Patterns of Supplement Consumption and Interaction Risks Among Polymedicated Older Adults: A Descriptive Study

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Introduction

- Polypharmacy in older adults increases the risk of drug–supplement interactions [1].
- Food supplements (FS), though widely perceived as safe, may modulate CYP450 enzymes and P-glycoprotein (P-gP), altering drug metabolism [2].
- Despite the risks, there is a lack of systematic data on FS use in polymedicated older adults, particularly in community settings, hampering efforts to identify high-risk combinations and implement preventive strategies.

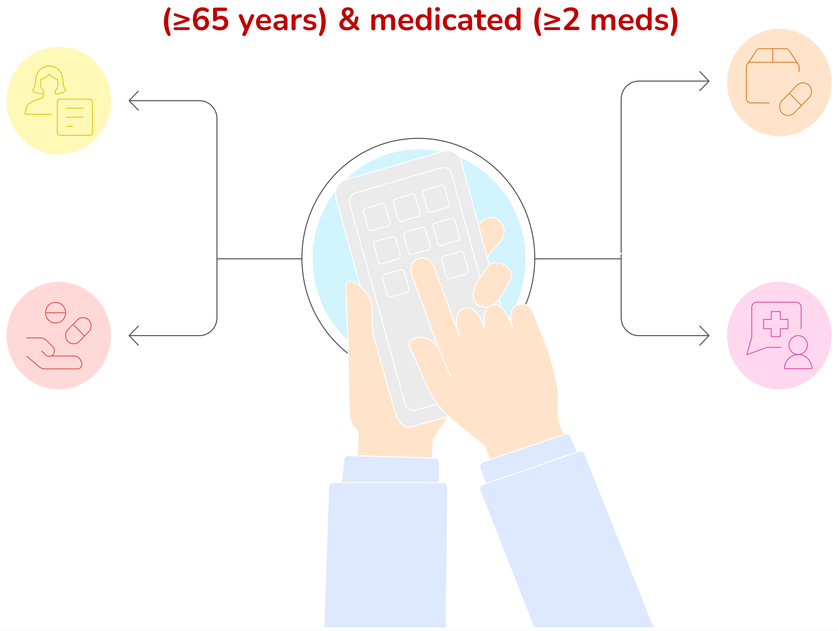
Aims

- Describe the patterns of FS use among polymedicated older adults, including type, duration, motivation and cost;
- identify potential FS–drug interactions using validated databases.

Methodology

Data collection

Community-dwelling elderly (≥65 years) & medicated (≥2 meds)



Demographics
Basic information about the participants, such as age and gender.

Supplement use
Product, ingredients, dose, duration, and motivation for supplement use.

Medication profile
Number and types of chronic medicines used by participants.

Recommendation source
Whether supplement use was based on professional advice or self-initiated.

Data treatment and analysis

Interaction risk
Assessed using DrugBank and Medscape Interaction Checker tools.

Supplement costs
Estimated using reported dosages and market prices.

Descriptive statistics
Used to summarize supplement use patterns.

