

Article

Exploring dietary supplement consumption behaviors and determinants among the urban Thai elderly

Jiranuch Ngamyinyod¹, Araya Chiangkhong^{1,*}, Pornprom Rujipairoch¹, Weerapong Ponglek²¹ Kuakarun Faculty of Nursing, Navaminradhiraj University, Bangkok 10300, Thailand² School of Communication Arts, Bangkok University, Pathumthani 12120, Thailand* **Corresponding author:** Araya Chiangkhong, araya@nmu.ac.th

CITATION

Ngamyinyod J, Chiangkhong A, Rujipairoch P, Ponglek W. (2024). Exploring dietary supplement consumption behaviors and determinants among the urban Thai elderly. *Journal of Infrastructure, Policy and Development*. 8(8): 3768. <https://doi.org/10.24294/jipd.v8i8.3768>

ARTICLE INFO

Received: 20 December 2023

Accepted: 26 June 2024

Available online: 28 August 2024

COPYRIGHT



Copyright © 2024 by author(s).

Journal of Infrastructure, Policy and Development is published by EnPress Publisher, LLC. This work is licensed under the Creative Commons Attribution (CC BY) license.

<https://creativecommons.org/licenses/by/4.0/>

Abstract: The consumption of dietary supplements among the elderly is on the rise. Despite the potential benefits, a comprehensive understanding of the decision-making processes leading to the consumption is lacking. This study explores the conditions influencing the decision-making and behavioral patterns of older adults related to dietary supplement consumption. Using a qualitative approach, in-depth interviews were conducted with 21 elderly participants from a seniors' club in Bangkok, Thailand, who had consistently consumed dietary supplements for at least one year. The behavior was classified into five primary categories: enduring use of identical dietary supplements, insufficient regard for health compatibility, replacing medications with supplements, not verifying before consumption, and opting for supplements over medical treatments. These patterns are aligned with the core constructs of the Theory of Planned Behavior (attitude, subjective norm, and perceived behavioral control). Many individuals perceive supplements as pivotal health investments, while others view them as a direct route to robust health. Trusted advice from friends and television significantly influence their choices, with a prevailing sentiment that dietary supplements are generally safe. The high price tag on supplements is often associated with superior quality. The findings highlight the multifaceted nature of dietary supplement consumption decisions among the Thai elderly, suggesting the need for interventions to promote safer and more informed choices.

Keywords: dietary supplements; elderly; decision-making; health behavior; urban health

1. Introduction

Driven by aspiration for enhanced health and well-being, the consumption of dietary supplements among older adults increases significantly each year (Gahche et al., 2017). These supplements, which include vitamins, minerals, herbal extracts, and bioactive compounds, are promoted as essential for optimal nutrition and overall health, in addition to being specifically tailored for the elderly demographic. This trend has been further intensified by the unique nutritional challenges faced by older adults such as diminished appetite, restricted food choices, and decreased nutrient absorption (Kaur et al., 2019; Kassis et al., 2023; Supapon, 2020; Walrand, 2018). However, the journey toward health improvement through supplements is not without pitfalls. Misconceptions about supplements, often rooted in inaccurate or fragmented knowledge prevalent in healthcare practices, can lead to adverse health outcomes (Alhazmi et al., 2023; Kramberger and Barlic-Maganja, 2021).

Global increases in longevity have highlighted significant inequalities in access to proper nutrition, healthcare services, and reliable information necessary for informed decisions. Both developing and developed societies face the double burden of energy excess and undernutrition leading to mental and physical deterioration,

higher rates of non-communicable diseases, lost productivity, increased medical costs, and reduced quality of life (Wickramasinghe et al., 2020). While adequate nutrition is essential for health at all life stages, its impact on maintaining quality of life during aging remains unclear.

Recent studies have explored various aspects of dietary supplement use among the elderly. For example, Han et al. (2021) examined the impact of social media on the perception and use of dietary supplements among older adults, highlighting the role of digital information in shaping health behaviors. Similarly, Kamphuis et al. (2015) investigated the economic factors influencing the purchase of dietary supplements in senior populations, finding that higher income levels correlate with increased supplement consumption. Additionally, a study by Walrand (2018) discusses the increasing use of dietary supplements among older adults and the associated benefits and hazards. It highlights that a significant percentage of the elderly do not meet their nutrient requirements through food alone, leading to the widespread use of dietary supplements. The potential benefits include reduced risks of age-related diseases, improved muscle mass and strength, and better cognitive function. However, the article also points out the drawbacks, such as the risk of overconsumption of nutrients and the lack of clear evidence on the effectiveness and safety of many supplements. The study emphasizes the need for more extensive research to confirm the efficacy and safety of dietary supplements for older people. Furthermore, Tan et al. (2022) analyzed the patterns of dietary supplement use and its implications on health, underscoring the importance of accurate information and regulatory oversight.

