RWD 257

The Role of Multivitamin Supplementation in Dementia Risk Reduction in Taiwanese Elderly: Insights from a Population Health and Economic Model

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Background

- By 2025, **>20%** of Taiwan's population will be **≥65 years**[1]
- **Mild cognitive impairment (MCI)** affects **10–25%** of older adults in Taiwan[2] and substantially increases dementia risk
- Dementia-related medical costs were estimated at **USD $412M** in 2015[1]; more recent MOHW data report **NT$533,000 annual cost per patient (1.67× higher than non-dementia)**[3]
- Dementia places a heavy burden on **informal caregivers**, including productivity losses[4]
- **Daily multivitamin and mineral (MVM) supplementation** presents a promising opportunity to support cognitive health and **reduce dementia risk**[5-8]
- However, large proportion of Taiwanese older adults do not regularly take MVMs[9], representing a missed opportunity for early prevention of cognitive disorders

Objective

To estimate the population **health and cost impact** of regular MVM supplementation in reducing dementia risk among Taiwanese adults aged 60 and above who are not regular MVM users, representing a significant unrealized public health opportunity

Methods

A population-based health economic model was developed to compare 10-year health and economic outcomes (2024–2033) between no MVM uptake versus regular MVM uptake among older Taiwanese adults who are non-users

Overview of health economic modelling approach

Literature review
To source model inputs and key model parameters

+

Expert panel consultation
To validate model inputs and key model parameters

Health Economics (HE model)

Comparison

Analysed over 10 years

Without MVM	With MVM
Current scenario	**Improved scenario**
Overall target population	Same population
Disease burden* Resource utilization**	+ Relative Risk Reduction from MVM use → Disease burden* Resource utilization**
	Cost of supplementation

Outcome: Difference between current scenario vs improved scenario (Impact of supplement) over a period of 10 years

Population health impact

1. **Dementia cases:** Number of new dementia diagnoses over time
2. **Premature deaths:** Early deaths caused by dementia-related complications
3. **YLL (Years of Life Lost):** Estimates the number of years lost due to early death from dementia
4. **YLD (Years Lived with Disability):** Measures the years lived with reduced quality of life due to dementia symptoms
5. **QALY (Quality-Adjusted Life Years):** Measures the quality of life, i.e. the years lived in perfect health, free from any dementia symptoms

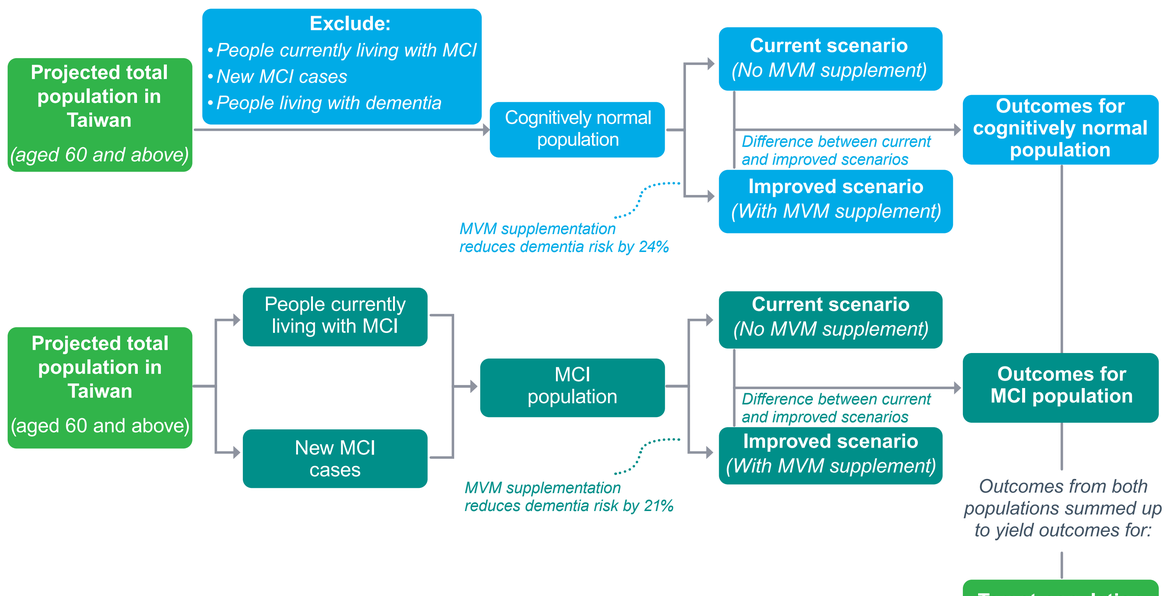
Economic impact

1. **Direct costs:**
   - » Direct medical cost: Hospital visits, medications, dementia-related treatments and cost of supplement
   - » Direct non-medical cost: Expenses for long-term care, home modifications, and hiring professional caregivers
2. **Indirect costs:** Also known as productivity loss of informal caregiver, i.e. time and income lost by family members caring for someone with dementia
3. **Total cost** impact = Savings in direct costs + Savings in indirect costs

*Disease burden: Dementia, death following dementia, premature death, life expectancy, disability/Health-Related Quality of Life(HRQOL)
**Resource utilization: Direct medical costs, direct non-medical costs, indirect cost (productivity loss of caregiver)

