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Development of a health coaching model to improve caregivers' ability to care for patients with mental disorders

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ABSTRACT

Introduction: The quality of care is often compromised by the high levels of stress, burden, and limited caregiving capacity experienced by family members of individuals with mental disorders. These challenges encompass societal stigma, emotional burden, financial difficulties, insufficient knowledge, inadequate support, interpersonal conflicts, and increased risks of both physical and mental health problems. Such barriers highlight the crucial importance of self-care in maintaining well-being and the caregiving ability. Few studies, however, have examined structured interventions such as health coaching, particularly those integrating the Friedman Family Assessment Model and the Theory of Planned Behavior. This study aimed to develop a health coaching model grounded in these theoretical frameworks.

Methods: An explanatory cross-sectional design was employed, involving 155 caregivers purposively recruited from seven primary health care centers in Makassar, Indonesia. Eligible participants were primary caregivers from nuclear or extended families, aged ≥18, with complete contact information, available for home visits, and referred by the mental health program coordinator. Study variables included family, caregiver, patient, nurse, and health care service factors, as well as health coaching, planned behavior, behavioral intention, and caregiver ability. Data were collected between February to June 2024 using structured questionnaires and analyzed with Partial Least Squares-Structural Equation Modeling (SmartPLS v3.8).

Results: The family, patient, and nurse-related factors significantly affected health coaching. These factors, along with caregiver characteristics, also affected planned behavior, which in turn significantly influenced behavioral intention and caregiver ability.

Conclusions: Health coaching directly improved caregivers' capability. These findings highlight the importance of comprehensive health coaching and family-centered training as integral components of mental health services.

Keywords: caregiver ability, family caregiver, health coaching, mental disorders

Introduction

Mental diseases are complex conditions characterized by impairments in cognitive, psychomotor, and emotional functioning. Globally, an estimated 970 million people are affected by various forms of mental illness (World Health Organization, 2024). In Indonesia, data from the National Health Survey, conducted every five years, indicate a sharp increase in prevalence, rising from 1.7 per 1,000 inhabitants in 2013 to 7 per 1,000 in 2018. This indicates an increase in affected individuals from approximately 400,000 to more than 1.8 million (Ministry of Health, 2023).

As prevalence continues to rise, the caregiving of families, who serve as primary caregivers, has become increasingly complex (Lin *et al.*, 2018; Lohrasbi *et al.*, 2023). Family caregivers face multiple challenges that may undermine their ability to provide appropriate care. These include societal stigma, emotional strain, financial difficulties, insufficient knowledge, inadequate support resources, disturbed daily routines, interpersonal disputes, and an elevated risk of both physical and mental health problems (Akbari et al., 2018; Leng et al., 2019; Liu, Heffernan and, Tan, 2020; Møllerhøj, 2022; Asgari et al., 2023; Rindayati et al., 2023).

Several interventions targeting cognitive skills, emotional support, and practical competencies have been instituted to augment the capacity of family caregivers in managing patients with mental disorders. These include group psychoeducational therapy, psychodynamic therapy, and cognitive-behavioral therapy, aimed at reinforcing caregiver capacity (Cheng *et al.*, 2019; Barbeito *et al.*, 2020; Kuhney *et al.*, 2023). Nevertheless, despite their implementation, enduring markers like as patient relapse, pharmaceutical non-adherence, and ongoing dependence on physical constraints indicate that these interventions have not achieved the intended results (Ministry of Health, 2023). To address these gaps, a more strategic and holistic approach is needed, one that not only improves knowledge and skills but also strengthens caregivers' motivation, confidence, and intention to provide care. Health coaching has emerged as a promising strategy in this context.

Health coaching is a client-centered approach that supports individuals in modifying health-related behaviors, preventing disease, and managing symptoms and challenges through the development of knowledge, skills, attitudes, and self-confidence (Greif *et al.*, 2022; Almulhim *et al.*, 2023; Potempa *et al.*, 2023). Unlike traditional interventions, health coaching emphasizes active engagement in decision-making and goal setting, thereby promoting sustained behavioral change (Conn and Curtain, 2019; Cidral, Berg, and Paulino, 2023). Prior studies have demonstrated the benefits of health coaching for caregivers of patients with mental disorders, including reductions in stress and burden, improvements in self-efficacy, emotional well-being, and social connectedness, as well as enhanced commitment to goals and reduced feelings of isolation (Töpfer et al., 2021; Fisher, Massimo, and Hirschman, 2022; Massimo et al., 2023). It also facilitates goal achievement, commitment, and reduces feelings of loneliness (Made *et al.*, 2021; Sarabia-Cobo *et al.*, 2021; Van Orden *et al.*, 2023).

Despite its potential, limited research has explored the broader factors that shape the effectiveness of health coaching for caregivers of individuals with mental disorders, particularly in community-based settings. To address this gap, the present study proposes an integrated model that combines several theoretical frameworks: the Friedman Family Assessment Model (FFAM) to inform family-centered nursing care (Friedman, Bowden and Jones, 2010), the Theory of Planned Behavior (TPB) to elucidate behavioral intention and change (Ajzen, 2020), the Model of Coaching Effectiveness as a benchmark for successful health coaching implementation (Greif *et al.*, 2022), and the principles of Community Mental Health Nursing in Indonesia (Ministry of Health, 2021).

