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Regular Article

Social and health factors affecting work-related accidents among older informal workers in Chile: A probit model analysis based on CASEN 2022

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ABSTRACT

Background: Given the demographic change that Chile is experiencing, more and more older people are participating in the labor market.
Objective: This study aims to understand the social and health factors that affect occupational accidents among older people in Chile who do not have an employment contract.
Methods: Data from the 2022 National Socioeconomic Characterization Survey were used to achieve this objective. A total of 3946 people were included in this study. A probit model was used to determine Average Marginal Effects (AMEs). The model classified 90 percent of the data accurately.
Results: According to the AMEs, older adults without a formal employment contract who are more likely to experience a work-related accident are men (0.061), aged between 60 and 65 years (0.119), with a low educational level (0.144), of indigenous descent (0.227), residing in urban areas (0.102), social insolation (0.108), without internet access (0.085), undergoing medical check-ups (0.562), diagnosed with hypertension (0.381), diabetes (0.397), or depression (0.247), experiencing food limitations due to lack of financial resources (0.242), and belonging to the middle-income group.
Conclusion: It can be inferred from this study that it is necessary to promote positive aging and comprehensive care for the elderly in the workplace to reduce work-related accidents and to strengthen the institutional framework for the elderly by regulating a special labor contract for this age group that would make their hiring conditions more flexible in order to encourage formality among the elderly who wish to remain in the labor market. Active policy interventions are required to improve the quality of employment for this vulnerable group.

1. Background

Chile is one of the most aged countries in Latin America, 18.4 percent of its total population being over 60 years old (MDSF, 2023). This trend aligns with developments observed at the global level (Maiyapakdee et al., 2025). The country faces the challenge of promoting the participation of older individuals in policy design and in both productive and social spheres. This is particularly important as Chile ratified the Inter-American Convention on the Protection of the Human Rights of Older Persons in 2017, which, in Article 8, establishes the right of older persons to active, productive, and full participation (OAS, 2025).

This study aims to identify the social factors—expressed as probabilities—that impact occupational accidents in people over 60 years of age. An accident at work is any situation that arises or occurs during work and results in an injury, whether fatal or not, such as a fall from height or contact with moving machinery (ILO, 2022).

We use the World Health Organization (WHO) framework for predicting social determinants of health—i.e., the underlying social conditions that determine a person's health and well-being. (WHO, 2007). This approach is enriched with a more comprehensive view, allowing us to address the social and contextual correlates that influence an older adult's likelihood to have an accident at work, such as particular inequalities associated with the territory, socioeconomic conditions, gender, ethnic relevance, age, and stages or situations of life (Frank et al., 2020; UN, 2024).

In Chile, as life expectancy continues to increase, so will the retirement age. Therefore, it is necessary to guarantee future generations of older workers non-discriminatory participation in employment with adequate working conditions (MINTRAB, 2024).

A safe and healthy work environment is a fundamental principle and

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right at work. In Chile, the National Occupational Safety and Health Policy for the period 2024–2028 considers a preventive approach to risk management in work environments (PUC, 2022). However, occupational accidents occur frequently despite advances in occupational safety and health. An inverse relationship between age and labor formality is observed in Chile. Older adults' possibility of obtaining informal jobs increases regardless of educational level, health status, or non-labor income (Montt & Contrucci, 2022).

Post-pandemic labor informality levels in 2022 peaked after age 70 for both men and women. After age 70, approximately six in ten women were working informally. For people over 70, the proportion of informality reached its highest point in 2022 at 58.6 percent, an increase of 3.4 percentage points compared to 2019 (SENCE, 2023). In 2024, informality ranged between 28.2 % and 27 % during the periods from April to June/July and September, respectively. Among individuals aged 65 and over, the informality rate reached 56.9 % and 55.8 % in those same periods, highlighting the particular vulnerability of this age group (SENCE, 2024).

The informal sector does not pay taxes, has no social protection coverage, and lacks employment-related benefits. Although older persons do not contribute for pension purposes since they are retired, they are prone to suffer accidents or work-related illnesses, which the social security system should cover.

Along the same lines, a study conducted in Chile between 2015 and 2019 evidenced that older workers experience higher rates of fatal injuries (Bravo et, al. 2020). On the other hand, work capacity (TC) is the basis of well-being, and the variables that affect it may be influenced by factors related to the individual, the environment, and life outside work; in such a sense, work is a protective mechanism against depression, disability, and frailty, helping to maintain well-being, a good cognitive level, and independence in older people's daily activities (Gould et al., 2008).