The factors influencing dietary supplement consumption among the Thai elderly include knowledge about supplements, perceived benefits, risks, and severity, as well as the convenience of nearby places to purchase supplements and information and recommendations from family and friends (Boardman et al., 2022; Tangkiatkumjai, 2014; Thanathiti and Chamroonsawasdi, 2016). Attitudes toward dietary supplements are shaped by beliefs about the supplements' efficacy, potential health benefits, and perceived risks (Ponphimai and Panomai, 2018). Societal expectations regarding aging, familial beliefs, and healthcare advice further influence subjective norms (Alowais and Selim, 2019; Cristea and Gheorghiu, 2016; Usman and Okafor, 2019). Additionally, accessibility to supplements, financial feasibility, and the ability to manage potential side effects shape perceived behavioral control. However, despite these valuable insights into the factors influencing supplement consumption, previous studies have shown a lack of comprehensive understanding regarding the behavior of dietary supplement consumption among the elderly in the Thai cultural context. Particularly, there has been a gap in exploring attitudes, subjective norms, and perceived behavioral control as proposed by the Theory of Planned Behavior (TPB) by Ajzen (1991). This theory posits that behavioral intentions shaped by attitudes, subjective norms, and perceived behavioral control, play a pivotal role in determining individual actions.

This study centered on the experiences of older individuals who had consumed various dietary supplements for over a year. The objective was to illuminate the behavioral patterns and belief systems steering their choices, delving into cognitive processes, societal influences, and individual predispositions. Understanding these

determinants, the research aimed to offer evidence-based recommendations for healthcare practitioners, bridging knowledge voids and promoting healthier aging trajectories for older adults. In essence, TPB provided a holistic framework for unravelling the complex determinants of dietary supplement consumption decisions among the Thai elderly, setting the stage for interventions that resonate with the unique experiences and societal contexts of the elderly. This study contributes to the existing literature by providing updated insights into dietary supplement consumption among the elderly, specifically within the Thai context. By integrating recent research and emphasizing the cultural and societal influences unique to this demographic, this research offers practical recommendations for healthcare practitioners and policymakers. The findings can guide the development of targeted interventions that address the specific needs and behaviors of the elderly, ultimately enhancing their health outcomes and well-being.

2. Materials and methods

The present study was grounded in a qualitative research paradigm and employed a case study methodology to elucidate the consumption patterns and associated needs of dietary supplement products among the elderly. Data were derived from in-depth interviews with senior individuals who had consistently consumed dietary supplements for a minimum of one year.

2.1. Participants

Employing the snowball sampling technique, participants were chosen based on the following criteria: elderly, consistent consumption of dietary supplements for at least one year, Thai language communication proficiency, and absence of intellectual or hearing impairments that could impede participation. All participants provided voluntary consent for in-depth individual interviews. The recruitment process was initiated with individuals affiliated with a seniors' club who subsequently recommended additional potential participants. Data collection persisted until saturation was achieved, culminating in data from 21 informants.

2.2. Research instruments

The primary instrument for data collection was in-depth interviews, which adhered to a semi-structured format facilitating open-ended responses and adaptability (**Table 1**). The interview guide was divided into two primary themes: understanding the decision-making process associated with dietary supplement consumption and elucidating the actual behaviors concerning supplement intake. To ensure the validity and rigor of the interview protocols, the questions were reviewed by three domain experts: a pharmacologist, a qualitative methodologies specialist, and a behavioral science expert. Their feedback was instrumental in refining the interview guide for clarity, relevance, and precision, with modifications integrated prior to the commencement of the study.

Table 1. Semi-structured interview questions.

Main Questions	Probing Questions
Part I: Understanding the Decision-Making Process	
Can you describe your experience with dietary supplements over the past few years?	How long have you been taking the same supplements? Are you aware of any guidelines or potential risks associated with prolonged use?
How do you decide which dietary supplements to take?	Do you consult with healthcare professionals before starting a new supplement?
What motivated you to continue using the same dietary supplements for an extended period?	Did you receive any advice or guidelines from a healthcare provider or family member?
Have you ever chosen a supplement based on a recommendation from a friend or advertisement?	Did you assess whether the supplement was suitable for your specific health needs?
Have you ever used dietary supplements instead of prescribed medications?	What were your reasons for making this choice? Did you experience any changes in your health as a result?
What steps do you take to verify the authenticity and safety of dietary supplements before using them?	Are you aware of any methods to check the safety of supplements?
Part II: Elucidating Actual Behaviors	
Can you describe any experiences where you used supplements to manage chronic health conditions?	What was the outcome of using these supplements?
Have you ever assumed that a supplement was safe based on its packaging or label?	Can you share an experience where you did this?
Have you ever used dietary supplements as a substitute for medical treatments or surgeries?	What were your reasons for this decision? Probing: What was the outcome of this substitution?
Do you see dietary supplements as a quick solution to improving your health?	Can you provide an example of a supplement you use for rapid health benefits?
How much do you trust recommendations from friends and television about dietary supplements?	Can you recall a time when you followed such a recommendation?
Do you believe that dietary supplements are inherently safe? Why?	How do you differentiate between supplements and prescription medications?
Do you believe that the price of a dietary supplement indicates its quality? Why?	Can you share an example of a high-priced supplement you trust?

2.3. Data collection

The data collection phase began by collaborating with an elderly club in Bangkok, Thailand. The researcher obtained permission and support from the club’s management through initial meetings that explained the research objectives, methodologies, and significance to both the management and potential informants.

2.3.1. Informant selection

Informants were selected using purposive sampling, targeting elderly individuals who met specific criteria relevant to the research objectives, including age, health status, willingness to participate, and ability to provide informed consent. The researcher worked closely with the club management to identify suitable informants.

2.3.2. Informed consent and scheduling

Potential informants received detailed information about the study, including its purpose, procedures, and expected participation duration. The researcher ensured that informants understood their rights, including the right to withdraw from the study at any time without consequences. Immediate consent led to on-site interviews, while others were scheduled at convenient times and venues to ensure informant comfort

and willingness to participate.

