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Original article

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Estudio de corte transversal sobre la asociación entre los determinantes del curso de vida y la fragilidad biopsicosocial en personas mayores que viven en comunidad en Chile

Estudo transversal sobre a associação entre os determinantes do curso de vida e a fragilidade biopsicossocial em pessoas idosas que vivem na comunidade no Chile

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RPM, CM, CR, SPS, FVS, SDA, *and* ***FRQ*** *Conceptualization.* ***RPM, FVS, SDA*** *and* ***FAQ.*** *Methodology. SPS. Software.* ***RPM, CM., CR.,*** *and* ***SDA.*** *Validation.* ***SPS.*** *Formal analysis.* ***RPM., FVS*** *and* ***SDA*** *Investigation.* ***RPM, CM, CR, SPS, FVS, SDA,*** *and* ***FRQ.*** *Resources.* ***RPM, CM, SPS*** *and* ***FVS*** *Data curation* ***RPM, CM, CR., SPS, FVS, SDA,*** *and* ***FRQ*** *writing-original draft preparation, writing-review and editing and data visualization.* ***SDA.*** *Supervision.* ***RPM.*** *Project administration. All authors have read and agreed to the published version of the manuscript.*

ABSTRACT

Introduction. The aging process is characterised by socio-demographic, physical, and psychological changes that lead to increased frailty among older populations. The aim of this research was to determine the association between life course determinants and biopsychosocial frailty in community-dwelling Older People (OP). **Methodology.** Cross-sectional study. A convenience sample of 51 OP in central Chile was analysed to examine the association between age, sex, marital status, country of birth, education level, monthly income, healthy lifestyle, chronic illnesses, life events influence biopsychosocial frailty, using the Tilburg Frailty Indicator (TFI). **Results.** A predominance of female participants (86.3%) and a higher representation of married (43.1%) and widowed (29.4%) individuals. Perception of a healthy lifestyle was reported by 62.8% of participants. In the older age group, higher income was inversely associated with the physical (β: -3.84, IC 95%: -6.71; -0.96), psychological (β: -2.55, IC 95%: -4.38; -0.73), and total scores (β= -8.16; IC 95%: -12.38 to -3.95) of the Tilburg Frailty Index (TFI). Additionally, in this older group, having a healthy lifestyle was inversely associated with the physical (β: -1.96, IC 95%: -3.46; -0.47) and total TFI (β= -3.10, IC 95%: -5.29 to -0.92) scores. **Discussion.** These findings provide valuable information on Life course determinants that may influence multidimensional, and specific (biological, psychological and social) frailty, of OP and underscore the importance of early detection and tailored interventions to improve the health and functionality of OP. **Conclusion.** It is crucial to conduct a Comprehensive Gerontological Assessment to equally identify the needs, problems, and opportunities of OP in biomedical, mental (cognitive and mood), functional, and social aspects; and consequently, generate multicomponent interventions adjusted at the individual and group levels of OP.

Keywords:
Aged; Life Course Perspective; Frailty; Social Determinants of Health; Holistic Health; Health Services for the Aged; Psychosocial Impact; Chile

RESUMEN

Introducción. El proceso de envejecimiento se caracteriza por cambios sociodemográficos, físicos y psicológicos que provocan un aumento de la fragilidad entre la población de edad avanzada. El objetivo de esta investigación era determinar la asociación entre los determinantes del curso de vida y la fragilidad biopsicosocial en personas mayores que viven en comunidad. **Metodología.** Estudio de corte transversal. Se analizó una muestra por conveniencia de 51 personas mayores del centro de Chile para evaluar la asociación entre la edad, el sexo, el estado civil, el país de nacimiento, el nivel educativo, los ingresos mensuales, el estilo de vida saludable, las enfermedades crónicas y los eventos de la vida que influyen en la fragilidad biopsicosocial, utilizando el Indicador de Fragilidad de Tilburg (TFI). **Resultados.** Predominaron las participantes mujeres (86.3%) y hubo una mayor representación de personas casadas (43.1%) y viudas (29.4%). El 62.8% de los participantes declaró tener un estilo de vida saludable. En el grupo de mayor edad, los ingresos más altos se asociaron inversamente con los puntajes físicos (β: -3.84, IC 95%: -6.71; -0.96), psicológicos (β: -2.55, IC 95%: -4.38; -0.73), y totales (β= -8.16; IC 95%: -12.38 a -3.95) del Índice de Fragilidad de Tilburg (TFI). Además, en este grupo de personas de edad avanzada, llevar un estilo de vida saludable se asoció inversamente con los puntajes físicos (β: -1.96, IC 95%: -3.46; -0.47) y totales del TFI (β= -3.10, IC 95%: -5.29 a -0.92). **Discusión.** Estos hallazgos proporcionan información valiosa sobre los determinantes del ciclo vital que pueden influir en la fragilidad multidimensional y específica (biológica, psicológica y social) de las personas de edad avanzada y subrayan la importancia de la detección temprana y las intervenciones personalizadas para mejorar la salud y la funcionalidad de las personas mayores. **Conclusiones.** Es fundamental realizar una evaluación gerontológica integral para identificar de manera equitativa las necesidades, los problemas y las oportunidades de las personas mayores en relación con los aspectos biomédicos, mentales (cognitivos y emocionales), funcionales y sociales y, en consecuencia, generar intervenciones que involucren múltiples componentes, que se ajusten a los niveles individuales y grupales de las personas mayores.