According to data from the Instituto de Seguridad Laboral in 2024, 53 percent of complaints filed for accidents in older adults were related to work-related incidents (ISL, 2024). Falls are among the most common causes of occupational injury, accounting for 20–30 % of all work-related accidents. They result in work limitations and hospital admissions in up to 20 % of cases (Matsugaki et al., 2024). It is possible to prevent falls in older people through environmental interventions (Clemson et al., 2023). Thus, the ILO Older Workers Recommendation 1980 (No. 162) (ILO, 2025) seeks to improve working conditions that accelerate aging. There is concern about the relationship between age and work demands, employment structure, and work organization (Abusleme et al., 2018).

Being employed can negatively affect health; the effect is particularly great in older people, including the increased risk of stress, occupational diseases, and accidents at work (Delattre et al., 2019). On the other hand, the literature shows that health problems such as chronic diseases, diabetes and mental illness (Sickles & Taubman, 1986) seem to have an important impact on the decision to leave the labor market (Kagamimori et al., 2004). However, paradoxically, the psychosocial stress caused by retirement is considered a determinant of health, particularly in the elderly. It has been shown that social support promotes health and protects the elderly against disease and death (Li et al., 2024), in which case remaining active in the labor market is a protective factor for the elderly. On the other hand, some studies indicate that the financial security offered by the pension system has reduced the need for older adults to participate in income-generating activities, which, combined with an increase in leisure time, represents a luxury not available to previous generations. However, in Chile—and this seems to be a trend in Latin America—the elderly, given the low retirement pensions, are forced to remain in the labor market despite the risk this entails for their health (CASEN, 2022).

The impact of socioeconomic inequalities on health may depend on culture. Some social determinants of health, such as education and income, may not necessarily depend on culture; however, some of the factors, such as social capital and social activities, depend on culture and are therefore not generalizable to other societies (Nedjat et al., 2020). Moreover, there are many interactions between culture and social determinants of health in relation to health outcomes. In addition to social and occupational factors, it is possible to examine the effects of territorial assets (access to transport, health centers, and green areas, among others), addiction to smartphones, or social networks, on whose health complications (Nedjat et al., 2020).

This study seeks to establish a relationship between health and social factors and the number of accidents among older workers. Its goal is to provide relevant information to decision-makers to identify and implement strategies to reduce the accident rate among older workers, in terms of both the number of accidents and their severity.

2. Methods

2.1. Study design

The study was based on the National Socio-Economic Characterization Survey (CASEN), the results of which are publicly available on the Ministry of Social Development's website (CASEN, 2022). The CASEN 2022 database is for public use and was obtained from the Ministry of Social Development (MINDES). All population-based surveys from MINDES, such as CASEN 2022 were conducted under Law N°17374, which protects citizens' privacy; consequently, they do not require approval by an Ethics Committee. All respondents participated voluntarily, and anonymity was guaranteed under Law N° 17374. CASEN is publicly available and used in research as a source of secondary data (Ibbett & Brittain, 2020).

2.2. Dependent variable

To define the dependent variable, all individuals under 60 years of age were first excluded. In addition, to ensure that the sample did not include older adults who were simultaneously studying and working during the reference period, individuals who responded "yes" to question e3 of the CASEN 2022 survey — "In the 2022 school year, do you attend any educational institution?" (1 = Yes, 2 = No) — were also removed. According to Law No. 19,828, which established the National Service for Older Persons (SENAMA) in Chile, an older adult is defined as any person aged 60 years or older.

The data for the dependent variable were filtered based on the responses of household heads to the following questions.

1) In the last three months, have you had health problems or an accident? (Question S16). This question has five possible answers: (1) Yes, health problems caused by work; (2) Yes, health problems not caused by work; (3) Yes, work or school accident; (4) Yes, non-work or school accident; (5) No, I did not have any health problems or accidents.

The present study only considered response (3) "Yes, work or school accident", in line with the objective of the study. To include only work accidents from answer (3), a second question was included.

2) Last week, did you work at least 1 h, not including household chores? (Question O1). This question has two possible answers: (1) Yes; (2) No. The present study considered YES responses as the inclusion criterion.
3) Do you have a written employment contract for your main job? (Question O19). There are three possible answers: (1) Yes, signed; (2) Yes, but not signed; and (3) No contract. The present study only included response number three.

Finally, the dependent variable, defined as dichotomous, was constructed as follows:

1 = Older adults who experienced an occupational accident and reported having worked during the previous week without a formal employment contract.