The integration of the FFAM and the TPB within a health coaching framework allows for a more comprehensive understanding of the psychological and family factors influencing caregiver behavior. The TPB highlights how attitudes, subjective norms, and perceived behavioral control shape the intentions and behaviors of families caring for members with mental disorders. Health coaching is incorporated into the FFAM as the study emphasizes family member caregivers. To our knowledge, no previous research has combined the FFAM with the TPB within a health coaching paradigm for family caregivers of patients with mental disorders. By aligning these frameworks, this study aims to foster more consistent and intentional caregiving practices that are aligned with community mental health goals. The primary objective of this study is to design a health coaching model based on the FFAM and the TPB to enhance the caregiving abilities of family members caring for individuals with mental disorders. This research serves as the foundation for a future intervention study to develop a health coaching module for caregivers. In line with Sustainable Development Goal (SDG) 3, guaranteeing healthful existence and fostering well-being for everyone, this study contributes to improving mental health services and supporting universal health coverage by strengthening and emphasizing the important role of caregivers for patients with mental disorders.

Materials and Methods

Research Design

This study employed an explanatory cross-sectional design in which both independent and dependent variables were measured simultaneously (Hair *et al.*, 2014). The selection of study variables was guided by a comprehensive literature review and the integration of health coaching concepts, the FFAM, and the TPB. These variables were structured within a conceptual framework (see Supplementary File: Figure 1) to guide the analysis and interpretation.

Study Setting

The study was conducted across seven *Puskesmas* (public healthcare centers), government-run facilities in Indonesia that provide primary health care services, including mental health programs, located in Makassar city. These centers play a pivotal role in delivering community-based mental health services, including early detection, case management, and follow-up care for individuals with mental disorders. The research team collaborated closely with mental health program coordinators at each *Puskesmas* to identify eligible families through outreach records, conduct home visits, recruit caregivers, and administer questionnaires.

Time Frame

Data collection was carried out between February and June 2024.

Variables

The variables of this study were: a) family factors (X1), comprising economic status (X1.1) and family function (X1.2); b) caregiver factors (X2), comprising age (X2.1), gender (X2.2), education (X2.3), stress (X2.4), experience (X2.5), motivation (X2.6), and knowledge (X2.7); c) patient factors (X3), comprising age (X3.1), gender (X3.2), duration of mental disorders (X3.3), relapse frequency (X3.4), and severity level (X3.5); d) nurse factors (X4), comprising behavior (X4.1) and psychological (X4.2); e) health care service factors (X5), comprising information (X5.1), accessibility (X5.2), and health care facilities (X5.3); f) health coaching (X6), comprising information sharing (X6.1), working alliance (X6.2), and goal difficulty (X6.3); g) planned behavior (Y1), comprising attitude towards behavior (Y1.1), subjective norms (Y1.2), and perceived behavioral control (Y1.3); h) behavioral intention (Y2), comprising goal attainment (Y2.1) and family insight (Y2.2); and i) caregiver ability to care for people with mental disorders (Y3), comprising assistance in carrying out daily living activities (Y3.1), assistance in socialization (Y3.2), symptom control (Y3.3), and medication adherence (Y3.4).

Population

The target population comprised family members serving as primary caregivers for individuals diagnosed with mental disorders residing within the catchment areas of *Puskesmas* in Makassar, Indonesia.

Samples

The sample size was determined using to the rule-of-thumb for Partial Least Squares-Structural Equation Modelling (PLS-SEM), which recommends a minimum of 5 to 10 times the number of observed indicators (Goodhue, Lewis and Thompson, 2012). With 31 observed indicators, the required sample size was 155 respondents. The inclusion criteria for participants were: (1) being a primary caregiver from either a nuclear or extended family; (2) aged 18 years or older; (3) possessing complete contact information; (4) available for home visits; and (5) referred by the mental health program coordinator. Caregivers with formal education in health-related disciplines, like medicine, nursing, midwifery, or psychology, were excluded. Since patients were not the study's unit of analysis, no inclusion or exclusion criteria were applied to them.

Sampling

A two-stage sampling method was employed. In the initial phase, seven *Puskesmas* were chosen from a total of 47, determined by the greatest documented incidence of patients with mental disorders from 2023 to 2024. This selection was conducted to ensure that areas with relatively higher needs for mental health care were adequately represented in the study. The second stage involved purposive sampling from caregiver lists provided by each center's mental health coordinator. This approach ensured that all participants met the inclusion criteria and were actively serving as primary caregivers.

Instruments

Data were collected using a structured, closed-ended questionnaire developed by the research team. The instrument underwent pilot testing for face validity, expert panel review for content validity, and preliminary psychometric evaluation (Streiner, Norman, and Cairnen, 2015; Hariati et al., 2020). Validity was assessed using Pearson's product-moment correlation, while reliability was evaluated with Cronbach's alpha. Results showed correlation coefficients ranging from 0.305-0.964 and Cronbach's alpha values between 0.636 and 0.974, indicating acceptable validity and reliability (see Supplementary Files: Table 1).

Family factors. The state of families whose members suffer from mental illnesses. The questionnaire encompasses two indicators, namely economic status and family function. *Economic status.* The average family income is each month. The indicator was determined based on the 2024 Makassar City Minimum Wage (UMK).

Family function. The way family members engage with one another shows the quality of relationships while caring for relatives with mental disorders. This indicator was assessed using a five-item questionnaire covering five dimensions: adaptation, partnership, growth, affection, and resolve, scored on a Likert scale (0 = never, 1 = sometimes, 2 = often). Total ratings vary from 0 to 10, categorized as poor (0–3), moderate (4–6), and good family function (7–10).