2.3.3. Data collection tools and procedures

Data were collected through in-depth interviews using a semi-structured questionnaire designed to elicit comprehensive information on informants' experiences, perceptions, and behaviors. Each interview began with an introduction to the study's objectives and securing permission for audio recording. Conducted in a quiet, private setting to ensure confidentiality and minimize distractions, sessions lasted 45–60 minutes. Open-ended questions encouraged detailed and free responses. The researcher continued the interviews until theoretical saturation was achieved, where no new information was obtained, ensuring the data was clear and comprehensive. Follow-up analysis checked for data redundancy and confirming saturation.

2.3.4. Ensuring data accuracy and validity

Post-interview, the audio recordings were transcribed verbatim. Transcripts were reviewed and verified by informants through member-checking, ensuring accuracy and validity. The informants received their interview transcripts for confirmation or necessary corrections to maintain data reliability.

To obtain cooperation, the researcher provided clear information about the study's objectives and significance, created a friendly and trustworthy atmosphere, and emphasized the informants' rights to withdraw without consequences. This respect and value for their contributions fostered open and willing participation.

In summary, the data collection phase was meticulously planned and executed, ensuring relevant informants, data accuracy, and ethical treatment of participants. This comprehensive approach facilitated the collection of rich, reliable, and ethically sound data for the study.

2.4. Data analysis

Anchored in a qualitative research design, the study utilized content analysis techniques based on the framework posited by Miles and Huberman (Miles and Huberman, 1994). The analytical trajectory encompassed data organization, code generation, visual data display, conclusion derivation, findings interpretation, and results validation. These stages were pivotal to the data analysis phase of the research.

2.5. Ethical considerations

Ethical clearance for this study was obtained from the Thailand Human Rights Committee for Research on Humans at Navamindrathiraj University (Approval No. KFN 24.1/2020). Throughout the data collection process, the researcher adhered to ethical guidelines, ensuring the privacy and confidentiality of the informants. All data were anonymized, and any identifying information was removed from the transcripts. The informed consent process emphasized the voluntary nature of participation and the informants' right to withdraw at any time.

3. Results and discussion

In this research, data were collected from urban communities and associations

dedicated to serving the elderly demographic. The study was conducted with a cohort of 21 participants over the period from December 2020 to April 2021. Demographic analysis, as depicted in **Table 2**, revealed that 61.9% of the participants was male, while 38.1% was female. Concerning age distribution, 23.81% was within the 60–70 age range, 57.14% was aged between 70–80 years, and 19.05% was over 80 years old. The mean age of the participants was calculated to be 75.29 years with a standard deviation of 6.91 years. Pertaining to dietary supplement usage, 33.33% of the participants consumed vitamins, 23.81% employed digestive fiber supplements, 19.05% opted for memory-boosting supplements, 14.29% chose meal replacement shakes, and 9.52% utilized sleep support supplements. In terms of financial status, 71.43% described their situation as balanced, while 28.57% perceived it as imbalanced. The findings of this study are systematically presented in accordance with the predefined research objectives, as further elucidated below.

Table 2. Study participants’ demographic characteristics.

Code	Age (years)	Gender	Duration of Supplement Use (years)	Supplement Category	Advice Sources
P1	70	Male	5	Vitamins	Friends, advertisements
P2	79	Female	2	Vitamins	Friends
P3	81	Female	1	Meal replacement shakes	Friends, advertisements
P4	79	Male	3	Meal replacement shakes	Friends
P5	60	Male	1	Meal replacement shakes	Friends, advertisements
P6	79	Female	3	Digestive fiber supplements	Friends
P7	83	Female	2	Memory-boosting supplements	Advertisements
P8	63	Male	3	Memory-boosting supplements	Friends
P9	78	Female	3	Sleep support supplements	Friends, advertisements
P10	77	Male	2	Sleep support supplements	Advertisements
P11	76	Male	2	Vitamins	Advertisements
P12	69	Female	1	Vitamins	Advertisements
P13	75	Male	2	Vitamins	Family
P14	90	Male	5	Vitamins	Friends, advertisements
P15	73	Female	3	Memory-boosting supplements	Friends, advertisements
P16	78	Male	3	Digestive fiber supplements	Advertisements
P17	81	Male	3	Memory-boosting supplements	Advertisements
P18	66	Female	4	Digestive fiber supplements	Advertisements
P19	76	Male	3	Vitamins	Family
P20	72	Male	2	Digestive fiber supplements	Family
P21	76	Male	5	Digestive fiber supplements	Friends, advertisements

Part I: Dietary supplement consumption behavior

Dietary supplement consumption behavior is multifaceted and can be divided into five primary categories: numerous individuals engaged in prolonged consumption of identical dietary supplements, frequently insufficient regard for the compatibility of

these supplements with one's health, frequent substitution of supplements for prescribed medications, a discernible absence of verification prior to the consumption of supplements, and some selection of dietary supplements as an alternative to conventional medical treatments.

Theme 1: Long-term consumption of similar dietary supplements

Elderly individuals frequently engage in prolonged consumption of the same dietary supplements, driven by belief in their health benefits. This practice occurs despite a general lack of knowledge about correct consumption methods and the possible risks associated with sustained use. Examples include a participant who had been taking a supplement for three years without awareness of potential residual substance buildup, another who did not realize that prolonged use might lead to liver inflammation, and a third who had consistently consumed a vitamin for over three years, based on a daughter's recommendation, but without any specific guidelines.