0 = Older adults who did not experience an occupational accident and reported having worked during the previous week without a formal employment contract.

2.3. Independent variables

The independent variables were considered according to previous literature; as a reference, the seven thematic modules of CASEN 2022 (registry residents, education, work, income, health, identities, and housing) were also considered. All variables were dichotomous, 1 indicating membership in the category and 0 indicating non-membership.

2.4. Data analysis

This study initially included 3946 workers, who answered questions S16, O1, and O19 of CASEN 2022. Of them, 50 percent (n = 1973) had had a work accident and 50 percent (n = 1951) had not.

A class imbalance analysis was conducted to evaluate the potential impact of unequal class representation on the model's performance. To address this issue, a random subsample of 1973 individuals who had not experienced an occupational accident was selected using a *Stata* command, ensuring data quality and internal consistency. The analysis incorporated the national expansion factor developed by the National Institute of Statistics (INE).

Statistical analyses were conducted using *Stata* version 18. A dichotomous response probit model was applied to estimate the probability of experiencing an occupational accident among older adults without a formal employment contract (Lee & Hwang, 2024). Probit models offer distinct advantages in mitigating overfitting compared to other regression techniques, primarily due to their structured specification for modeling binary outcomes. Their flexibility—particularly when integrated with advanced methods such as Bayesian Additive Regression Trees (BART)—allows for robust estimation while maintaining interpretability through the analysis of marginal effects, as demonstrated within the ordered probit framework (Lee & Hwang, 2024; Pho & Truong, 2023).

The model specification is as follows:

$$\Pr(y=1/x)=\Phi(\beta_0+\beta_1x_1+\ldots+\beta_kx_k) \quad 1)$$

$$\Phi(z)=\frac{1}{\sqrt{2\pi}}\int_{-\infty}^{z}e^{\frac{-l^2}{2}}\,\mathrm{dt}. \quad 2)$$

2.4.1. Where

Where:

Y: Binary dependent variable. 1 when older people had mild or established depressive symptoms and 0 when they did not (according to the GDS).

P: Probability that $\mathbf{Y}=\mathbf{1}$.

Φ: Cumulative Distribution Function (CDF) of the standard normal distribution.

X: Vector of explanatory variables.

β: Model parameters, estimated through maximum likelihood estimation.

From the said model, the average marginal effects (AMEs) were estimated (Pho & Truong, 2023). Through this technique, it is possible to measure the average impact that each independent variable (controlling for the remaining factors) has on the probability of a worker having had a work accident. The Average Marginal Effects (AMEs) were calculated using the following equation:

$$AME=\frac{1}{N}\sum_{i=1}^{N}\frac{\partial E[y_i|x_i,w_i]}{\partial x}\beta_x \quad 3)$$

2.4.2. Model fit

Using the probit model, 3946 observations were identified. According to the statistical test based on χ^2, the model was significant with 95 percent confidence. According to the Count R^2 statistic, the model correctly classified 86.9 percent of the data. According to Cox-Snell and Nagelkerke statistics, the independent variables explained between 49 percent and 67 percent of the variance in the dependent variable. The sensitivity of the model was 89.4 percent and the specificity 82.9 percent. The area under the ROC curve was 0.93 (see Table 1).

3. Results

3.1. Sample description

Of the total sample (N = 3946), no one had an employment contract and 50 percent had had an occupational accident (n = 1973). Of those injured, 61 percent were men, 46 percent were over 65 years of age, 91 percent lived in urban areas, 8 percent were descendants of indigenous peoples, 88 percent had basic or secondary education, 62 percent did not have a partner (proxy: separated, divorced, widowed, or single), 8 percent did not have access to the internet, 93 percent had public health insurance (Fonasa), 4 percent lived more than 2 km from a health center, 2 percent live more than 2 km from a green area center, 24 percent had not had a general medical consultation in the last three months, 74 percent had not withdrawn food from the PACAM program, 72 percent had hypertension, and 23 percent had diabetes. Quintile I, equivalent to the lowest income quintile, accounted for 33 percent of occupational accidents; the highest percentages of occupational accidents was concentrated in the middle-income quintiles, quintile II (23 %), quintile III (15 %), and quintile IV (19 %). However, this trend decreased for the highest income quintile, quintile V (10 %). Fifty-nine percent were concerned about lack of food due to lack of money.

3.2. Average marginal effects

The results are presented following the five dimensions of this study, according to AMEs. Variables with statistical significance within the model are shown.