Caregiver factors. The state of family members who are primarily responsible for caring for relatives with mental disorders. The questionnaire included seven indicators: age, gender, education level, stress, experience, motivation, and knowledge. *Age, gender, and education level*. Age was measured according to the productive age range defined by the Indonesian Ministry of Health, categorizing individuals aged 18 to 64 years as being in the productive age group. Gender was classified as male or female. Education level was assessed based on the highest level of formal education completed, categorized as follows: no formal education (score 0), Elementary School (score 1), Junior High School (score 2), Senior High School (score 3), and Higher Education (score 4). *Stress.* The tension experienced while caring places pressure on family members who are primarily responsible for caring for people with mental disorders. A 10-item questionnaire assessed three dimensions, treatment, family, and financial problems, using a Likert scale (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always). The cumulative score varies from 10 to 50, with categories of mild stress (10–14), moderate stress (15–23), and severe stress (24–50). *Experience.* The feelings and experiences of relatives who are the primary caregivers for people with mental disorders. This indicator measured caregivers' involvement in care assessed using a three-item, three-dimensional questionnaire (involvement in care, barriers to care, and problem-solving ability in mental health care), based on the Guttman scale (yes = 2, no = 1). Total scores range from 3 to 6, with 3–4 indicating limited experience and 5–6 indicating sufficient experience. *Motivation.* Support from within for family members who are the primary caregivers for people with mental disorders. The assessment of this indicator was done using an eight-item questionnaire, which covers four dimensions: intrinsic motivation, external motivation, identified regulation, and amotivation. The responses were rated with a Likert scale with five points. For positive items, responses were scored using the following scale: 'strongly agree' = 5, 'agree' = 4, 'neutral' = 3, 'disagree' = 2, and 'strongly disagree' = 1. For negative items, the scoring was reversed. The overall score ranged between 8 and 40, with scores between 8 and 27 categorized as low motivation and scores of 28–40 categorized as high motivation. *Knowledge.* The understanding of mental disorders that family members who are the primary caregivers possess. The evaluation of this indicator involves ten questions across six dimensions: definition of mental disorder, causes, signs and symptoms, treatment, impact on families, and family empowerment in the care of mental health patients. It includes both positive and negative statements, using the Guttman scale. For positive items, a "true" answer receives a score of 1 and "false" gets 0; for negative items, the scores are reversed. The sum of the scores varies between 0 and 10, with scores of 0–7 indicating insufficient knowledge, and 8–10 reflecting good knowledge.

Patient factors. The condition of family members who have mental disorders. The questionnaire encompasses five indicators, namely age, gender, duration of mental disorders, relapse frequency, and severity level. *Age and gender*. Age was recorded based on a predefined age range, while gender was classified as male or female. *Duration of mental disorders*. This indicator measures the time from the initial diagnosis of a mental disorder by healthcare professionals until the study was conducted, measured in years. The duration was categorized as: 1-3 years, 4-6 years, 7-10 years, and >10 years. *Relapse frequency.* This indicator was measured based on the number of recurrence events occurring within a year. The recurrence frequency was classified as follows: 1–3 times every year, 4–5 times every year, and more than 5 times every year. *Severity level.* Severity of symptoms assessed by people with mental disorders. The assessment was conducted using a questionnaire modified by the researcher, based on (Fitryasari *et al.*, 2021). It included 17 items covering three dimensions: positive symptoms, negative symptoms, and affective disorder symptoms, rated on a Likert scale. Responses were scored as follows: "no symptoms" = 1, "very mild symptoms" = 2, "mild symptoms" = 3, "moderate symptoms" = 4, "somewhat severe symptoms" = 5, "severe symptoms" = 6, and "very severe symptoms" = 7. The total score ranged from 17 to 119, with severity categorized as mild (17–31), moderate (32–52), and severe (53–119).

Nurse factors. The evaluation of the nurse's coaching skills by family caregivers. The questionnaire has two indicators, namely behavior and psychological. *Behavior.* Refers nurses' capacity to support the effective implementation of health coaching. This questionnaire consists of nine questions, five dimensions (building trust, providing content, regulating motivation, coaching authentically, boundary setting), and utilizes the Guttman scale. For each question, a "yes" response is assigned a score of 1, while a "no" response is assigned a score of 0. The total score ranges from 0 to 9, encompassing the following categories: "incapable" for scores between 0 and 8, and "capable" for a score of 9. *Psychological.* The nurse's comprehension of family caregivers' attitudes, behaviors, and thoughts. The questionnaire consists of seven questions, three dimensions (thoughts, feelings, actions), and employs the Guttman scale. A "yes" answer is assigned a score of 1,

while a "no" answer receives a score of 0. The total score varies from 0 to 7, categorized as "incapable" for scores ranging from 0 to 6, and "capable" for a score of 7.

Health care service factors. Health service support received by family caregivers. This questionnaire addresses three indicators: information, accessibility, and healthcare facilities. *Information.* Availability and provision of information on mental health services for family caregivers. The questionnaire comprises three items that evaluate three dimensions: the implementation of mental health programs, the availability of health personnel, and the dissemination of mental health information. It utilizes the Guttman scale, assigning a score of 1 for a "yes" response and 0 for a "no" response. The overall score varies between 0 and 3, classified as "not supportive" for scores 0-2, and "supportive" for a score of 3. *Accessibility*. The ease of access to health care facilities for family caregivers. The questionnaire comprises two items that evaluate two dimensions: proximity to health care facilities and transportation availability. It utilizes the Guttman scale (yes = 1, no = 0). The overall score varies between 0 and 2, categorized as "not supportive" for scores of 0–1 and "supportive" for a score of 2. *Health care facilities*. Infrastructure and facilities in health services that promote the delivery of mental health services. A three-item questionnaire was used to evaluate the availability of health facilities, consultation rooms, and information media, applying the Guttman scale (scored 1 for "available" and 0 for "not available"). Total scores range from 0 to 3, with 0–1 classified as "not supportive" and 2–3 as "supportive".