Model structure

- The model divides the projected population **(aged 60+)** into two groups: cognitively normal and those with MCI
- For each group, outcomes under a Current Scenario (no MVM use) and an Improved Scenario (regular MVM use) are compared
- Dementia risk reductions of **24%** for cognitively normal individuals (derived from RCT[8]) and **21%** for those with MCI (derived from meta-analysis[10,11] and MMSE conversion[12]) are applied under the Improved Scenario
- The differences in outcomes between the two scenarios are calculated separately for each group and then combined to estimate population health impact and economic impact

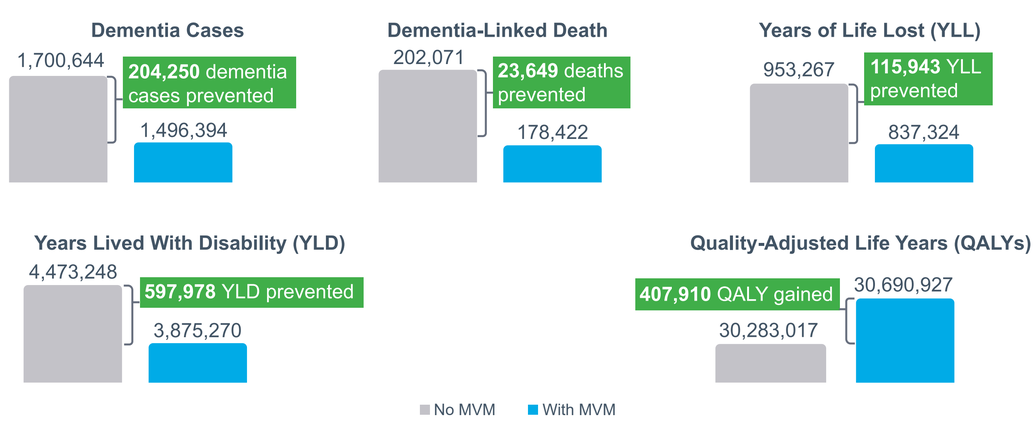


- ***Current scenario*** *refers to 54.7% of older men and 75.3% of older women of the Taiwanese population do not take MVM regularly for the 10-year period. (Derived from Taiwan nationwide nutrition survey 2005-2008)*[9]
- ***Improved scenario*** *refers to this same segment of population initiates regular MVM intake for the entire 10-year duration*

Result

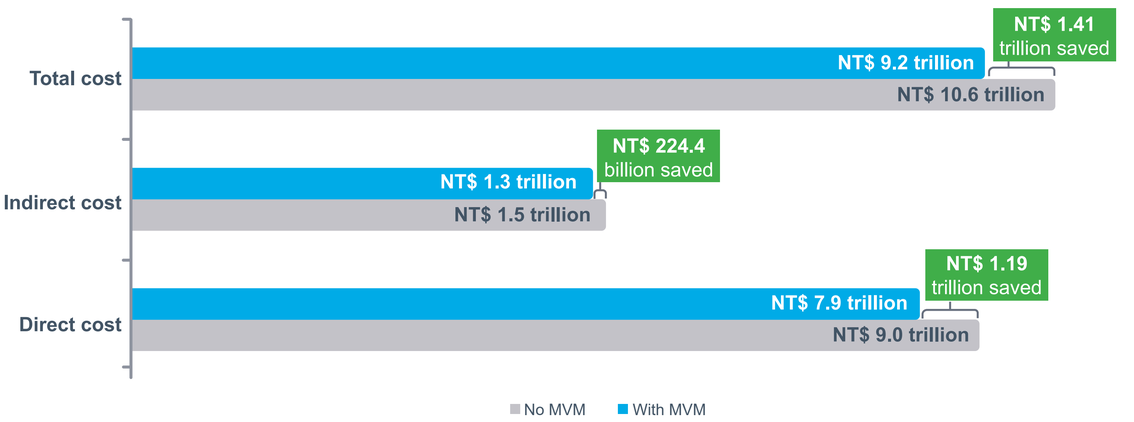
Population Health Impact

10-Year Population Health Impact of Regular MVM Use Among Previously Non-Using Older Adults in Taiwan



Economic Impact

10-Year Economic Impact of Regular MVM Use Among Previously Non-Using Older Adults in Taiwan



Sensitivity Analyses and Scenario Analyses

- Sensitivity analyses identified multivitamin efficacy and dementia-related direct costs as significant cost drivers
- Nevertheless, **various scenario analyses yielded consistent results even when more conservative assumptions were applied**, thus demonstrating the robustness of the findings

Conclusion

Novelty and Key Findings

- **First-of-its-kind** population health economic analysis in Taiwan
- Regular MVM use in older adults could, over 10 years:
  - » Prevent **204,000 dementia cases**
  - » Avoid **23,600 premature deaths**
  - » Gain **407,910 QALYs**
  - » Save **NT$1.41 trillion** in societal costs

Key Drivers

Cost savings primarily driven by:

- Reduced **direct healthcare costs**
- Reduced **long-term care needs**
- Reduced **caregiver productivity loss**
- **Relatively low cost of regular MVM supplementation over 10 years,** especially compared with the substantial costs of dementia treatment and management

Broader Relevance & Future Research

- Scalable framework for other Asia-Pacific countries with similar systems
- Supports policy discussions on preventive interventions for ageing populations
- Future research: validate **long-term dementia risk reduction** from MVM use, especially through large-scale, longitudinal studies in Asian populations

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