Older males are more likely than females (6.1 %) to experience an occupational accident. The gender was analyzed as a dichotomous variable; initial stratified analyses did not yield significant results. Nonetheless, we have clarified this point and discussed it as a limitation in the revised versionIndividuals aged between 60 and 65 exhibit a higher probability (11.9 %) of experiencing an occupational accident compared to those aged over 65. Older adults with no formal education or only primary or secondary education have a higher likelihood of experiencing an occupational accident (14.4 %) than those with tertiary education. Being a descendant of Indigenous peoples is associated with a higher probability (22.7 %) of experiencing an occupational accident

Table 1
Goodness of fit statistics.

Number of observations	3946
LR chi^2 (16)	2657.446
Prob > chi^2	0.000
Count R^2	0.869
Sensitivity	89.4 %
Specificity	82.9 %
Area under ROC curve	0.93
Correctly classified	86.9 %
Cox-Snell	0.49
Nagelkerke	0.67

compared to those who are not. Moreover, older individuals living in urban areas are more likely (10.6 %) to experience an occupational accident than those residing in rural areas (see Table 2).

Additionally, older adults who do not participate in social organizations, proxy the social isolation, have a higher probability (10.8 %) of experiencing an occupational accident compared to those who do. Similarly, those without internet access (mobile broadband) are more likely (8.5 %) to experience an occupational accident than their counterparts who have such access (see Table 2).

In the same vein, older workers who have not had a general medical consultation in the past three months exhibit a higher probability (56.2 %) of experiencing an occupational accident compared to those who have. Older workers with arterial hypertension are more likely (38.1 %) to experience an occupational accident than those without this condition. Similarly, older adults with diabetes show a higher probability (39.7 %) of experiencing an occupational accident compared to those without diabetes. Conversely, older individuals with depression present a higher probability (24.2 %) of experiencing an occupational accident compared to those without this condition (see Table 2).

Older individuals who reported being worried about not having enough food due to a lack of financial resources are more likely (24.2 %) to experience an occupational accident than those who did not express such concern. Older workers belonging to income quintiles II, III, IV, and V exhibit a higher probability (40.1 %, 47.8 %, 36.5 %, and 34.2 %, respectively) of experiencing an occupational accident compared to those in the lowest income quintile (I). In Chile, individuals in income quintile I (with an average monthly income of approximately US$491) are more likely to be employed than those in quintile V (with an average monthly income of about US$3400) (see Table 2).

Table 2
Average marginal effects of accidents among older informal workers.

Variable	Values (a)	Predic (dy/dx) (b,c)	Std. Err.	95 %. Conf. Interv.
Gender	Male = 1, Female = 0	0.061**	0.224	[0.018; 0.105]
Age	Age >60 ≤ 65 years = 1 Age >65 years = 0	0.119***	0.028	[0.065; 0.174]
Educational level	Without, primary and secondary education = 1 Tertiary Education = 0	0.144***	0.031	[0.205; 0.804]
Native ethnic group	Yes = 1, No = 0	0.227***	0.018	[0.191; 0.264]
Residence	Urban = 1 Rural = 0	0.102*	0.031	[0.023; 0.181]
Social insolation	Yes = 0, No = 1	0.108***	0.022	[0.064; 0.152]
Internet access (mobile broadband)	Yes = 0, No = 1	0.085**	0.028	[0.030; 0.140]
Medical check-ups	Yes = 1, No = 0	0.562***	0.023	[0.517; 0.607]
Hypertension (high blood pressure)	Yes = 1, No = 0	0.381***	0.036	[0.310; 0.452]
Diabetes	Yes = 1, No = 0	0.397***	0.027	[0.345; 0.449]
Depression	Yes = 1, No = 0	0.247***	0.020	[0.207; 0.287]
Food limitation due to lack of money	Yes = 0, No = 1	0.242***	0.023	[0.198; 0.286]
Income quintile I (base)	–	–	0.012	-[0.385;
Income quintile II	Inside = 1, Outside = 0	0.401***	0.018	0.434]
Income quintile III	Inside = 1, Outside = 0	0.478***	0.014	[0.444;
Income quintile IV	Inside = 1, Outside = 0	0.365***	0.011	0.512]
Income quintile V	Inside = 1, Outside = 0	0.342***		[0.337; 0.394]
				[0.319; 0.366]

Note: (a) Inside/Outside = inside the range/outside the range; (b) dy/dx for factor levels is the discrete change from the base level, which is the marginal effect; (c) ***p < .001; **p < .01; *p < .05.