Palabras clave:
Anciano; Perspectiva del Curso de la Vida; Fragilidad; Determinantes Sociales de la Salud; Salud Holística; Servicios de Salud para Ancianos; Impacto Psicosocial; Chile

RESUMO

Introdução. O processo de envelhecimento é caracterizado por mudanças sociodemográficas, físicas e psicológicas que levam ao aumento da fragilidade na população idosa. O objetivo desta pesquisa foi determinar a associação entre os determinantes do curso

de vida e a fragilidade biopsicossocial em pessoas idosas que vivem na comunidade. **Metodologia**. Estudo transversal. Foi analisada uma amostra de conveniência de 51 pessoas idosas da região central do Chile para avaliar a associação entre idade, sexo, estado civil, país de nascimento, nível educacional, renda mensal, estilo de vida saudável, doenças crônicas e eventos da vida que influenciam a fragilidade biopsicossocial, utilizando o Indicador de Fragilidade de Tilburg (TFI na sigla em inglês). **Resultados.** Os participantes do sexo feminino predominaram (86,3%), com maior representação de pessoas casadas (43.1%) e viúvos (29.4%). Do total, 62.8% dos participantes relataram um estilo de vida saudável. Na faixa etária mais velha, a renda mais alta foi inversamente associada aos escores físico (β: -3.84, IC 95%: -6.71 a -0.96), psicológico (β: -2.55, IC 95%: -4.38 a -0.73) e total (β = -8.16, IC 95%: -12.38 a -3.95) do Indicador de Fragilidade de Tilburg (TFI). Além disso, neste grupo de pessoas idosas, viver um estilo de vida saudável foi inversamente associado aos escores físicos (β: -1.96, IC 95%: -3.46 a -0.47) e total do TFI (β = -3.10, IC 95%: -5.29 a -0.92). **Discussão.** Essas descobertas fornecem informações valiosas sobre os determinantes do curso de vida que podem influenciar a fragilidade multidimensional e específica (biológica, psicológica e social) das pessoas idosas e ressaltam a importância da detecção precoce e de intervenções personalizadas para melhorar a saúde e a funcionalidade desse grupo. **Conclusão.** É fundamental realizar uma avaliação gerontológica ampla para identificar equitativamente as necessidades, os problemas e as oportunidades das pessoas idosas em relação aos aspectos biomédicos, mentais (cognitivos e emocionais), funcionais e sociais e, consequentemente, gerar intervenções que envolvam múltiplos componentes que se ajustem aos níveis individuais e de grupo das pessoas idosas.

Palavras-chave:
Idoso; Perspectiva de Curso de Vida; Fragilidade; Determinantes Sociais da Saúde; Saúde Holística; Serviços de Saúde para Idosos; Impacto Psicossocial; Chile

Introduction

In recent decades, Latin America and the Caribbean have entered a stage of accelerated aging, with the most significant changes expected by 2030, positioning Chile as one of the most aged countries in the region (1). The aging process is complex and heterogeneous. It is associated with great variation in the life experiences of individuals through changes in socio-demographic, physical and psychological domains (2). However, increased global longevity is not synonymous with successful ageing, and if aging is characterized by sociodemographic changes accompanied by an accelerated decline in physical and mental capacity (3), overall health will decline and frailty of older people (OP) will increase (4,5).

Aging is often associated with the concept of frailty, which is defined as a clinical condition associated with aging. During the frailty state, there is a decline in the physiological reserve and functionality of various organs and systems of the OP. This decline leads to a reduced ability to cope with stressors, both chronic and acute, resulting in a state of vulnerability to the environment. Consequently, it is associated with a higher risk of experiencing negative health outcomes such as dependency, disability, institutionalization, hospitalization and/or death (6). In this regard, Fried et al (7), propose a frailty profile in OP that has predictive value for adverse health outcomes in OP (even beyond socio-economic status) (7). This frailty profile would consist of the following factors: slow walking speed, low physical activity, self-reported physical fatigue, unintentional weight loss and muscle weakness. If an OP has three or more of the above criteria, he or she is biological frail. This clinical and geriatric syndrome (or frailty) should be measured not only in institutionalized or hospitalized people, but also in the general population, in order to identify certain early risks, prevent complications and develop interventions to increase and maintain the functionality and health of OP. However, this definition provides a more fragmented and geriatric view of frailty, as it limits it only to the biological realm.