Health coaching. Health assistance programs that enhance families' capacity to care for individuals with mental disorders. This questionnaire includes three indicators: information sharing, working alliance, and goal difficulty level. *Information sharing*. The examination of family caregivers' knowledge about the care of individuals with mental illnesses. The five-item questionnaire covers four dimensions (personalization, goal disclosure, behavior change support, and decision-making), using the Guttman scale (yes = 1, no = 0). Scores of 0–4 indicate "ineffective," and a score of 5 indicates "effective". *Working alliance*. The working relationship between health workers and family caregivers. The questionnaire comprises five items that address three dimensions: cooperation, openness, and accessibility. It uses the Guttman scale, assigning 1 point for each "yes" response and 0 for "no". The total number of points spans between 0 and 5, with scores if 0–4 designated as "ineffective" and a score of 5 categorized as "effective." *Goal difficulty*. The establishment of objectives and the difficulties family caregivers encounter in accomplishing treatment results. This five-item questionnaire measures three dimensions (realism, relevance, and action planning), using the Guttman scale (yes = 1, no = 0). A score ranging from 0 to 4 is classified as "ineffective," but a score of 5 is deemed "effective."

Planned behavior. Components about family caregivers' behaviors, emotions, and perspectives. This variable is assessed by a questionnaire comprising three indicators: attitude toward the behavior, subjective norms, and perceived behavioral control. *Attitude toward the behavior.* Family caregivers' expression of either favorable (supportive) or negative (unsupportive) emotions toward the care of individuals with mental disorders. A six-item questionnaire covering three dimensions (belief in behavior, belief in motivation/behavior, and supportive or inhibiting beliefs) was used, employing a four-point Likert scale of four points. Responses were assigned scores with the following values: "strongly agree" = 4, "agree" = 3, "disagree" = 2, and "strongly disagree" = 1. The overall scores vary between 6 and 24, while score between 1 and 18 are categorized as poor and those between 19 and 24 as good. *Subjective norms*. The perspectives of family caregivers regarding social influences or the reactions of others that are deemed significant in promoting or opposing the care of individuals with mental illnesses. Comprising eight items across two dimensions (normative belief and motivation to comply), the questionnaire employs a Likert scale with four points. Responses are scored as follows: "strongly agree" = 4, "agree" = 3, "disagree" = 2, and "strongly disagree" = 1. The overall scores vary between 8 and 32, while scores between 8 and 23 are classified as low, and those from 24 to 32 are classified as high. *Perceived behavioral control.* Family caregivers' perceptions are related to the ease or difficulty of caring for people with mental disorders. Containing six items across two dimensions (control belief and power belief), the instrument uses a Likert scale with four points: "strongly agree" = 4, "agree" = 3, "disagree" = 2, and "strongly disagree" = 1. Total scores vary from 6 to 24, where 6–17 indicates a negative perception and 18–24 reflects a positive one.

Behavior intention. Family caregivers' intention to care for people with mental disorders. The questionnaire of this variable consists of two indicators**:** goal attainment, family insight. *Goal attainment.* Plans established by family caregivers to enhance their capacity to provide care for individuals with mental disorders. Assessment was based on seven items reflecting three core dimensions: goal setting, action planning, and evaluation with revision. A four-point Likert scale was applied, where “strongly agree” was scored 4, “agree” 3, “disagree” 2, and “strongly disagree” 1. The final score varied from 7 to 28. Scores between 7 and 20 indicated weak goal achievement, while scores of 21–28 reflected strong goal achievement. *Family insight.* The insight of family caregivers on the care of individuals with mental disorders. This questionnaire includes seven items across three dimensions: self-desire, weakness, and self-

potential. Responses are evaluated using a Likert scale, where "strongly agree" receives a score of 4, "agree" a score of 3, "disagree" a score of 2, and "strongly disagree" a score of 1. The total of the score spans between 7 and 28, with scores of 7-20 reflecting inadequate family insight, and scores of 21-28 denoting strong family insight.

A caregiver's ability to care for people with mental disorders. Family caregivers' behavior when delivering informal care. The questionnaire comprises four dimensions: namely, assistance in daily living activities, assistance in socialization, symptom control, and medication adherence. *Assistance in carrying out daily living activities.* The capacity of family caregivers to assist individuals with mental disorders in carrying out routine activities. The questionnaire includes 15 questions across five dimensions: eating and drinking, bathing, toileting, dressing, and maintaining cleanliness. The assessment employs a Likert scale, assigning a score of 0 to "not done," 1 to "sometimes done," and 2 to "always done." The cumulative score varies from 0 to 30. Values ranging from 0 to 18 signify "less," and values from 19 to 30 denote "sufficient."*Assistance in socialization*. The capacity of family caregivers to support individuals with mental disorders in interacting socially in their surroundings. Comprising 5 questions and two dimensions (interaction with family, interaction with the community), the assessment uses a Likert scale. Responses of "not done" are scored 0, "sometimes done" 1, and "always done" 2. The total of the score spans from 5 to 10, with scores of 0–5 classified as "less" and scores of 6–10 classified as "good."*Symptom control*. The capacity of family caregivers in assisting individuals with mental disorders to avoid relapsing. The questionnaire includes eight questions covering four dimensions (knowledge improvement, patient involvement in simple tasks, provision of mental support, utilization of mental health services), and uses a Likert scale. Responses are graded as follows: "not done" receives a score of 0, "sometimes done" receives a score of 1, and "always done" receives a score of 2. The total of the score spans from 0 to 16, with scores of 0–11 classified as "less" and scores of 12–16 classified as "good".*Medication adherence*. Family caregivers' capacity to attend to therapy with individuals who have mental disorders. The questionnaire comprises nine questions across two dimensions: control over health services and medication adherence, using a Likert scale. Responses are scored as follows: "not done" = 0, "sometimes done" = 1, and "always done" = 2. Total scores vary from 0 to 18, with scores of 0-13 reflecting lower performance and scores of 14-18 reflecting better performance.

