerability model of cognition-emotion-function. Through six standardized sessions, the protocol integrated the autonomy support strategy of motivational interviewing into the goal-setting and exception-finding process of solution-focused brief therapy (SFBT). Individualized intervention intensity was dynamically adjusted using a progress index, and a high-fidelity process monitoring system ensured consistency. Experimental results showed that after intervention, patients with geriatric syndromes achieved stable GDS-15 scores between 4.0 and 5.0, and WHOQOL-BREF scores in the psychological domain reached 68, reflecting substantial improvements in psychological state and subjective quality of life. This method effectively compensates for the structural deficiencies in the psychosocial intervention dimension of traditional care while maintaining the routine nursing framework. Its standardized scripts, motivational embedding mechanism, and closed-loop quality control design provide a psychological intervention paradigm with both theoretical depth and feasibility for the comprehensive management of geriatric syndromes. It is applicable to diverse care scenarios such as hospitals, communities, and elderly care institutions, and has practical value in promoting the transformation of geriatric nursing from physiological stability maintenance to holistic well-being.

Crucially, the synergistic improvement between psychological state and daily functioning validated by this study provides an evidence-based foundation for the industry. Enhanced self-efficacy and motivation for behavioral change directly increase the likelihood of adopting functional products. Specifically, improvements in self-care ability (Barthel Index) necessitate corresponding innovative solutions, such as garments with optimized closure systems, smart sensors for monitoring ambulation or sleep quality (WHOQOL-BREF physical and social domains), and comfortable, therapeutic fabrics that support emotional regulation. Therefore, this research serves as a critical bridge, translating successful psychological intervention outcomes into clear and validated design specifications for future smart and functional products in the rapidly expanding geriatric care market.

AUTHOR CONTRIBUTIONS

Conceptualization-Wenjuan Ye, Qian Li, Qiong Wang and Zhongling Liu; methodology-Wenjuan Ye, Qian Li, Qiong Wang and Zhongling Liu; formal analysis-Wenjuan Ye, Qian Li, Qiong Wang and Zhongling Liu; investigation-Wenjuan Ye, Qian Li, Qiong Wang and Zhongling Liu; writing-original draft preparation-Wenjuan Ye, Qian Li, Qiong Wang and Zhongling Liu; writing-review and editing-Wenjuan Ye, Qian Li, Qiong Wang and Zhongling Liu; visualization-Wenjuan Ye, Qian Li, Qiong Wang and Zhongling Liu; supervision-Wenjuan Ye, Qian Li, Qiong

Wang and Zhongling Liu. All authors have read and agreed to the published version of the manuscript.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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HUMAN RESEARCH SUBJECTS

This study was approved by the Ethics Committee of The Third Affiliated Hospital of Gansu University of Chinese Medicine, and was performed in accordance with the principles of the Declaration of Helsinki. Informed consent has been obtained from the experimenter

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