The World Health Organisation (WHO) defines health as 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity' (8). In this sense, the well-being of OP does not only depend on biological aspects; there are other aspects that can influence it, such as Life course determinants of the population (9). Thus, it is possible to think that the state of frailty should be mediated to some extent by the socio-demographic characteristics of the population. At the same time, a construct is required that allows for the visualization of frailty from a biological, psychological, and/or social perspective, allowing for a more comprehensive view, evaluation, and intervention within the context of gerontology. To measure biopsychosocial frailty in a multidimensional way, some instruments have been developed at the clinical level, where the Tilburg Frailty Indicator (TFI) is a measure with good psychometric properties that measures frailty in OP and includes physical, psychological and social domains (10). Although there is no data on the prevalence of biopsychosocial frailty in OP in Chile, using the TFI, one study reported that of 35 OP who attended day care centers, 80% presented biopsychosocial frailty (score of 5 or more on the TFI) (11).

Many studies have been conducted to assess the associations between sociodemographic factors (sex, age, marital status, education, and income) and health, well-being and frailty in OP (7,10,12,13). However, there is no consensus on the

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impact of these factors on this population. For example, with regard to sex, most studies have shown no differences in health, well-being and frailty between the sexes (12). Regarding place of residence, some studies support that rural living, associated with lower income, may also affect OP well-being, but others show that urban living may affect OP mental health (14). On the other hand, studies have shown that living without a partner was negatively associated with quality of life. For example, it has been found higher QoL scores among OP who were in a marital relationship (15).

Regarding the socio-demographic factors of education and income level, more years of education were associated with higher scores for psychological, social relationships and environmental QOL (14). Furthermore, in other study, higher education alone was significantly associated with better psychological and environmental quality of life (16). On the other hand, it has been shown that low income was associated with poor QoL among OP living alone, although they found no differences in QoL between upper-middle and upper income groups (12).

In this scenario, and in view of the imminent increase in the number of elderly people worldwide, it is essential to have tools that allow the early detection of some conditions, such as frailty biopsychosocial, and that generate the necessary evidence for the design and implementation of interventions that are specific and have a positive impact on the population. The hypothesis of this research proposes that there is an association between some determinants of the life course and biopsychosocial frailty, in its biological, psychological and/or social components. Therefore, the aim of this research was to determine the association between Life course determinants and biopsychosocial frailty in community-dwelling OP.

Methodology

Study Desing

This cross-sectional study, Following the guidelines of the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) for cross-sectional studies (17). The checklist is found as supplementary material.

Sample size

The study was performed with a convenience sample of 51 OP. Data were collected from participants who gave informed consent to participate in a pre-post study, describe previously (18). Briefly, those participants are older than 60 years of age, with treated and compensated multimorbidity, from a community centre in an urban city in central Chile who met regularly for social activities (but did not participate in physical exercise programs), who were having their regular health check-ups in Primary Health Care and were invited to participate in the research. Inclusion criteria were as follows: (a) 60 years or older, for both sexes, (b) self-reliant, (c) able to see and hear well enough to participate in the physical activity intervention, (d) without major physical and/or cognitive disease/ disability that would affect participation. Participants who were performing a similar intervention in the same period were excluded.

The research was conducted in accordance with the Helsinki Declaration was approved by the ethics committee of the Eastern Metropolitan Health Service (Servicio de Salud Metropolitano Oriente); all the participants signed an informed consent.

Assessment and Variables

The TFI is a structured assessment tool, based on the conceptual model created by its author (9), which considers in its first part 10 Life course determinants of frailty (10 closed-ended questions); and in its second part Biopsychosocial frailty, 15 closed-ended questions (Biological components, 8 questions; Psychological, 4 questions; and Social, 3 questions) (9).

Life course determinants (first part TFI): analysed were Age, Sex, Marital status, Country of birth, Education level, Monthly income, Healthy lifestyle, Chronic illnesses, Life events in the previous year (widowhood, divorce, traffic accident, crime, own illness, spouse's illness) (10). In addition, we have added the "number of life events".

Biopsychosocial frailty (second part TFI): was assessed using the Tilburg Frailty Indicator, which comprises three components (physical, psychological, and social), and has been validated for the Spanish population (19). The scoring system categorizes individuals as non-frail (0-4 points) or frail (5-15 points). Higher score is higher biopsychosocial frailty. This score has reported good validity and reproducibility (9).