Data Collection

The data for this study were gathered from February to June 2024 through home visits and face-to-face interviews in the catchment areas of seven *Puskesmas* in Makassar. The research team collaborated with the mental health program coordinators at each *Puskesmas* to get caregiver contact information. The questionnaire was conducted through face-to-face interviews by trained data collectors, owing to differing levels of literacy and comprehension among participants. The interviewers articulated each topic and offered standardized clarifications as necessary to guarantee participants comprehended the content prior to replying. This interviewer-led method reduced misinterpretation and ensured that all participants, irrespective of educational background, could engage effectively. Systematic questioning methods and an organized framework were employed to mitigate interviewer bias and preserve the integrity of the responses (Hariati *et al.*, 2020).

Data Analysis

The data were analyzed using PLS-SEM version 3.8, which is adept at handling intricate structural equation models that incorporate latent variables and mediation effects. It facilitates concurrent evaluation of measurement (outer) and structural (inner) models without presupposing a normal data distribution.

Outer model or Measurement Model

The examination of the outer or measurement model is employed to assess the validity and reliability of the questionnaire. The ordinary least squares method in SEM-PLS was used to extract values for convergent validity, discriminant validity, and reliability. The convergent validity analysis refers to the Average Variance Extracted (AVE) and the loading factor value. The AVE and loading factor value used as a reference is >0.5. Discriminant validity was assessed by the Heterotrait-Monotrait (HTMT) criterion to ensure that each dimension of a variable differs from other dimensions and the indicators can measure the associated variable, with acceptable values <0.90. Reliability was assessed through both Cronbach's alpha and composite reliability. However, a composite reliability value is more recommended because Cronbach's alpha will yield a lower result when used to measure a construct's reliability. The reference value for composite reliability is >0.6 (Hair *et al.*, 2014; Duryadi, 2021).

Inner Model or Structural Model.

The inner, or structural, model was examined to analyze the relationships among latent variables within the conceptual model. The component that is a criterion in evaluating the inner model is the path coefficient. The evaluation criteria for the path coefficient refer to the original sample estimates (β-value), t-statistic value (t-value), and p-value. A positive original sample value signifies a direct relationship between the variables, while a negative value denotes an inverse relationship. An association between variables is deemed significant if the t-value >1.96 and the p-value is <0.05 (Hair *et al.*, 2014).

Table 1: Demographic characteristic of participants (n=155)

Characteristics	Category	Frequency	Percentage
Age	Adult	74	47.7
	Middle age	48	31.0
	Elderly	33	21.3
Gender	Male	56	36.1
	Female	99	63.9
Education level	No education	5	3.2
	Elementary school	11	7.1
	Junior high school	27	17.4
	Senior high school	88	56.8
	Associate/bachelor/postgraduate degree	24	15.5
The duration of caregiving for a patient with mental disorder (years)	1-3	17	11.0
	4-6	31	20.0
	7-10	26	16.8
	>10	81	52.2
The type of caregiver-patient relationship	Parent	60	38.7
	Sibling	48	31.0
	Family (grandfather, grandmother, uncle, aunty, niece, nephew, mother/father-in-law, brother/sister-in-law)	42	27.1
	Neighbour	5	3.2

Ethical Clearance.

This study received approval from the Health Research Ethics Committee of the Faculty of Nursing, Universitas Airlangga (Approval No. 3100-KEPK), on February 26, 2024. All participants provided written informed consent prior to their involvement. To ensure ethical standards and minimize bias, participation was entirely voluntary, with no incentives or coercion involved. Every prospective participant was provided with a comprehensive elucidation of the study's objectives, methodologies, and their entitlements, including the ability to quit at any moment without repercussions. Informed consent in writing was secured before the collection of data.

Results

Participants Characteristics

From an initial pool of 350 individuals identified through caregiver records across seven *Puskesmas*, 200 were screened according to the inclusion and exclusion criteria. A total of 155 caregivers met the eligibility requirements and voluntarily consented to participate in the study. All 155 participants completed the data collection and were incorporated into the ultimate analysis. Table 1 summarizes the demographic characteristics of the participants. Table 1 indicates that most participants were adult females who had completed high school, had provided care for relatives with mental

Table 2: Validity and reliability analysis result

Variables	Indicators	Validity		Reliability
		Convergent	Discriminant	
(X1) Family factors	X1.1 Economic status	X	√	√
	X1.2 Family function	√		
(X2) Caregiver factors	X2.1 Age	X		
	X2.2 Gender	X		
	X2.3 Education level	X		
	X2.4 Stress	√	√	√
	X2.5 Experience	X		
	X2.6 Motivation	√		
	X2.7 Knowledge	X		
(X3) Patient factors	X3.1 Age	X		
	X3.2 Gender	X		
	X3.3 Duration of mental disorders	X	√	√
	X3.4 Relapse frequency	X		
	X3.5 Severity level	√		
(X4) Nurses factors	X4.1 Behaviour	√	√	√
	X4.2 Psychological	X		
(X5) Health care service factors	X5.1 Information	√		
	X5.2 Accessibility	X	√	X
	X5.3 Health care facilities	X		
(X6) Health coaching	X6.1 Information sharing	√		
	X6.2 Working alliance	√	√	√
	X6.3 Goal difficulty	√		
(Y1) Planned behaviour	Y1.1 Attitude toward the behaviour	√		
	Y1.2 Subjective norm	√	√	√
	Y2.3 Perceived behavioural control	√		
(Y2) Behaviour intention	Y2.1 Goal attainment	√	√	√
	Y2.2 Family insight	√		
(Y3) Caregiver ability to care for patient with mental disorders	Y3.1 Assistance in carrying out daily living activities	√		
	Y3.2 Assistance in socialization	√	√	√
	Y3.3 Symptom control	√		
	Y3.4 Medication adherence	√		