P4 remarked, *"I've been taking this for three years straight. I was unaware that continuous consumption might result in residual substances."*

P16 shared, *"I've been using this for over two years without any problems. I didn't know prolonged use might cause liver inflammation."*

P19 commented, *"I've taken this vitamin daily for at least three years without breaks. My daughter got it for me, and since she didn't provide any guidelines, I've just been consistently consuming it."*

Theme 2: Inadequate consideration of health compatibility

Elderly individuals often choose dietary supplements based on suggestions from friends or advertisements rather than assessing their personal health needs. This approach reflects a common misconception equating supplements with medications, leading them to overlook the importance of medical advice. For instance, one participant started using supplements recommended by a friend without considering their body's specific requirements. Another believed in the inherent safety of all supplements and never questioned their potential impacts or sought professional guidance.

P2 shared, *"I wasn't sure what my body needed, so I took whatever my friend suggested without assessing its suitability."*

P20 said, *"I believed that all supplements were inherently safe, so I never really questioned their potential impacts or where to seek guidance."*

Theme 3: Substituting supplements for medications

Driven by concerns over the potential harm conventional medicines might cause to their organs, elderly individuals are increasingly turning to dietary supplements as alternatives to prescribed medications for managing chronic ailments. This is exemplified by a participant who, facing high cholesterol, minimized food intake and switched to dietary milk designed for diabetics. Another individual, addressing the scarcity of quality food, chose a nutrient-rich, protein-packed milk supplement perceived as free from contaminants. Additionally, the labeling of supplements as 'food' and their trustworthy packaging further influenced these choices, as seen in a participant who found reassurance in the product's presentation and perceived health benefits.

P4 shared, *"I had minimized my food intake due to high cholesterol and switched to this dietary milk designed for diabetics."*

P5 remarked, *“Quality food was rare. I chose this milk as it was nutrient-rich and free from contaminants. Moreover, it had sufficient protein.”*

P18 commented, *“The label ‘food’ on the supplement gave an impression of safety. The packaging and branding made it appear trustworthy and healthy.”*

Theme 4: Lack of pre-consumption verification

A significant number of elderly individuals often start using dietary supplements without verifying their authenticity or safety, primarily due to uncertainty about how to conduct such verification. For instance, one participant assumed a product was safe and met safety standards, simply because it looked legitimate and was labeled as medicine. Another admitted to not knowing the process for verifying authenticity but proceeded anyway because the product seemed fine. Similarly, a third individual assumed safety based on the supplement label and drew parallels with a doctor-prescribed vitamin, believing it to be similarly beneficial.

P7 said, *“It looked legitimate, and I assumed it met safety standards. It was medicine, after all.”*

P8 mentioned, *“I didn’t know how to verify its authenticity, but it seemed okay.”*

P14 shared, *“I had assumed it was safe since it was labeled as a supplement. My doctor had prescribed Vitamin B for my eyes, so I thought this was similar and beneficial.”*

Theme 5: Substituting supplements for medical treatment

Some elderly individuals, wary of potential side effects from medications or invasive surgeries, chose dietary supplements as a substitute for formal medical treatments. This is highlighted by experiences such as a participant who, fearing injections, used a supplement to manage blood sugar levels, only to find an increase rather than a decrease in those levels. Similarly, another individual, intimidated by the prospect of surgery, turned to a vitamin supplement for eyesight improvement but did not observe any notable enhancement, despite prolonged use.

P12 noted, *“I feared injections, so I tried this supplement to manage my blood sugar levels but, instead of dropping, my blood sugar rose.”*

P19 shared, *“I was scared of surgeries, so I began using this vitamin for my eyesight. I had been on it for a while, but hadn’t seen significant improvement.”*

Part II: Conditions underpinning decision-making

The criteria for selecting dietary supplements encompassed various factors. First, many individuals viewed them as investments in health. Second, some considered them as shortcuts to achieving robust physical health. Third, there was a notable trust in advice received from friends and television regarding these supplements. Fourth, there was a prevalent belief that dietary supplements were inherently safe health products. Lastly, many perceived high-priced dietary supplements as reliable indicators of quality.

Theme 1: Viewing supplements as an investment in good health

The participants unanimously viewed the use of dietary supplements as a crucial investment in their health, especially in old age. This belief stemmed from the understanding that aging bodies are more vulnerable and require additional support. For many seniors, spending money on supplements is seen as an essential step toward maintaining well-being. They recognize that their physical strength may not be what

it once was, but remain committed to staying vigilant about their health. This mindset extends beyond cost considerations; it is about the necessity of supplementing what the body might lack in terms of nutrition and wellness. Moreover, this investment in health is not limited to supplements alone but also includes other aspects such as organic food and vacations for de-stressing, underlining a holistic approach to health and well-being in later years.

