

Table Physical activity intervention for older adults based on the Theory of Planned Behavior

Intervention Measures	BCTs	TPB Construct
First Session (Week 1)		
1. First, hold an activity launch ceremony. [The director of preventive healthcare announces the launch of the physical activity (PA) group series and the establishment of the PA group, encouraging participants to attend classes on time and strengthen their bodies through exercise] (1). [Sign a small commitment card promising to attend classes on time] (2). [Write on the card what they hope to gain from this PA group, e.g., weight loss, making friends, improving balance, etc.] (3). The activity assistant collects the completed cards from the participants. [Inform participants that throughout the activity period, they can come to the activity venue to exercise and communicate; everyone is welcome to come and exchange ideas outside of scheduled sessions.] (4).	(1) Social support (unspecified); (2) behavior contract; (3) Goal setting (outcome); Intention; (4) Social support (practical);	Subjective Norms; Intention;
2. [The general practitioner (GP) introduces the composition of the PA group: twelve participants, one GP (responsible for lecturing), and one activity assistant (responsible for attendance, assisting in classroom teaching, and exercise safety). Introduces classroom discipline and rules, safety protocols, and leave policy (e.g., those unable to attend must inform the activity assistant in advance, and the GP will provide a make-up session afterwards.))] (5). [Reward system: small gifts can be received after completing makeup sessions] (6). [The activity assistant distributes participant manuals (including schedule and brief intro to activities), resistance bands, and	(5) Social support (practical); (6) Material reward; (7) Social support (practical);	Subjective Norms; Incentive;

establishes a WeChat group] (7). The GP invites participants to briefly introduce themselves.		
3. The GP [shows a video "Zhong Nanshan Talks about Exercise and Fitness": In the video, Academician Zhong Nanshan shares his past sports experiences, those of his basketball coach wife, and his daily fitness routine. The video shows pull-up bars in his home; at 80 years old, he still does pull-ups daily. He also explains the physical and mental benefits fitness brings him] (8).	(8) Information about health consequences;	Attitude;
4. The GP leads participants in a brief 5-minute warm-up, then [plays a video and leads participants in learning and practicing three exercises together: "Stand on one foot for 10 s", "Weight shift in standing position (left and right)", "Resistance band chest squeeze". Perform 8-10 repetitions per set, 3 sets per exercise, with 1-minute rest between sets] (9). Conduct 5 minutes of cool-down stretches after the exercises.	(9) Demonstration of the behavior;	Subjective Norms;
5. After completing 10 sets of each exercise, rest for 5 minutes. The GP [selects 1 older adult who performed the movements relatively well to come forward and lead everyone in practicing the learned movements] (10).	(10) Social comparison;	Subjective Norms;
6. The GP and activity assistant help participants [create a weekly exercise plan in their participant manual (e.g., types of PA including but not limited to today's learned movements, frequency, duration, and specific schedule)] (11) and [set a behavioral goal for the week] (12). [The GP affirms the participants' performance today and encourages them, expressing confidence in their ability to follow the exercise plan]	(11) Action planning; (12) Goal setting (behavior); (13) Verbal persuasion about capability; (14) Material reward;	Intention; Perceived behavioral control; Incentive;

(13). [Distribute 2 small gifts to each participant (daily necessities like food wrap, tissues, towels, toothpaste, storage boxes, etc.)] (14). [Inform participants that they can receive more gifts for attending the next session on time] (15). Announce the end of the session.

Second Session (Week 2)