Notes: √: valid/reliable; X: not valid/not reliable

Tabel 3: Path Coefficient Analysis Result

Variables	β	T*	p**	Note
X1 -> X6	0.327	3.773	0.000	Significant
X1 -> Y1	0.086	1.122	0.262	Not Significant
X2 -> X6	0.032	0.419	0.676	Not Significant
X2 -> Y1	0.462	5.706	0.000	Significant
X3 -> X6	0.141	2.100	0.036	Significant
X3 -> Y1	-0.247	4.183	0.000	Significant
X4 -> X6	0.343	4.553	0.000	Significant
X4 -> Y1	-0.228	3.110	0.002	Significant
X5 -> X6	0.113	1.356	0.175	Not Significant
X5 -> Y1	0.019	0.231	0.817	Not Significant
X6 -> Y1	-0.172	1.854	0.064	Not Significant
X6 -> Y2	0.008	0.182	0.855	Not Significant
X6 -> Y3	0.435	5.989	0.000	Significant
Y1 -> Y2	0.864	31.522	0.000	Significant
Y2 -> Y3	0.272	3.802	0.000	Significant

Notes: X1: Family Factors; X2: Caregiver Factors; X3: Patient Factors; X4: Nurse Factors; X5: Health Care Service Factors; X6: Health Coaching; Y1: Planned Behavior; Y2: Behaviour Intention; Y3: Caregiver Ability
*T Value: >1.96; **p-value: <0.05:

problems for over ten years, and were parents of the affected individuals.

Measurement Model (Outer Model)

The measurement model was evaluated to establish the validity and reliability of the indicators, focusing on convergent validity, discriminant validity, and composite reliability. Detailed results are presented in Supplementary File: Table 2.

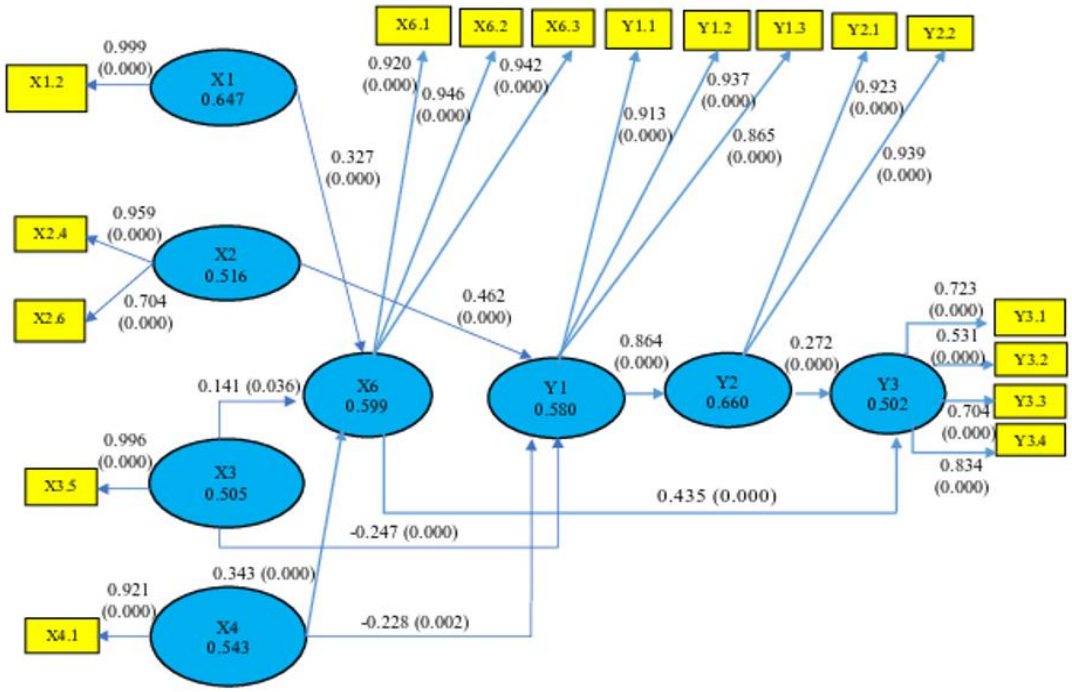
Convergent Validity Analysis. Convergent validity was assessed using factor loadings and the AVE value. The acceptable loading factor and AVE threshold is >0.5. The following table (Table 2) shows that out of 31 indicators assessed, 18 met the required criteria, while the other 13 were excluded due to insufficient validity.

Discriminant Validity Analysis. Discriminant validity was examined using the Heterotrait-Monotrait Ratio (HTMT), employing a cutoff value of <0.90 (Duryadi, 2021). Results confirmed that all retained constructs met the criterion, confirming that each construct measured a unique concept (Table 2).