4. Discussion

The results show that of the total number of older persons included in the study who declared that they did not have a work contract, 50 percent had had a work-related accident. People over 65 have the highest rate of informal employment. The informality rate has decreased since 1980 for the general population, but it has not been reduced for people over 65 and always remains above the national informality rate. This group has the highest rate of informality compared to other age groups. While the national average is 26.6 percent, among those over 65 years of age, the informality rate reaches 51.8 percent and is higher in women (58.7 %) than in men (48.6 %) (Montt & Contrucci, 2023).

According to data from the Instituto de Seguridad Laboral (IST), 53 percent of the complaints filed for accidents by older adults are work-related. This situation underscores the importance of taking preventive measures at work and at home. Continuous training is key to informing older people about preventing accidents and maintaining a healthy lifestyle. As the administering agency of Law N°. 16744, the IST must provide information on preventing occupational accidents, since this information promotes active and healthy aging (Abad-Corpa et al., 2021).

Our study also shows that an older male person is more likely than a woman to have an occupational accident. This result coincides with the national reality of occupational accidents; for the year 2023, men registered a higher number of accidents (64 %) than women (36 %) (SUSESO, 2024). However, it could also be inferred that there are differences due to local and cultural realities; for example, in Spain, women are affected by a higher proportion of accidents and have more average days of absence than men (Fontaneda et al., 2019).

The results of the study also show that the risk of occupational accidents generally increases with age for people older than 65 years. This result coincides with the literature reviewed; the accident risk for each worker depends on age, since the causes of injuries are related to jobs. Greater demands at work are associated with a higher risk of injury (Bravo et al., 2020). In general, evidence shows that older age is a relevant factor in occupational accidents and is associated with longer treatment times for those affected. There is a relationship between the duration of treatment or severity of the accident and the variable older age. It should be noted that the number of accidents is higher among younger workers, but the severity increases with age (Boufous & Williamson, 2009; Fuentes-Bargues et al., 2022).

Furthermore, the findings of this study indicate that older adults with lower levels of education who participate in the informal labor market are more likely to experience work-related accidents. International evidence also suggests that older workers with limited educational attainment are disproportionately exposed to precarious employment conditions, characterized by job insecurity, inadequate income, and the absence of labor rights (Baek et al., 2023). Similarly, a study conducted in India found that, among the elderly population, those with lower levels of education are more likely to participate in the labor force. In particular, older women are predominantly employed in the informal sector—an unregulated area of the economy that provides minimal or no social protection benefits (Paramita & Barua, 2023).

A study on the particularities of aging among the Indigenous peoples of Chile reveals that well-being in old age within these groups is closely linked to a system of social organization centered on intergenerational care, deeply rooted in the cultural practices and family structures characteristic of Chile's Indigenous communities. However, this traditional support network is increasingly threatened by the depopulation of rural and Indigenous settlements, as younger generations migrate to

urban areas, leaving older Indigenous individuals to rely on self-care, including continued labor, to secure the financial means necessary for survival.

This phenomenon has global relevance. Understanding and addressing these challenges in the Chilean context can provide valuable insights applicable to other cultural settings, fostering more inclusive and supportive approaches to elder care worldwide. The study underscores the urgent need for culturally sensitive strategies that promote the well-being of older adults within Indigenous communities (Valencia-Gálvez et al., 2025).

This study demonstrates that individuals who do not participate in social organizations—used here as a proxy for the risk of social isolation—are more likely to experience occupational accidents than those who are socially engaged. Previous research has shown a strong association between loneliness, social isolation, and reduced cognitive functioning in older adults across multiple cognitive domains, as well as an increased risk of dementia (Guarnera et al., 2023). Examples of social participation, such as involvement in community singing groups, represent promising avenues for fostering cognitive and emotional resilience among aging populations (Tragantzopoulou & Giannouli, 2021).

The risk of social isolation increases with age due to life factors such as widowhood and retirement. Nearly a quarter of US adults aged 65 and older are socially isolated, and the prevalence of loneliness is even higher, with estimates ranging from 22 percent to 47 percent (Koszalinski et al., 2025). In Chile, by contrast, the family configuration is changing. The 1992 and 2024 population measurements show that single-person households increased from 8.3 percent to 21.8 percent and the majority of single-person households are made up of older people (CENSO, 2024).