P1 shared, *“In old age, health is paramount. I might not be as strong as before, but I have to stay vigilant. Spending on supplements is an investment for my well-being.”*

P3 noted, *“My body isn’t as robust as in my youth. I need to remain healthy, eat well, and sleep enough. If I lack something, I supplement it. It isn’t about the cost but necessity.”*

P6 stated, *“Good health is an investment of both money and time. We spend on supplements, organic food, and vacations to de-stress. We should spend the money we’ve saved on keeping ourselves healthy.”*

Theme 2: Considering dietary supplements shortcuts to achieving robust physical health

The participants largely perceived dietary supplements as a quick solution for achieving better health, often bypassing traditional health practices. There was a common sentiment that regular food does not fully meet the body’s nutritional needs. For instance, one participant turned to a supplement that promised rapid kidney recovery, finding the selection of appropriate food too complex. Another individual, dealing with knee problems, was influenced by advertisements claiming enhanced knee strength and observed apparent improvements in others. Similarly, a participant with vision issues was attracted to a product advertised to restore clear sight, hoping to regain former visual acuity. This theme reflects a tendency among the elderly to seek immediate and noticeable health improvements, often placing their trust in supplements as a more straightforward alternative to conventional health practices.

P4 explained, *“Some medicines promised noticeable kidney improvements. While I focused on diet, selecting food was complex. This medicine sped up kidney recovery.”*

P7 mentioned, *“I had knee problems. Advertisements claimed their product enhanced knee strength. I had seen individuals walk with ease after using it.”*

P11 stated, *“I had vision issues, and they advertised clearer sight after consumption. I wanted my old vision back.”*

Theme 3: Trusting advice from friends and television

The elderly often place significant trust in the recommendations of peers and information obtained from television, which plays a considerable role in shaping their choices regarding dietary supplements. In the current information age, many seniors learn about these products through various channels, but such sources frequently promote supplements without offering a complete picture. This leads to a reliance on these partial sources of information. For example, one participant described how the participant and friends exchanged supplement recommendations and discussed their benefits in social groups. Another was influenced by television advertisements featuring credible celebrities who appeared rejuvenated and energetic after using certain products, prompting them to try these supplements. Additionally, the simplicity and direct benefits promoted in ads, such as the explanation of omega-3 for tear

production and eye health, further entice the elderly, despite the lack of comprehensive information or guidance on additional necessary health steps.

P4 said, *“My friends and I coached each other on health. We shared supplement recommendations, discussing their benefits in our LINE group.”*

P7 noted, *“Television ads feature credible celebrities who seem rejuvenated after using products. They felt energetic and looked better, so I decided to try it.”*

P11 commented, *“They explained how omega-3 aided tear production, improving eye conditions. No additional steps were needed.”*

Theme 4: Believing that dietary supplements were inherently safe health products

The prevailing belief among the elderly was that dietary supplements inherently contributed to health enhancement and were considered safer than conventional medications. This perception stemmed from the understanding that supplements were designed specifically for health improvement and lacked the intimidating aspects often associated with prescription drugs. For example, one participant viewed supplements as non-intimidating and purely beneficial for health. Another held the opinion that these products should be safer and more advantageous than potentially harmful. Furthermore, the presentation of supplements, from the use of the term ‘food’ to their packaging, reinforced the notion that they were health- friendly. This theme highlights a general trust in the safety and health benefits of dietary supplements among the elderly, often contrasting them favorably with traditional medical treatments.

P1 remarked, *“It was for health enhancement. It wasn’t intimidating like prescription drugs.”*

P9 added, *“They should have been safer and more beneficial than harmful.”*

P13 observed, *“Everything about it, from the term ‘food’ to the packaging, suggested it was health-friendly.”*

Theme 5: Perceiving high-priced dietary supplements as indicators of quality

Among the elderly, there is a prevalent belief that the cost of dietary supplements is directly indicative of their quality. This perception is rooted in the assumption that higher-priced products are made from superior raw materials, thus offering better health benefits. For instance, a participant trusted in the safety and effectiveness of vitamins purchased by a grandson during COVID-19, primarily because of their high cost. Another individual associated high cost with good quality, expressing skepticism toward cheaper alternatives and their efficacy. Additionally, the perception of quality was not just limited to the product itself but extended to its origin, as evidenced by a participant who believed that a supplement’s high price, along with its Australian origin, was reflective of its quality and production standards. This theme reflects a common mindset where price is often seen as a proxy for the overall quality and effectiveness of health-related products.

P13 recalled, *“My grandson bought me vitamins during COVID-19, saying it boosts immunity. Given its high cost, I believed it was safe.”*

P8 shared, *“If it was expensive, it must have been of good quality. Cheap ones raised concerns about their efficacy.”*

P20 stated, *“My granddaughter got this from Australia. We thought its price reflected the quality and production costs.”*

The elderly population's approach to dietary supplements is characterized by prolonged use, reliance on non-professional advice, and a strong belief in the inherent safety and efficacy of these products. There is a notable lack of critical assessment regarding health compatibility and safety verification alongside a perception that high cost equates high quality. This behavior reflects a broader trend of viewing supplements as crucial to maintaining health, especially in older age, and as a preferable alternative to conventional medicine.

4. Discussion

Utilizing the Theory of Planned Behavior (Ajzen, 1991; Ajzen and Fishbein, 2005) as an interpretative lens, this study provided deeper insights into dietary supplement consumption behavior among the elderly. The study illuminated these patterns in two broad sections.