Reliability Analysis. The Composite reliability was used to assess internal consistency, with values >0.6 considered acceptable. The analysis presented in Table 2 indicates that most of the variables, including X1 (family factors); X2 (caregiver factors); X3 (patient factors); X4 (nurse factors); X6 (health coaching); Y1 (planned behavior); Y2 (behavioral intention); and Y3 (caregiver ability), met the reliability threshold, indicating that the constructs were measured consistently. However, X5 (health care service factors) failed to reach the reliability threshold. Consequently, it was not included in the inner model analysis.

Structural Model (Inner Model)

The structural model was assessed through path coefficient analysis to determine the strength, direction, and significance of the hypothosized relationships



Note: X1: Family Factors; X2: Caregiver Factors; X3: Patient Factors; X4: Nurse Factors; X5: Health Care Service Factors; X6: Health Coaching; Y1: Planned Behavior; Y2: Behaviour Intention; Y3: Caregiver Ability
Figure 1. The Development of Health Coaching Model to Improve Caregivers' Ability to Care for Patients with Mental Disorders

among latent variables. The relationship between variables is deemed significant when the t-value is >1.96 and the p-value is <0.05. In addition, the β-value indicates the magnitude and direction of the relationships between variables. The path coefficient analysis revealed that out of the 15 hypothesized paths examined, 9 demonstrated statistically significant relationships, whereas 6 did not. (Table 3).

The structural analysis indicates that two variables, namely planned behavior (Y1) and behavioral intention (Y2), acted as mediators between caregiver factors (X2), patient factors (X3), and nurse factors (X4) in relation to the caregiver's ability to care for patients with mental disorders (Y3). Additionally, the health coaching variable (X6) served as a mediator linking family factors (X1), patient factors (X3), and nurse factors (X4) to the caregiver's ability to provide care (Y3). These results support the development of the Health Coaching Model established on the FAM and the TPB on caregivers' ability to care for patients with mental disorders. The final structure model constructed from significant relationships is illustrated in Figure 1.

Discussions

This study demonstrates that a health coaching model, grounded in the FFM and the TPB, significantly enhances caregivers' ability to care for individuals with mental disorders. The findings indicate that family, caregiver, patient, and nurse factors influence health coaching, planned behavior, and behavioral intention, which in turn directly affect caregiver competence. The discussion below highlights the relationships among key variables, the practical implications for nursing, and study limitations.

One of the central findings underscores the pivotal role of family in the health coaching process. This result is consistent with prior research, showing that educational background and family involvement contribute significantly to improving caregiving skills through coaching intervention (Arifin *et al.*, 2023; Cameron *et al.*, 2024). Strong family support has been identified as a major determinant of caregiving capacity, with families acting as health-promoting units that reinforce behavioral change and healthcare engagement (Rahmaniyah, 2019). Active family participation, particularly in decision-making and understanding care plans, enhances both patient outcomes and caregivers' commitment to provide care (Michaelson, Pilato, and Davison, 2021; Amini, Jalali, and Jalali, 2023).

Caregiver motivation and stress were significantly associated with planned behavior and behavioral intention. In line with the TPB, caregivers with positive attitudes and strong perceptions of control are more likely to develop firm behavioral intentions (Ajzen, 2012). This concept is supported by previous studies indicating that caregivers with high motivation and lower stress demonstrate greater emotional stability and caregiving commitment (Cheng et al., 2019; Kızılırmak, Ertem, and Kılıçaslan, 2023). In contrast, caregivers from underprivileged backgrounds, characterized by poorer education, income, or rural residence, often report a greater caregiving burden, especially when employing avoidant coping mechanisms (Siddiqui and Khalid, 2019; Mohamad *et al.*, 2024). Motivation reinforces caregivers' aim to deliver consistent care by bolstering their positive views and sense of control. On the other hand, excessive stress affects behavioral intention by undermining motivation and caregivers' confidence in handling expectations (Cornelius *et al.*, 2017). Additionally, stress can subtly erode positive attitudes, leading to decreased emotional stability and reduced dedication to caregiving responsibilities (Broxson and Feliciano, 2020; Rady, Mouloukheya, and Gamal, 2021). This dynamic is further shaped by socioeconomic factors such as income and education, which can either heighten or alleviate motivation and stress (Ansari *et al.*, 2024). Taken together, these interactions demonstrate how caregiver traits influence one another and collectively determine the degree of behavioral intention and planned conduct.

Patient factors also influenced the effectiveness of health coaching and planned behavior. The severity and duration of illness, coupled with the frequency of relapses, increase the caregiving burden and often require more extensive support. These findings are consistent with prior research indicating that caretakers of patients with intricate requirements must cultivate better coping and management skills (Akbari *et al.*, 2018; Ramani *et al.*, 2024). Caregivers may experience reduced perceived control in care situations marked by recurrent relapses, negatively affecting their intention to persist in caregiving (Leng *et al.*, 2019; Litzelman *et al.*, 2023). Tailoring health coaching interventions to align with the patient's clinical condition may enhance caregivers' sense of agency and motivation. Research indicates that effectively structured coaching programs can alleviate stress and anxiety while improving caregiver involvement, power, and engagement (Harris, Bourke-Taylor, and Leo, 2022).

Nurse-related factors, particularly nurse behavior and psychological support, emerged as crucial components in effective coaching and the creation of caregiver intentions. Supportive actions, including empathy, encouragement, and instruction, demonstrated enhancements in caregiver self-efficacy and diminished emotional burden (Imanigoghary *et al.*, 2017). When nurses provide accurate information and practical coaching, caregivers report improved competence and an elevated sensation of control (Seyedrasooli *et al.*, 2020; Sarabia-Cobo *et al.*, 2021; Møllerhøj, 2022). These studies also revealed that health coaching enhances caregivers' abilities by providing them with pertinent knowledge, skills, and confidence. Previous studies substantiate

these findings, indicating that coaching interventions enhance caregivers' comprehension, attitudes, and adherence to consistent care procedures (Purba, Suttharangsee, and Chaowalit, 2017; Fisher, Massimo, and Hirschman, 2022). Goal-directed coaching further supports caregivers in setting realistic goals, elevating patient quality of life, and fostering treatment adherence.