Statistical analysis

Descriptive statistics were calculated for all variables to describe the characteristics of the sample. The association between Life course determinants and the components of the Tilburg Frailty Indicator (physical, psychological, social) as well as the total TFI score was analysed using multivariable regression models. The model was adjusted by sex, age, marital status, country, education, income, healthy lifestyle, suffering from chronic disease, satisfaction with you living, number of life events, spouse's illness, and own illness. Variables were included based on theoretical relevance. Residuals were tested for normality

using histograms and the Shapiro-Wilk test. Sensitivity analyses were done by age, younger and older than 70 years. The increase or decrease in the score is presented as the β coefficients and 95% confidence intervals (CIs) were reported, and statistical significance was set at $p < 0.05$. Sensitivity analyses were performed by age group (<70 vs. ≥70 years). All analyses were performed with the statistical software STATA MP version 17.3.

Results

Table 1 presents the sociodemographic characteristics of the participants, highlighting a significant predominance of female participants (86.3%), a higher representation of married (43.1%) and widowed (29.4%) participants, mostly participants from Chile, and with university education or higher (54.9%). There is a higher proportion of people with a perception of an healthy lifestyle (62.8%).

Table 1. Bio-sociodemographic Characteristics of the participants

Variable	N (%)
N (%)	51 (100.0)
Sex, n (%)	
Women	44 (86.3)
Male	7 (13.7)
Age, n (%)	
Less than 70	22 (43.0)
Marital Status, n (%)	
Married	22 (43.1)
Divorced	5 (9.8)
Single	9 (17.7)
Widowed	15 (29.4)
Country, n (%)	
Chile	33 (64.7)
Other	18 (35.3)
Education, n (%)	
Basic	6 (11.8)
Secondary	17 (33.3)
University or Higher	28 (54.9)
Income, in Chilean pesos, n (%)	
Less than 200.000	20 (39.2)
Between 200.000 and 400.000	20 (39.2)
More than 400.000	11 (21.6)
Healthy lifestyle, n (%)	
Yes	32 (62.8)
No	19 (37.2)
Suffer from chronic diseases, n (%)	
No	6 (11.8)
Yes	45 (88.2)
Satisfied with your living environment, n (%)	
No	4 (7.8)
Yes	47 (92.2)
Number of Life Events, n (%)	
None	2 (3.9)
1	44 (86.3)
2	4 (7.8)
3	1 (2.0)
Spouse Illness, n (%)	
No	45 (88.2)
Yes	6 (11.8)
Own Illness, n (%)	
No	37 (72.6)
Yes	14 (27.4)

Note: "Other" in the Country, corresponds to OP of Venezuela
Source: prepared by authors.

Table 2 shows the association between the different components and the total TFI score, with Life course determinants. Males had a significant inverse association with the social component score (β: -0.75, 95% CI: -1.39; -0.12). Being from a country other than Chile was significantly inverse associated with both the physical (β: -2.36, 95% CI: -3.95; -0.76) component score, and the total TFI score (β: -2.99, 95% CI: -5.21; -0.77). Higher income was associated with a significant inverse association with the physical component score (β: -2.00, 95% CI: -3.76; -0.25), psychological component score (β: -1.20, 95% CI: -2.09; -0.31), and total TFI score (β: -3.64, 95% CI: -6.08; -1.20). A healthy lifestyle was significantly inversely associated with the physical component score (β: -1.55, 95% CI: -2.75; -0.34) and the total score of the TFI (β: -2.33, 95% CI: -4.01; -0.65). Having experienced two life events was significantly directly associated with the social component score (β: 4.51, 95% CI: 0.95; 8.06). No other significant associations were found.

Table 2. Linear Regression Analysis Between Life Course Determinants and Tilburg Frailty Index Component Scores