Part I: Dietary supplement consumption behavior

The behavior of dietary supplement consumption among the elderly was distilled into five primary categories: enduring use of identical dietary supplements, insufficient regard for health compatibility, replacing medications with supplements, not verifying before consumption, and opting for supplements over medical treatments. These patterns aligned with the core constructs of the Theory of Planned Behavior (TPB). The positive attitudes toward dietary supplements were based on beliefs about health benefits and efficacy. This confidence in supplements potentially contributed to prolonged usage, reflecting the TPB notion that favorable attitudes toward a behavior increase the likelihood of engaging in that behavior (Ajzen, 1991; Ajzen and Fishbein, 2005).

The decisions to use dietary supplements were heavily influenced by subjective norms, including trusted advice from friends and media. This social influence often outweighed professional medical advice, aligning with the TPB idea that perceived social pressure affects behavioral intentions (Çoker et al., 2022; Huang and Wu, 2021; Stamatiou et al., 2022). The lack of rigorous product verification and the preference for supplements over medications highlighted issues in perceived behavioral control. The elderly perceived a higher level of control and fewer risks with dietary supplements compared to conventional medications, despite potential misinformation (Carpenter and Yoon, 2011; Chiba and Tanemura, 2022).

Continuous dietary supplement consumption among the elderly was associated with the attitudinal aspect of the TPB. Confidence in the efficacy and health benefits of these supplements reflected a positive attitude potentially contributing to prolonged usage (Ajzen, 1991; Bazhan et al., 2024). This finding aligns with Gahche et al. (2017), who reported that older adults in the U.S. frequently used dietary supplements to enhance their health.

Decisions based on recommendations from friends or advertisements were consistent with the TPB's subjective norms. The influence of peers, especially among the elderly, often superseded medical advice, resonating with findings from Çoker et al. (2022) and Stamatiou et al. (2022), who highlighted the power of social norms in shaping health behavior. This pattern suggests that peer influence can be a significant factor in the elderly's health decisions, as also noted by Huang and Wu (2021).

This study uniquely identified cultural factors specific to the Thai elderly, where peer recommendations and media advertisements had a more significant influence compared to Western contexts. This contrasts with Western studies where physician recommendations are more prominent (Carpenter and Yoon, 2011). Moreover, the study revealed a critical gap in the perceived behavioral control of the elderly regarding product verification, a finding that is less emphasized in Western literature.

Part II: Conditions underpinning decision-making

The Theory of Planned Behavior (TPB) served as a comprehensive framework for understanding the determinants shaping dietary supplement consumption behavior among the Thai elderly (Ajzen, 1991). The elderly's inclination toward prolonged consumption of the same dietary supplements exemplified the attitudinal facet of the TPB. This belief in consistent usage leading to positive health outcomes is consistent with findings from Alowais and Selim (2019) and Torres et al. (2015).

Behaviors such as insufficient consideration of health compatibility and neglecting to verify supplement authenticity were attributed to perceived behavioral control. Karpinski and Milliner (2016) also found that attitudes toward supplement efficacy significantly influence consumption behaviors.

This study uniquely highlights the dual influence of attitudes and subjective norms on the decision to use supplements as alternatives to medications, revealing a cultural propensity to trust external advice from friends and media over medical professionals, a trend less documented in Western studies (Dwyer, 2018; Ekor, 2014). Additionally, the perception of high-priced supplements as quality indicators is deeply rooted in the Thai context, a belief not widely reported in other studies.

The criteria for selecting dietary supplements among the elderly encompassed various factors in the study. Viewing supplements as an investment in good health was a common perception, with many seeing the supplements as essential for maintaining health, especially as aging bodies require additional support. The belief that supplements could quickly and effectively address health needs, bypassing more complex health practices, was prevalent. Many elderly individuals trusted advice from friends and television, which significantly impacted their decisions. There was a prevailing belief that supplements were inherently safe and beneficial, often seen as safer than conventional medications. Additionally, high-priced supplements were often associated with superior quality and effectiveness.

These behaviors and perceptions were also aligned with the constructs of the TPB. The elderly's inclination toward prolonged consumption of the same dietary supplements exemplified the attitudinal facet of the TPB. The belief in the positive outcomes of consistent usage was deeply rooted in attitudes toward supplements (Alowais and Selim, 2019; Torres et al., 2015). The influence of friends and media, combined with societal expectations, shaped the subjective norms. This cultural propensity to trust non-medical advice more than professional guidance underscores the significant role of subjective norms in the elderly's decision-making (Dwyer, 2018; Ekor, 2014). Factors such as ease of access, affordability, and perceived lower risks of supplements reinforced the elderly's perceived control over their health decisions. This was evident in the tendency to prefer high-priced supplements, assuming they were of better quality (Carpenter and Yoon, 2011).

The study's informants consisted of elderly individuals from urban communities and associations dedicated to serving the elderly demographic in Bangkok, Thailand. This specific urban context provided unique cultural and social dynamics influencing dietary supplement consumption. The availability and accessibility of dietary supplements in urban areas may have facilitated their use. Additionally, exposure to media and advertising is typically higher in urban settings, which can influence consumer behavior. In Thai culture, high value is placed on advice from trusted social networks, including friends and family, which can significantly influence health-related decisions. This cultural nuance was evident in the strong influence of peer recommendations on dietary supplement use. The perception that higher-priced supplements equate better quality might be linked to socioeconomic factors where urban residents with sufficient financial resources can afford more expensive health products.