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| 1. Before this session begins, the GP [selects 1 participant to come forward and lead a brief warm-up, and together review the movements learned in the previous session, performing 1 set of each exercise] (16). | (16) Social comparison; | Subjective Norms; |
| 2. After reviewing the previous exercises, the GP begins this session's content: [Show the educational video "Dr. Berg's Huge Benefits of 11 Minutes of Daily Exercise. The video features Dr. Berg explaining how even small amounts of exercise can bring significant health benefits, such as reducing the risk of certain diseases and extending lifespan. Exercise is the most effective natural medicine. Developing a habit of regular exercise builds a fitness reserve, providing an extra health buffer to help counter various negative impacts and stresses on the body] (17). | (17) Information about health consequences; | Attitude; |
| 3. The GP [shows a video "Xu Wei: Only Running Cured My Depression". Video content: The singer Xu Wei shares his experience of using running to cure his depression] (18). | (18) Information about emotional consequences; | Attitude; |
| 4. Show participants [a population pyramid image of our district to illustrate the severity of aging in China. Display the "Healthy China 2030" plan and the "Outline for | (19) Information about social and environmental consequences; | Attitude; |
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Building a Leading Sports Nation" documents to show current policy support for exercise in China. Show pictures of community health pathways and pocket parks in our community to demonstrate environmental support for PA in China. Present World Health Organization guidelines and China's recommended PA levels for older adults] (19).

5. The GP leads participants in a brief 5-minute warm-up, then [plays a video and leads participants in learning and practicing new exercises together: "Toe-heel stand for 5 seconds", "Leg lifts (forward, backward, outward directions)", "Resistance band chest expansion". Perform 8-10 repetitions per set, 3 sets per exercise, with 1-minute rest between sets] (20). Conduct 5 minutes of cool-down stretches after the exercises.

(20) Demonstration of the behavior;

Subjective Norms;

6. Ask participants to open their manuals and look at their weekly exercise plan. The GP [asks each participant about their completion of last week's exercise plan, compares it to the plan, and asks if adjustments are needed for next week's plan based on their situation] (21).

(21) Review behavior goal(s);

Intention;

7. The GP and activity assistant help participants [create a new weekly exercise plan in their manual (e.g., types of PA including but not limited to all learned movements, frequency, duration, and specific schedule) (22) and [set a behavioral goal] (23). The GP [affirms the participants' performance today and encourages them, expressing confidence in their ability to follow the exercise plan] (24). [Distribute 2 small gifts to each participant (daily necessities)] (25). Announce the end of the session.

(22) Action planning;

Intention;

(23) Goal setting (behavior);
(24) Verbal persuasion about capability;
(25) Material reward;

(24) Perceived behavioral control;
Incentive;

Third Session (Week 3)

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| 1. Before this session begins, the GP [selects 1 participant to come forward and lead a brief warm-up, and together review the movements learned in the previous session, performing 1 set of each exercise] (26). | (26) Social comparison; | Subjective Norms; |
| 2. The GP [shows the video: "The Last 10 Years of Life" advertisement. Video summary: A contrast of a day in the last ten years of life for two older men - one with exercise habits and one without. The active man can dress independently in the morning, cycle out, and eat and play with his granddaughter. The inactive man remains in bed, needs a caregiver to feed him, give him medicine, help him dress, and cannot go out independently] (27). | (27) Information about health consequences; | Attitude; |
| 3. After watching the video, the GP asks participants to share their feelings. [Imagine what you will be like when you are old] (28). [Consider if you would regret it if, due to lack of exercise, you became disabled prematurely and spent the last ten years of your life bedridden needing care. Would you regret it if this really happened one day?] (29) | (28) Pros and cons;
(29) Anticipated regret; | Attitude; |
| 4. First, the GP and activity assistant analyze their own reasons for wanting to exercise but being reluctant, based on their personal situations. Then, the participants [analyze their own reasons for wanting to exercise but being reluctant] (30). | (30) Pros and cons; | Attitude; |
| 5. The GP [asks the participants if they have ever had a period of continuous exercise in the past, including occupational, transport-related, or leisure exercise, and what their physical condition and mental state were like during that time. Ask the older adults to | (31) Focus on past success; | Perceived behavioral control; |
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think back and answer one by one] (31).

6. The GP leads participants in a brief 5-minute warm-up, then [plays a video and leads participants in learning and practicing new exercises together: "Lateral walking", "Sit-to-stand-to-sit practice", "Resistance band front raise". Perform 8-10 repetitions per set, 3 sets per exercise, with 1-minute rest between sets] (32). Conduct 5 minutes of cool-down stretches after the exercises.