Variable	Physical Components		Psychological Components		Social Components		Total TFI	
	Coeficiente β (95% CI)	P-value	Coeficiente β (95% CI)	P-value	Coeficiente β (95% CI)	P-value	Coeficiente β (95% CI)	P-valu
Sex (Ref. Female)								
Male	0.75 (-0.96; 2.47)	0.376	-0.76 (-1.64; 0.11)	0.086	-0.75 (-1.39; -0.12)	0.021*	-0.76 (-3.16; 1.63)	0.519
48	48	48	48	48	48	48	48	48
Age (Ref. Less tan 70)								
More tan 70	0.34 (-1.08; 1.77)	0.624	0.07 (-0.65; 0.79)	0.845	0.02 (-0.50; 0.55)	0.917	0.44 (-1.55; 2.43)	0.652
Marital Status (Ref. Married)								
Divorced	0.77 (-1.55; 3.09)	0.503	-0.16 (-1.35; 1.02)	0.782	0.03 (-0.82; 0.89)	0.936	0.64 (-2.59; 3.88)	0.687
Single	-0.52 (-2.28; 1.23)	0.546	0.09 (-0.80; 0.98)	0.837	0.15 (-0.49; 0.80)	0.625	-0.28 (-2.72; 2.16)	0.818
Widowed	-0.43 (-2.18; 1.31)	0.614	-0.47 (-1.36; 0.41)	0.287	0.07 (-0.56; 0.72)	0.812	-0.83 (-3.26; 1.60)	0.489
Country (Ref. Chile)								
Other	**-2.36 (-3.95; -0.76)**	**0.005***	-0.59 (-1.40; 0.22)	0.148	-0.04 (-0.62; 0.54)	0.887	**-2.99 (-5.21; -0.77)**	**0.010***
Education (Ref. Basic)								
Secondary	-0.42 (-2.32; 1.47)	0.650	0.24 (-0.72; 1.20)	0.616	0.27 (-0.42; 0.97)	0.424	0.09 (-2.55; 2.73)	0.944
University or Higher	-0.16 (-2.08; 1.75)	0.862	0.05 (-0.92; 1.03)	0.914	0.41 (-0.29; 1.12)	0.237	0.31 (-2.37; 2.98)	0.816
Income (Ref. Less than 200.000 Chilean pesos)								
Between 200.000 and 400.000 Chilean pesos	-1.67 (-3.42; 0.07)	0.060	-0.33 (-1.23; 0.55)	0.446	0.26 (-0.37; 0.91)	0.401	-1.74 (-4.18; 0.69)	0.154
More than 400.000 Chilean pesos	**-2.00 (-3.76; -0.25)**	**0.026***	**-1.20 (-2.09; -0.31)**	**0.010***	-0.42 (-1.07; 0.21)	0.187	**-3.64 (-6.08; -1.20)**	**0.005***
Healthy lifestyle (Ref. No)								
Yes	**-1.55 (-2.75; -0.34)**	**0.014***	-0.48 (-1.10; 0.14)	0.118	-0.29 (-0.73; 0.15)	0.189	**-2.33 (-4.01; -0.65)**	**0.008***
Suffer from chronic diseases (Ref. No)								
Yes	1.05 (-0.74; 2.85)	0.239	-0.09 (-1.01; 0.82)	0.831	0.34 (-0.31; 1.01)	0.295	1.31 (-1.20; 3.81)	0.294
Satisfied with your living environment (Ref. No)								
Yes	1.10 (-1.66; 3.86)	0.421	0.25 (-1.15; 1.66)	0.717	-0.49 (-1.51; 0.52)	0.333	0.87 (-2.98; 4.71)	0.649
Number of Life Events (ref. None)								
1	-3.54 (-9.44; 2.35)	0.228	-0.81 (-3.83; 2.19)	0.582	1.74 (-0.43; 3.92)	0.112	-2.62 (-10.83; 5.59)	0.519
2	-4.00 (-13.64; 5.62)	0.402	-0.77 (-5.68; 4.14)	0.750	**4.51 (0.95; 8.06)**	**0.015***	-0.27 (-13.67; 13.14)	0.968
3	-0.29 (-8.09; 7.50)	0.939	0.55 (-3.42; 4.53)	0.778	1.13 (-1.74; 4.00)	0.428	1.39 (-9.46; 12.24)	0.795

Spouse Illness (Ref. No)								
Yes	1.10 (-1.66; 3.86)	0.421	0.25 (-1.15; 1.66)	0.717	-0.49 (-1.51; 0.52)	0.333	-2.54 (-9.25; 4.17)	0.445
Own Illness (Ref. No)								
Yes	2.22 (-3.02; 7.47)	0.393	0.59 (-2.08; 3.27)	0.653	-1.73 (-3.67; 0.20)	0.078	1.09 (-6.22; 8.39)	0.763

Note: "Other" in the Country, corresponds to OP of Venezuela
Source: prepared by authors.

Table 3 shows the association between the different components and the Total TFI Score with Life course determinants, according to those under or over 70 years old. In the older age group, being from a country other than Chile (β: -5.01, 95% CI: -7.54; -2.49), having a higher income (β: -3.84, 95% CI: -6.71 -0.96), and maintaining a healthy lifestyle (β: -1.96, 95% CI: -3.46; -0.47) were inversely associated with the physical component. Additionally, in this group, higher income (β: -2.55, 95% CI: -4.38; -0.73) was inversely associated with the psychological component score of the TFI. Additionally, in the same group, being from another country (β: -6.82, 95% CI: -10.52; -3.12), having a higher income (β: -8.16, 95% CI: -12.38; -3.95), and maintaining a healthy lifestyle (β: -3.10, 95% CI: -5.29; -0.92) were inversely associated with the total TFI score.