5. Conclusion

In summary, the Theory of Planned Behavior provided significant insights into the intricate determinants of dietary supplement consumption among the elderly. The study highlighted the interplay of attitudes, subjective norms, and perceived behavioral control in shaping these behaviors. To effectively support this demographic in health choices, interventions need to address these intertwined influences. This comprehensive approach resonates with both the study's findings and prior research, offering a path forward for enhancing the health and well-being of the elderly population.

The findings suggest that healthcare practitioners, policymakers, and educators should consider these behavioral determinants when designing interventions aimed at promoting safe and informed dietary supplement use among the elderly. The study underscores the importance of understanding the cultural and social dynamics that influence health behaviors in this demographic. By acknowledging the unique factors that shape the elderly's decisions, health professionals can develop more effective strategies to support health and well-being.

6. Recommendations for implications

To effectively manage dietary supplement use among the elderly, several steps are essential. These include refining advertising and labeling policies to ensure transparency and reduce misconceptions; developing educational programs that utilize trusted channels such as peer groups and media to provide comprehensive information about proper supplement use and the risks of substituting supplements for prescribed medications; adopting a patient-centric approach that acknowledges the elderly's beliefs and involves the elderly in informed decision-making to reinforce confidence in health choices; focusing on improving the elderly's ability to critically evaluate supplement authenticity and compatibility with individual health needs through training; and regulating supplement marketing to ensure accurate and comprehensive consumer information, with an emphasis on product verification and safe consumption practices.

7. Limitations and recommendations for future research

7.1. Limitations of the research study

The findings of this study were intrinsically linked to the specific urban cultural and geographical context in which they were derived. This particular focus might have constrained broader applicability to diverse settings or regions. The unique characteristics of the urban environment and its cultural nuances played a pivotal role in shaping the outcomes, potentially limiting the generalizability of the results to other contexts.

7.2. Recommendations for future research

Expanding Geographical and Cultural Horizons: It would be beneficial to conduct analogous studies in varied cultural or geographical landscapes. Such endeavors would not only validate the findings of the current study but also offer a comparative perspective, enriching understanding of dietary supplement consumption behaviors across a spectrum of populations.

Diving into Rural Dynamics: Given the urban-centric nature of the present study, there is a compelling case to delve into dietary supplement consumption behaviors within rural settings. This exploration would elucidate the contrasts and parallels between urban and rural elderly populations, shedding light on the broader influences at play.

Educational Interventions: Future studies should investigate the ramifications of targeted educational programs tailored for the elderly. Assessing how these programs influence dietary supplement choices and subsequent long-term health outcomes would be invaluable.

Leveraging Digital Innovations: In an increasingly digital age, it is imperative to explore the potential of digital tools such as mobile applications or online platforms. Assessing roles and efficacy in educating and guiding the elderly about the judicious and effective use of dietary supplements could pave the way for more informed health decisions.

Author contributions: Conceptualization, JN, AC, PR and WP; methodology, JN, AC, PR and WP; validation, JN, AC, PR and WP; formal analysis, JN, AC, PR and WP; investigation, JN; data curation, JN, AC, PR and WP; writing—original draft preparation, JN and AC; writing—review and editing, JN, AC, PR and WP; supervision, JN; project administration, JN and AC; funding acquisition, JN. All authors have read and agreed to the published version of the manuscript.

Funding: The research was funded by the Navamindradhiraj University Research Fund (Research.Dean's Office.51-THEME/2564) and was conducted as part of research project titled "The Development of Healthcare Media in Safety Using Supplementary Products for the Elderly".

Conflict of interest: The authors declare no conflict of interest.