(32) Demonstration of the behavior;

Subjective Norms;

7. Ask participants to open their manuals and look at their weekly exercise plan. The GP [asks each participant about their completion of last week's exercise plan, compares it to the plan, and asks if adjustments are needed for next week's plan based on their situation] (33).

(33) Review behavior goal(s);

Intention;

8. The GP and activity assistant help participants [create a new weekly exercise plan in their manual (e.g., types of PA including but not limited to all learned movements, frequency, duration, and specific schedule) (34) and [set a behavioral goal] (35). [The GP affirms the participants' performance today and encourages them, expressing confidence in their ability to follow the exercise plan] (36). [Distribute 2 small gifts to each participant (daily necessities)] (37). Announce the end of the session.

(34) Action planning;

Intention;

(35) Goal setting (behavior);

Perceived

(36) Verbal persuasion about capability;

behavioral control;

(37) Material reward;

Incentive;

Fourth Session (Week 4)

1. Before this session begins, the GP [selects one older adult to come forward and lead a brief warm-up, and together review the movements learned in the previous session, performing one set of each exercise] (38).

(38) Social comparison;

Subjective Norms;

2. The GP uses pictures and text to [present and share a case study of Uncle Gu, who changed himself through exercise. This case was found by a rehabilitation department during a community volunteer activity. Uncle Gu is 69 years old, usually never exercises, walks unsteadily, needs external support to go up/down stairs, has poor posture (often cannot straighten his back), and is generally frail. After the rehabilitation department's exercise intervention, significant changes occurred in Uncle Gu's mental state, posture, and various indicators] (39).	(39) Information about health consequences;	Attitude;
3. Ask participants to [review the outcome goals set in the first session. Distribute the small commitment cards signed during the first session to the participants. Ask if they need to adjust their initial outcome goals based on their current needs.] (40)	(40) Review outcome goal(s);	Intention;
4. The GP leads participants in a brief 5-minute warm-up, then [plays a video and leads participants in learning and practicing new exercises together: "Brisk walking" (Reference intensity: 60-69 years: 65-75% HRmax; 70+ years: 60-70% HRmax. Reference step frequency 90-120 steps/min, pace 80-100 m/min), "Resistance band standing lateral flexion". Perform each exercise for 8-10 repetitions per set, 3 sets, with 1-minute rest between sets] (41). Conduct 5 minutes of cool-down stretches after the exercises.	(41) Demonstration of the behavior;	Subjective Norms;
5. Ask participants to open their manuals and look at their weekly exercise plan. The GP [asks each participant about their completion of last week's exercise plan, compares it to the plan, and asks if adjustments are needed for next week's plan based	(42) Review behavior goal(s);	Intention;

on their situation] (42).

6. The GP and activity assistant help participants [create a new weekly exercise plan in their manual (e.g., types of PA including but not limited to all learned movements, frequency, duration, and specific schedule) (43) and [set a behavioral goal] (44), [reset an outcome goal] (45). The GP [affirms the participants' performance across the four sessions and encourages them, expressing confidence in their ability to continue following the exercise plan after returning home] (46). [Distribute 2 small gifts to each participant (daily necessities)] (47). Announce the end of the activity series.	(43) Action planning; (44) Goal setting (behavior); (45) Goal setting (outcome); (46) Verbal persuasion about capability; (47) Material reward;	Intention; Perceived behavioral control; Incentive;
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First Follow-up (Week 6)

Call to [ask participants about their completion of the exercise plan and behavioral goals during this period](48). Ask participants to rate and evaluate the activity implementation. [Assist in developing the next week's exercise plan] (49).	(48) Review behavior goal(s); (49) Action planning;	Intention;
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Second Follow-up (Week 8)

Call to [ask participants about their completion of the exercise plan and behavioral goals during this period] (50), and assist in [developing the next week's exercise plan] (51).	(50) Review behavior goal(s); (51) Action planning;	Intention;
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Note : Abbreviations: BCTs, Behavior Change Techniques. The content within square brackets denotes the specific intervention components corresponding to each BCTs, as implemented in this study. The superscript numbers (e.g., (1), (2), etc.) are used to link each intervention component to its corresponding BCT(s) listed in the adjacent column.