Table 3. Stratified Linear Regression Analysis of Life Course Determinants and Tilburg Frailty Index Components by Age Group (<70 and ≥70)

Variable	Physical Components		Psychological Components		Social Components		Total TFI	
	Less than 70	More tan 70	Less than 70	More tan 70	Less than 70	More tan 70	Less tha 70	More tan 70
	Coeficiente β (95% CI)	Coeficiente β (95% CI)	Coeficiente β (95% CI)	Coeficiente β (95% CI)	Coeficiente β (95% CI)	Coeficiente β (95% CI)	Coeficiente β (95% CI)	Coeficiente β (95% CI)
Sex (Ref. Female)								
Male	3.09 (-1.23; 7.42)	0.43 (-2.11; 2.98)	-0.21 (-4.83; 4.42)	-1.15 (-2.76; 0.47)	-0.06 (-1.43; 1.32)	-0.98 (-2.66; 0.69)	2.83 (-6.15; 11.81)	-1.70 (-5.42; 2.03)
Marital Status (Ref. Married)								
Divorced	2.47 (-1.35; 6.29)	-0.52 (-3.46; 2.42)	-0.19 (-4.28; 3.90)	-0.76 (-2.63; 1.10)	-0.13 (-1.35; 1.09)	-0.57 (-2.50; 1.37)	2.15 (-5.79; 10.09)	-1.84 (-6.16; 2.47)
Single	-1.33 (-5.54; 2.89)	-1.57 (-4.73; 1.60)	0.07 (-4.43; 4.58)	0.16 (-1.85; 2.17)	0.06 (-1.28; 1.40)	0.95 (-1.14; 3.03)	-1.19 (-9.94; 7.55)	-0.46 (-5.10; 4.18)
Widowed	3.80 (-1.53; 9.14)	-1.82 (-4.82; 1.17)	-0.97 (-6.68; 4.73)	-0.34 (-2.24; 1.56)	0.08 (-1.62; 1.78)	0.62 (-1.34; 2.59)	2.91 (-8.17; 13.99)	-1.54 (-5.93; 2.85)
Country (Ref. Chile)								
Other	0.85 (-3.17; 4.86)	**-5.01 (-7.54; -2.49)**	-0.72 (-5.01; 3.57)	-1.17 (-2.77; 0.43)	-0.08 (-1.36; 1.20)	-0.63 (-2.30; 1.03)	0.04 (-8.29; 8.37)	**-6.82 (-10.52; -3.12)**
Education (Ref. Basic)								
Secondary	0.73 (-6.61; 8.08)	-1.96 (-4.48; 0.56)	1.36 (-6.50; 9.21)	-0.91 (-2.50; 0.69)	0.56 (-1.78; 2.90)	-0.70 (-2.35; 0.96)	2.65 (-12.60; 17.90)	-3.56 (-7.25; 0.13)
University or Higher	-3.06 (-7.26; 1.13)	-0.51 (-2.97; 1.95)	0.62 (-3.87; 5.11)	-0.49 (-2.05; 1.07)	0.74 (-0.59; 2.08)	0.04 (-1.58; 1.65)	-1.70 (-10.41; 7.02)	-0.96 (-4.57; 2.64)

