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EXTENDED ABSTRACT

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PERSONALIZED PROMPT GENERATOR AND AI CHATBOT FOR DIETARY AND EXERCISE PLANNING: A CONTROLLED INVESTIGATION OF ADHERENCE AND PHYSICAL FITNESS OVER 12 WEEKS IN OLDER MALAYSIAN ADULTS

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I. Introduction

This study evaluates the effectiveness of a novel prompt generator (NExGEN) and AI chatbot (ChatGPT) intervention in improving exercise and dietary adherence, and physical fitness among older adults over three months. By comparing pre- and post-intervention outcomes, it addresses gaps in understanding AI-driven personalized strategies for sustained adherence and health improvements in elderly populations [1].

II. Methods

A convenience sample of 18 elderly (>60 yrs old) Malaysians, meeting defined health criteria, completed a 3-month NExGEN-ChatGPT intervention. Pre NExGEN-ChatGPT (Pre-NC) and post NExGEN-ChatGPT (Post-NC) intervention assessments included anthropometric measures, flexibility, balance, muscular strength, endurance, and cardiovascular fitness. Participants utilized ChatGPT (model GPT-4o) [3] for personalized dietary and exercise plans, provided weekly feedback, and completed adherence surveys. Results were analyzed for physical activity adherence, dietary adherence, and physical fitness outcomes.

III. Results and Discussion

A. Changes in Physical Fitness

Participants showed significant improvements in balance [4], handgrip strength [5], chair-stand repetitions [6], and walking distance [7] throughout intervention (P<0.05). However, chair-sit-and-reach [8] scores rose but were not statistically significant (p>0.05) (Table 1).

TABLE I
Physical Fitness Outcomes Before (Pre-NC) and After (Post-NC) the NExGEN-ChatGPT Intervention.

Assessment	Pre-NC	Post-NC	*p* value
Chair-sit and reach (*cm*)	10.7 ± 3.6	12.3 ± 1.3	0.068
One-leg balance (*sec*)	47.5 ± 17.4	57.2 ± 11.7	*0.049
Handgrip (*kg*)	36.7 ± 3.2	44.1 ± 4.7	*<0.01
30s-Chair-stand (*times*)	13 ± 2.4	14.3 ± 1.9	*0.034
6-meter walking (*m*)	469.1 ± 53	586.1 ± 64	*<0.01

**Significantly different from Pre-NC (P<0.05)*.

B. Physical Activity Adherence

Physical activity adherence was initially high, peaking at 98 ± 3.1% in Week 2, then declined gradually. After a slight drop at Weeks 3–4, a more pronounced decrease emerged by Week 5 (81 ± 3.6%), continued through Week 8 (72 ± 4.2%), and reached 69 ± 4.5% by Week 12.

A one-way ANOVA revealed significant variance in weekly adherence, F=6.11, p<0.01. Tukey HSD indicated Week 1 exceeded Weeks 10–12. Weeks 5 and 8 were significantly lower than early weeks but comparable to the final weeks.

C. Dietary Adherence

Dietary adherence varied considerably. Week 1's mean score (42 ± 2.9) stayed stable through Week 3, dipped slightly in Week 4 (39 ± 3.7), and declined by Week 5 (31 ± 6.6). Though partial recovery occurred by Week 7 (37 ± 5.9), levels dropped again from Week 8 onward, reaching 30 ± 6.5 by Week 12.

A one-way ANOVA revealed significant variance in weekly adherence, F=6.13, p<0.01. Tukey HSD indicated Week 1 exceeded Weeks 10–12. Weeks 5 and 8 were significantly lower than early weeks but comparable to the final weeks.

IV. Conclusions

The NExGEN-ChatGPT intervention significantly improved physical fitness, while partial improvements in dietary and physical activity adherence highlight the potential of AI-driven programs for older adults. Despite declines in adherence over time, these findings underscore the capacity of tailored interventions to enhance health outcomes. Further studies should refine engagement approaches and explore sustaining adherence, ensuring that AI-based solutions continue to support healthy aging.

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