References

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Ajzen, I., & Fishbein, M. (2005). The influence of attitudes on behavior. In: Albarracín, D., Johnson, B. T., & Zanna, M. P. (editors). *The handbook of attitudes*. Lawrence Erlbaum Associates Publishers.
- Alhazmi, A., Kuriakose, B. B., Mushfiq, S., et al. (2023). Prevalence, attitudes, and practices of dietary supplements among middle-aged and older adults in Asir region, Saudi Arabia: A cross-sectional study. *PloS One*, 18(10). <https://doi.org/10.1371/journal.pone.0292900>
- Alowais, M. A., & Selim, M. E. (2019). Knowledge, attitude, and practices regarding dietary supplements in Saudi Arabia. *Journal of Family Medicine and Primary Care*, 8(2), 365–372. https://doi.org/10.4103/jfmjpc.jfmjpc_430_18.
- Bazhan, M., Shafiei Sabet, F., & Borumandnia, N. (2024). Factors affecting purchase intention of organic food products: Evidence from a developing nation context. *Food Science & Nutrition*, 12(5), 3469–3482. <https://doi.org/10.1002/fsn3.4015>
- Boardman, L., Lockwood, J. L., Angilletta, M. J. (2022). The Future of Invasion Science Needs Physiology. *BioScience*, 72(12), 1204–1219. <https://doi.org/10.1093/biosci/biac080>
- Carpenter, S. M., & Yoon, C. (2011). Aging and consumer decision making. *Annals of the New York Academy of Sciences*, 1235(1), E1–E12. <https://doi.org/10.1111/j.1749-6632.2011.06390.x>
- Chiba, T., & Tanemura, N. (2022). Differences in the Perception of Dietary Supplements between Dietary Supplement/Medicine Users and Non-Users. *Nutrients*, 14(19), 4114. <https://doi.org/10.3390/nu14194114>
- Çoker, E. N., Jebb, S. A., Stewart, C., et al. (2022). Perceptions of social norms around healthy and environmentally-friendly food choices: Linking the role of referent groups to behavior. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.974830>
- Cristea, M., & Gheorghiu, A. (2016). Attitude, perceived behavioral control, and intention to adopt risky behaviors. *Transportation Research Part F: Traffic Psychology and Behaviour*, 43, 157–165. <https://doi.org/10.1016/j.trf.2016.10.004>
- Dwyer, J., Coates, P., & Smith, M. (2018). Dietary Supplements: Regulatory Challenges and Research Resources. *Nutrients*, 10(1), 41. <https://doi.org/10.3390/nu10010041>
- Ekor, M. (2014). The growing use of herbal medicines: issues relating to adverse reactions and challenges in monitoring safety. *Frontiers in Pharmacology*, 4. <https://doi.org/10.3389/fphar.2013.00177>
- Gahche, J. J., Bailey, R. L., Potischman, N., et al. (2017). Dietary Supplement Use Was Very High among Older Adults in the United States in 2011–2014. *The Journal of Nutrition*, 147(10), 1968–1976. <https://doi.org/10.3945/jn.117.255984>
- Han, M., Tan, X. Y., Lee, R., et al. (2021). Impact of Social Media on Health-Related Outcomes Among Older Adults in Singapore: Qualitative Study. *JMIR Aging*, 4(1), 1–12. <https://doi.org/10.2196/23826>
- Huang, W. Y., & Wu, C. E. (2021). Predict the exercise behavior intention of the older adults in Taipei City to promote exercise behavior. *Science Progress*, 104(S3), 1–13. <https://doi.org/10.1177/00368504211042468>
- Kamphuis, C. B., de Bekker-Grob, E. W., & van Lenthe, F. J. (2015). Factors affecting food choices of older adults from high and low socioeconomic groups: a discrete choice experiment. *The American Journal of Clinical Nutrition*, 101(4), 768–774. <https://doi.org/10.3945/ajcn.114.096776>
- Karpinski, C. A., & Milliner, K. (2016). Assessing Intentions to Eat a Healthful Diet Among National Collegiate Athletic Association Division II Collegiate Athletes. *Journal of Athletic Training*, 51(1), 89–96. <https://doi.org/10.4085/1062-6050-51.2.06>
- Kassis, A., Fichot, M. C., Horcajada, M. N., et al. (2023). Nutritional and lifestyle management of the aging journey: A narrative review. *Frontiers in Nutrition*, 9, 01–19. <https://doi.org/10.3389/fnut.2022.1087505>
- Kaur, D., Rasane, P., Singh, J., et al. (2019). Nutritional Interventions for Elderly and Considerations for the Development of Geriatric Foods. *Current Aging Science*, 12(1), 15–27. <https://doi.org/10.2174/1874609812666190521110548>
- Kramberger, K., & Barlič-Maganja, D. (2021). Elderly and dietary supplements: Benefits and Risks. *Zdravje Starostnikov/Health of the Elderly*, 123–130. <https://doi.org/10.26493/978-961-293-129-2.123-130>
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*, 2nd ed. Sage Publications.
- Ponphimai, S., & Panomai, N. (2018). Prevalence of dietary supplement consumption for health of elderly in the elderly club, Maharat Nakhon Ratchasima Hospital, Nakhon Ratchasima Province. *Journal of Health Research*, 21(2), 174–185.
- Stamatiou, R., Katsafadou, V. S., & Mouratidou, T. (2022). The impact of social media on dietary choices, emotions around food

- consumption and body image in Greek adolescents and young adults. *Public Health and Toxicology*, 2(S1), 69. <https://doi.org/10.18332/pht/149841>
- Supapon, S. (2020). Behavior and demands of elderly dietary supplement use in Thailand. *Journal of Humanities and Social Sciences Nakhon Phanom University*, 10(3), 12–21.
- Tan, E. C. K., Eshetie, T. C., Gray, S. L., et al. (2022). Dietary Supplement Use in Middle-aged and Older Adults. *The Journal of Nutrition, Health and Aging*, 26(2), 133–138. <https://doi.org/10.1007/s12603-022-1732-9>
- Tangkiatkumjai, M., Boardman, H., & Walker, D. M. (2014). Herbal and dietary supplement use in Bangkok: a survey. *Journal of Complementary and Integrative Medicine*, 11(3), 203–211. <https://doi.org/10.1515/jcim-2013-0016>
- Torres, T. de L., Camargo, B. V., Bousfield, A. B., et al. (2015). Social representations and normative beliefs about ageing (Portuguese). *Ciência & Saúde Coletiva*, 20(12), 3621–3630. <https://doi.org/10.1590/1413-812320152012.01042015>
- Usman, A., & Okafor, S. (2019). Exploring the Relationship Between Social Media and Social Influence. In: *Advances in Marketing. Customer Relationship Management, and E-Services*. IGI Global. pp. 83–103. <https://doi.org/10.4018/978-1-5225-7344-9.ch004>
- Walrand, S. (2018). Dietary supplement intake among the elderly. *Current Opinion in Clinical Nutrition & Metabolic Care*, 21(6), 465–470. <https://doi.org/10.1097/mco.0000000000000512>
- Wickramasinghe, K., Mathers, J. C., Wopereis, S., et al. (2020). From lifespan to healthspan: the role of nutrition in healthy ageing. *Journal of Nutritional Science*, 9, 1–10. <https://doi.org/10.1017/jns.2020.26>