Income (Ref. Less than 200.000 Chilean pesos)								
Between 200.000 and 400.000 Chilean pesos	-0.62 (-6.85; 5.60)	**-2.70 (-4.79; -0.61)**	-0.44 (-7.09; 6.22)	-1.12 (-2.45; 0.21)	-0.19 (-2.18; 1.79)	-0.49 (-1.87; 0.89)	-1.25 (-14.17; 11.67)	**-4.31 (-7.38; -1.24)**
More tan 400.000 Chilean pesos	-0.04 (-2.84; 2.77)	**-3.84 (-6.71; -0.96)**	-0.61 (-3.61; 2.39)	**-2.55 (-4.38; -0.73)**	-0.20 (-1.10; 0.69)	-1.77 (-3.66; 0.12)	-0.85 (-6.67; 4.98)	**-8.16 (-12.38; -3.95)**
Healthy lifestyle (Ref. No)								
Yes	-0.73 (-3.51; 1.92)	**-1.96 (-3.46; -0.47)**	0.74 (-2.17; 3.64)	-0.47 (-1.42; 0.47)	0.19 (-0.68; 1.05)	-0.67 (-1.65; 0.32)	-1.34 (-6.99; 4.30)	**-3.10 (-5.29; -0.92)**
Suffer from chronic diseases (Ref. No)								
Yes	3.45 (-0.45; 7.35)	1.09 (-2.45; 4.63)	0.33 (-3.84; 4.50)	-0.65 (-2.90; 1.59)	1.09 (-0.15; 2.33)	-0.74 (-3.07; 1.59)	4.87 (-3.23; 12.97)	-0.30 (-5.49; 4.89)
Satisfied with your living environment (Ref. No)								
Yes	-1.24 (-5.74; 3.25)	1.51 (-2.99; 6.02)	1.03 (-3.78; 5.85)	-1.94 (-4.80; 0.92)	-1.15 (-2.58; 0.29)	-1.06 (-4.03; 1.90)	-1.36 (-10.70; 7.99)	5.24 (-11.66; 22.14)
Number of Life Events (ref. None)								
1	-	-2.44 (-9.69; 4.80)	-	-0.72 (-5.31; 3.88)	-	2.09 (-2.68; 6.86)	-	-1.07 (-11.69; 9.56)
2	-5.01 (-14.93; 4.90)	-0.58 (-12.10; 10.95)	1.07 (-9.54; 11.67)	0.37 (-6.94; 7.69)	1.09 (-2.06; 4.25)	5.44 (-2.14; 13.03)	-2.85 (-23.44; 17.74)	5.24 (-11.66; 22.14)
3	-	0.82 (-9.72; 11.36)		-2.04 (-8.73; 4.65)	-	-0.28 (-7.22; 6.65)	-	-1.50 (-16.96; 13.95)
Spouse Illness (Ref. No)								
Yes	2.42 (-7.59; 12.44)	-3.27 (-6.22; 5.90)	-2.54 (-13.26; 8.18)	-1.95 (-6.39; 2.49)	0.28 (-2.91; 3.47)	-3.43 (-8.03; 1.18)	0.16 (-20.64; 20.97)	-8.65 (-18.91; 1.61)
Own Illness (Ref. No)								
Yes	8.49 (-0.51; 17.49)	-0.16 (-7.21; 4.82)	-1.06 (-10.69; 8.57)	0.29 (-3.55; 4.14)	1.29 (-1.58; 4.16)	-2.41 (-6.39; 1.58)	8.72 (-9.97; 27.41)	-2.27 (-11.16; 6.62)

Note: "Other" in the Country, corresponds to OP of Venezuela
Source: prepared by authors.

Discussion

The main finding of this research is that, in the older age group, having higher income was inversely associated with the physical, psychological, and total TFI scores. Additionally, in this older group, maintaining a healthy lifestyle was inversely associated with the physical and total TFI scores, which may reflect that differences in biopsychosocial frailty are associated with economic and health-related life-course determinants, particularly among OP.

Overall, higher income was significantly and inversely associated with the physical and psychological component scores, as well as the total TFI score, suggesting that economic limitations are associated with poorer health perception and functioning. It is important to note that, at this stage of life, retirement leads to a significant reduction in income. Additionally, OP tend to have lower economic resources (20), which are lower compared to other age groups (20). In this context, in Chile, there is socioeconomic inequality among OP, which negatively affects their health (21). Implying that OP face economic limitations that may restrict access to healthcare services, increase the risk of biopsychosocial frailty, worsen health problems, and reduce functional capacity.

Men had a significant inverse association with the social component score of the TFI, which may reflect that living with others and/or having a partner could mitigate frailty in the social component. It has been described that marriage can foster feelings of affection, love, and understanding, which serve as a form of social support, increasing satisfaction and peace of mind (22). At the same time, it could improve healthcare and the use of health services among spouses (22). These feelings are absent or significantly lower in single individuals, with loneliness having a substantial impact on the health of OP. There is a relationship between loneliness and vulnerability, as people tend to be more frail when they feel lonely (23).

Experiencing two life events was directly and significantly associated with the social component score, which may reflect that living through more than one event (such as widowhood, personal illness, spouse's illness, divorce, traffic accident, and/or crime, which were investigated) could increase frailty in the social component. It has been observed that the death of a partner and deteriorating health are risk factors that contribute to feelings of loneliness and increased vulnerability (24). OP are exposed to both events, leading to significant social transformation, making them more vulnerable and increasing their social frailty (24,25). However, individuals with adequate social relationships are more likely to survive compared to those with insufficient social relationships (26).

It is important to consider that aging is a biopsychosocial phenomenon in which various factors beyond biology interact, making it a universal but not homogeneous process within the population (27). Frailty does not only refer to physical changes but also to psychological, functional, social, and spiritual factors that can precipitate and mediate these changes (27). This highlights the importance of life-course events in OP and their impact on well-being (9). This also underscores the importance of assessing social participation and support networks in OP, while developing interventions that consider family and community life. Promoting social interaction among OP with their peers or other generations reinforces participation and social inclusion, thus reducing feelings of loneliness and social frailty.