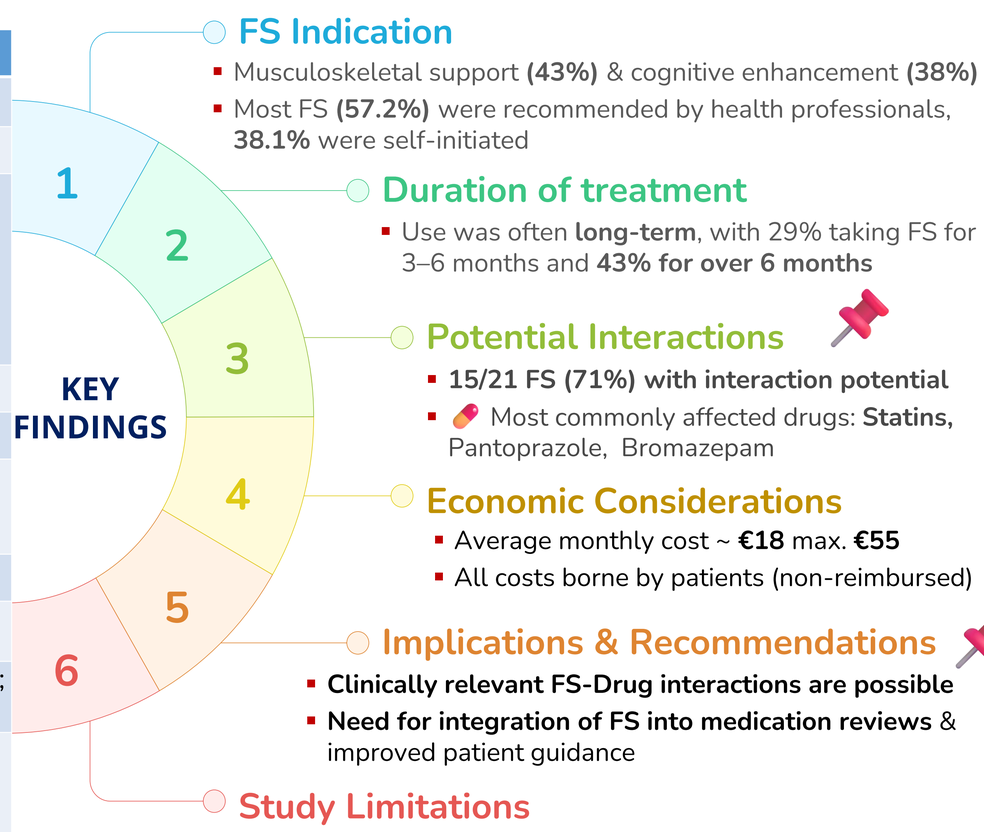
Results

- Among 98 elderly individuals studied, 18 **(18.4%)** were taking FS, with a total of 21 distinct products reported. These were taken in addition to an average of **4.6 medications**. Women accounted for 66.7% of FS users.
- Fifteen FS **(71%)** showed potential CYP/P-gP interactions (Table 1 and caption with key findings), possibly **affecting the metabolism, efficacy, and safety of co-medications**. Despite the identification of potential clinically significant interactions, none of these were deemed to represent a life-threatening risk

Table 1. Summary of bioactive constituents in the FS used by study participants (FS A & B | P1 & P2 given as examples), the potential modulatory effects with Cytochrome P450 (CYP) isoenzymes and P-glycoprotein (P-gP), and the concomitant medicines possibly affected.

P	FS	Bioactive	CYP ↑	CYP ↓	P-gP ↓	Drugs affected (CYP/transporter involved)
1	A	**Biotin**	1B1	-	No	-
		Lutein	-	2C19	No	Simvastatin; Bromazepam; Pantoprazole (2C19)
		Resveratrol	1A2	1A2; 1A1; 1B1; 3A4; 2D6; 2B6; 2C19; 2C9	No	Betahistine (2D6); Simvastatin (3A4; 2D6; 2C19); Calcitriol (3A4); Acetylsalicylic acid (2C9); Bromazepam (1A2, 2C19; 3A4); Pantoprazole (2C19; 3A4); Spironolactone (3A4)
		Vitamin A	26A1	-	No	-
		Vitamin B1	4B1	-	No	-
		Riboflavin	-	CYP1A2; CYP2C19	No	Simvastatin (2C19); Bromazepam (1A2; 2C19); Pantoprazole (2C19)
		Vitamin B6	-	CYP1A1	No	-
		Vitamin D3	-	CYP1A1; CYP2C8	No	Simvastatin (2C8)
		Vitamin E	3A4	-	No	Simvastatin; Calcitriol; Bromazepam; Pantoprazole; Spironolactone (3A4)
2	B	**Quercetin**	-	2C8; 2D6; 2C9; 1A2; 2E1; 2C19	Yes	Alprazolam (2C9); Bisoprolol (2D6/ P-gP)

Interactions are classified based on how FS bioactives affect CYP enzymes and the P-gP transporter involved in drug disposition. Arrows indicate whether these pathways are induced (↑) or inhibited (↓), while "Yes" under P-gP denotes documented transporter inhibition. Lack of interaction (-) means that no current evidence of significant effect exists.



Conclusions

- FS consumption in older adults with polypharmacy presents **pharmacological, regulatory and economic vulnerabilities.**
- Health systems must promote **awareness, monitoring, and education** to reduce risk and ensure **safe, equitable use** of FS consumption in **older adults with polypharmacy**.

1. Maher, R.L.; Hanlon, J.; Hajjar, E.R. Clinical consequences of polypharmacy in elderly. *Expert Opin. Drug Saf.* **2014**, *13*, 57–65
2. Asher, G.N.; Corbett, A.H.; Hawke, R.L. Common herbal dietary supplement-drug interactions. *Am. Fam. Physician* **2017**, *96*, 101–107.

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