Similarly, communication related to digital access and engagement emerges as a relevant variable in this study. Older adults without Internet access—including mobile broadband—are more likely to experience workplace accidents. Evidence from China suggests that Internet use can enhance both the emotional and physical health of older adults living in rural areas, particularly among those without children, with social participation acting as a mediating factor in the relationship between Internet use and physical health (Shen et al., 2024). At the same time, prior studies have shown that men are more likely than women to use social media, and that engagement with online platforms can reinforce gender-stereotypical biases, disproportionately affecting marginalized communities (Fosch-Villaronga et al., 2021; Thakur et al., 2023). Consequently, subsequent research has recommended incorporating gender-stratified patterns to promote equitable Internet use and social participation among older adults.

This study also indicates that older workers who have attended a general medical consultation within the last three months are more likely to experience a workplace accident than those who have not. A study on the self-reported health status of older adults in Chile found that having worked at least 1 h during the week prior to the interview increased the likelihood of reporting good health by 1.24 and 1.21 times for men and women, respectively, compared with those who had not worked (Alvear et al., 2019). In this context, older adults with a positive self-perception of health may be more inclined to engage in work activities that involve greater physical or occupational risks.

On the other hand, an older working person with hypertension, diabetes or depression is more likely to have an accident at work than an older person who does not have that pathology. Two studies show that each worker's risk depends on body mass index, hearing disorders, sleep disorders, and sports activities, variables associated with diabetes (Chau et al., 2003; Fraade-Blanar et al., 2017). Other studies indicate that if the person has a family medical history of diabetes and they do less exercise, there is a greater risk of occupational accidents (Pietilä et al., 2018). Consistently, the fact that accidents increase in severity as a person age has been related to possible pre-existing health conditions and the fatigue levels of those affected (Rey-Merchan & Lopez-Arquillos, 2021; López et al., 2018). The occupational physician could inform workers about these risks and encourage them to engage in physical activity. Preventive measures in the workplace could also be implemented to address the identified hazards.

A working older adult belonging to the highest income quintile is more likely to have a work-related accident than a person belonging to the lowest income quintile. This result coincides with the self-reported health status. The Chilean elderly who reported good health status belong to the highest income quintiles. It is precisely their good self-perception of health that encourages them to remain active at work. However, they present greater physical frailty than older people from lower income quintiles (Alvear and Vargas, 2022).

There are also studies showing that greater self-assessment of work performance is correlated with better self-awareness, i.e., more attention focused on one's own thoughts, emotions, and needs, which is, in essence, on what is happening in the moment. This could be an interesting line of further study, as older people who are more connected to the present moment may experience a reduced risk of workplace accidents (Stoyanova et al., 2024).

The social and health factors that affect occupational accidents in older people in Chile should be considered in future work planning for an aging workforce, such as the acceleration of digitalization and robotization of work in low-skilled sectors and the adoption of practical policies to prolong working life in high-skilled sectors.

5. Conclusion

Given the demographic change that Chile is experiencing, fewer and fewer young employees are joining the labor force. This phenomenon is directly related to the aging of the workforce. It can be inferred from this study that it is necessary to promote positive aging and comprehensive care for older people, and strengthen the institutional framework for the elderly by regulating a special labor contract for this age group that would make their hiring conditions more flexible to encourage the formal employment of older people who wish to remain in the labor market.

Bearing in mind the social and health factors that the present study identifies as potential accident risks for older people, in addition to formalizing their contract situation, specific prevention plans should be established for this group based on training and continuous identification of accident risks, which change according to local and cultural circumstances and work contexts.

CRediT authorship contribution statement

Sandra Alvear-Vega: Writing – review & editing, Writing – original draft, Validation, Supervision, Software, Methodology, Investigation, Formal analysis, Conceptualization. **Angela Arenas-Massa:** Writing – review & editing, Writing – original draft, Validation, Supervision, Investigation, Formal analysis, Conceptualization.

Declaration of the use of AI assisted technologies

During the preparation of this work the author(s) used [Ginger] in order to [Grammar correction and rephrasing (English)]. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the published article.

Innovation and implications

By reducing the risk factors for older workers identified in this study, the rate of occupational accidents can be reduced, with consequent cost savings for employers and the insurance system.

Ethics approval statement

All respondents gave informed consent, and data collection was conducted under the guidelines of the Declaration of Helsinki.

Consent for publication

Consent for publication is not applicable as the manuscript does not include details, images, or videos relating to an individual person.

Data availability statement

The CASEN 2022 database is for public use and was obtained from the Ministry of Social Development (MINDES).

The CASEN 2022 database analyzed during the current study is available on the MINDES webpage. https://observatorio.ministeriodesarrollosocial.gob.cl/encuesta-casen-2022.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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