A healthy lifestyle was significantly and inversely associated with the physical component and total TFI score. It has been observed that healthy lifestyles, such as better diet quality, increased physical activity, and no tobacco use, have been associated with lower levels of frailty (25). It has been described that individuals with a healthy lifestyle and good functional capacity have a better perception of their own health (28,29). Therefore, promotion and prevention health activities are essential to encourage healthy lifestyles that enable OP to maintain good health and, consequently, better biopsychosocial functioning. At the same time, a recent study identified an association between diseases and multimorbidity, specifically with six chronic conditions (diabetes mellitus, cancer, hypertension, osteoarthritis, urinary incontinence, and severe low back pain). These conditions presented moderate to strong associations with total frailty (measured with the TFI) and its physical component; and weak associations with the psychological and social components of frailty (30). Specifically, urinary incontinence and severe low back pain were the most influential factors in frailty (30). Therefore, it is recommended that different weights be assigned to each chronic condition in a multimorbidity measure that seeks to examine the effects of multimorbidity on multidimensional frailty (30).

Being from a country other than Chile was significantly and inversely associated with the physical and total TFI scores, highlighting the importance of considering the cultural context when interpreting the results. At the same time, the migration of OP between countries should be taken into account when designing interventions aimed at their integration, reducing potential biopsychosocial frailty in these groups.

Currently, OP have a longer life expectancy due to global demographic and epidemiological changes, as well as in the Latin American and Caribbean region. Combined with the sociocultural shift in the population, this means that OP today are different from previous generations. They have increased their educational level, are more organized, active, and have a greater sense of life satisfaction, along with challenges and opportunities (1). This is a result of various measures, such as international agreements and the creation and implementation of comprehensive policies, which have contributed to a better response to aging (31), indicating that countries with health programs and policies would respond better to aging, with a strong correlation between public policies and population health, making these actions a priority for the region's governments.

It has been observed that life course determinants influence frailty and its physical, psychological, and social domains in patients hospitalized during the acute period (16), This reinforces the premise that biopsychosocial assessment of frailty should be conducted early and within both clinical and community contexts. In this regard, it is essential to analyse frailty using a multidimensional model, such as the one described by Gobbens et al. (9), And to strengthen interdisciplinary teams that conduct Comprehensive Gerontological Assessments as the cornerstone of Gerontology (18,32). However, it is a reality that there is a discrepancy between the number of OP and the teams trained to conduct an adequate assessment, considering that this age group is heterogeneous and complex, requiring specialized

management since health problems are often complex and interrelated, creating particularities that are essential to understand for proper subsequent management (33).

Therefore, it is essential to consider multicomponent interventions (18), and community-based approaches as a strategic focus that promotes more integrated actions aimed at improving the quality of life of OP (31). All indications point to the need for a comprehensive and interdisciplinary approach, for which Primary Health Care would play a key role, as it is a level of care focused on an integrated care model, strengthening the individual, family, and community.

Future research could expand the understanding of life course determinants and incorporate other life events that could affect people's frailty, whether normative or non-normative, over periods longer than one year. This would allow for a deeper and broader investigation into how life events in childhood, adolescence, and/or adulthood could influence frailty in old age. Similarly, with larger samples and analyzing separately by sex.

This study has its limitations. Among the weaknesses, we can mention that this is a cross-sectional study, so we cannot speak of causality but only of association. Other possible limitation is the omission of additional variables from the medical history, such as the number of pathologies, number of medications used, use of assistive devices and orthoses, among others, which could have provided a more comprehensive picture. Another limitation is selection bias; to avoid this in the future, we recommend using random sampling methods. Additionally, the number of participants included, and the absence of a statistical power calculation is a limitation, which should be carried out in future research, therefore we recommend analyzing the results in the context of the present sample and research. However, notable strengths include addressing the phenomenon of frailty from a multidimensional perspective, encompassing biological, psychological, and social components. Furthermore, the study not only analysed the association with sociodemographic variables but also considered relevant life-course aspects of the participants, offering a more holistic and comprehensive view.

Conclusions

In the older age group, higher income was inversely associated with the physical, psychological, and total scores of the Tilburg Frailty Index (TFI); additionally, in this older group, having a healthy lifestyle was inversely associated with the physical and total TFI scores. This research presents some limitations that must be considered, the results must be analyzed in the context of this research and sample.

Biopsychosocial frailty is a common clinical and geriatric syndrome in OP, associated with multiple factors that reduce their autonomy, functionality, and quality of life. Therefore, it is crucial to conduct a Comprehensive Gerontological Assessment to equally identify the needs, problems, and opportunities of OP in biomedical, mental (cognitive and emotional), functional, and social aspects, to detect those who OP are susceptible to intervention and to prevent future disability. Consequently, multicomponent interventions should be developed, tailored to both individual and group levels. This suggests that policies should not focus solely on OP but also incorporate professionals working with this segment of the population. Adequate training enables early detection and timely care for OP.

Conflicts of interest

The authors declare that they have no conflicts of interest.

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