Despite the influence of interpersonal factors, structural elements such as healthcare services demonstrated a different trend. Healthcare services, including facilities, information, and accessibility, did not significantly correlate with either planned behavior or health coaching. Although most families considered these services sufficient, effective caregiver participation was not determined by structural availability alone. This finding supports the idea that interpersonal elements, especially therapeutic connections and collaboration between nurses and caregivers, have a greater influence on the efficacy of health coaching than do facilities (Barr and Tsai, 2021; Cidral, Berg, and Paulino, 2021). Similarly, until families get trust and steady assistance in practice, service availability has no direct effect on attitudes, subjective norms, or perceived control (Sari, Çetinkaya Duman, and Kahveci Gül, 2021). Previous research also shows that poor caregiver self-efficacy and social support views might last even in the presence of healthcare facilities, which limits behavioral intention (Rahayu, Mubin, and Suerni, 2023; Widyastuti et al., 2023). Collectively, these results highlight that rather than relying solely on structural support, the influence of health care services on caring outcomes is mostly dependent on how well they are integrated with psychological empowerment and nurse-caregiver teamwork.

The correlation between behavioral intention and caregiver ability is also essential. Caregivers with robust intentions are more inclined to endure psychological and physical adversities, exhibiting enhanced emotional resilience and superior quality of care (Abedini, Zareiyan and Alhani, 2020). This finding aligns with the results of a study that emphasized that organizational behavioral intention might enhance caregivers' emotional fortitude and resilience, enabling them to maintain consistency in delivering long-term care. Furthermore, a strong intention to assist patients is associated with heightened support for medication, assistance with daily activities, and training in social skills (Fitryasari *et al.*, 2024). Caregivers with strong intentions in caregiving have enhanced resistance to stress and demonstrate superior quality of care (Aksin *et al.*, 2023).

This model can be adapted to diverse cultural contexts through appropriate contextual modifications. Given that cultural norms influence family relationships and views of mental illness, it is imperative to include family members in culturally sensitive coaching programs. In communities with strong cultural values, culturally oriented health education has demonstrated efficacy in enhancing knowledge, diminishing stigma, and fostering engagement. Cultural competencies is therefore a vital criterion for effectively conveying information to individuals from varied backgrounds, ensuring that communication is congruent with their ideas and values (Ningsih *et al.*, 2020). Nurses must be prepared to identify and address cultural variances in caring practices to improve the efficacy of health coaching treatments. With appropriate adaptation, the concept possesses the potential for extensive deployment across various communities.

However, it is important to recognize several limitations in this study. First, the application of purposive sampling may have resulted in selection bias and restricted sample diversity, thus impacting the generalizability of the findings. Secondly, the cross-sectional design prohibits judgments regarding causality or the long-term effects of health coaching. The study included individuals from various *Puskesmas* in various metropolitan catchment areas to minimize bias. Future studies should utilize longitudinal or experimental methodologies with more heterogeneous participant cohorts to more effectively evaluate the model's long-term effects.

This study offers significant insights for the development of caregiver training programs and nursing interventions. Effective programs should provide emotional and motivational support in addition to technical information and caregiving skills. Nurses are urged to engage families in care planning and provide regular assistance based on health coaching principles. Integrating organized coaching into nursing practice can substantially enhance caregivers' motivation and ability to manage mental health care, resulting in better outcomes for both patients and caregivers.

Conclusion

This study demonstrates that the health coaching model, grounded in the FFAM and the TPB, is significantly associated with caregivers' ability to provide appropriate care for individuals with mental disorders. The model's effectiveness is shaped by various critical aspects, encompassing those associated with the family, caregiver, patient, and nurses. The findings indicate that family, patient, and nurse factors have a major influence on health coaching, with nurse factors having the biggest impact. Strong support from family, a thorough comprehension of the patient's condition, and active involvement of nurses enhance caregivers' readiness and motivation to provide consistent, high-quality treatment in alignment with mental health objectives.

The health coaching model further strengthens caregivers' planned behavior by fostering collaboration and encouraging realistic goal setting. Caregivers with strong behavioral intentions exhibit greater emotional resilience and are more consistent in providing long-term

care. These findings suggest that a family-inclusive coaching model, supported by healthcare professionals, particularly nurses, can serve as a practical and effective strategy for improving the quality of care for patients with mental disorders. Furthermore, the results of this study hold implications for health policy by highlighting the development of inclusive, culturally sensitive, and sustainable caregiver training programs. These kinds of programs can be extremely important for enhancing family caregivers' long-term abilities and guaranteeing all-encompassing assistance for community-based mental health treatment.

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Availability of data and materials

On reasonable request, the corresponding author will provide the datasets created and/or examined during the current work.

Authors' contributions

AA, AY, RF, and KSK were in charge of the design and conception of the study. AA, AY, RF, MJB, DSA, and WS contributed to data collection, analysis, and interpretation. AA, AY, RF, KSK, MJB, KS, DSA, and WS were involved in drafting the article. AA, AY, RF, KSK, NF, and DSA revised the manuscript for significant intellectual content. AA, AY, RF, KSK, KS, and NF approved the final version of the manuscript to be published.

Declaration of Interest

The author states there are no other conflicts of interest.

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