

Evidence on Social and Economic Dimensions of Informal Caregiving in Slovenia

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ABSTRACT

Purpose: This paper examines key socio-demographic and health characteristics of informal caregivers and selected lifestyle pattern indicators in Slovenia. It also provides estimates of the economic value of unpaid caregiving.

Design/methodology/approach: Using nationally representative data (n = 1,075) collected in 2025 through a comprehensive questionnaire, we provide evidence on caregiver profiles through logistic regression modelling.

Findings: The results indicate that older age and engagement in flexible or self-directed forms of employment significantly increase the likelihood of providing informal care, while notable differences emerge in the prevalence of specific health conditions, mental well-being indicators, and lifestyle patterns between caregivers and non-caregivers. Self-reported

general health status does not differ significantly across the two groups, yet caregivers exhibit higher rates of musculoskeletal disorders, injuries, and certain chronic conditions. By combining data from the questionnaire with estimates from other large-scale studies on caregivers' and their caregiving time, we estimate the economic value of unpaid caregiving at €2.1–€4.1 billion, representing approximately 3–6% of Slovenia's GDP.

Academic contribution to the field: This study contributes to the academic literature by providing the important nationally representative evidence on the socio-demographic, health, and lifestyle characteristics of informal caregivers in Slovenia. It advances research on the economics of care by combining caregiver profiling with macroeconomic valuation, thereby linking micro-level health and employment data with macro-level cost estimates of unpaid caregiving.

Research implications: The findings underscore the substantial but largely unrecognised contribution of informal caregivers to the national long-term care system and emphasise the importance of considering the burden of informal care in designing not only social and health policies but also labour market measures addressing the well-being and workability of caregivers, thereby enabling sustainable complementarity between informal care and formal care systems. The evidence highlights the need to integrate support for informal caregivers into social, health, and labour market policies to sustain their ability to work and ensure the complementarity of informal and formal care. Future research could build on these findings by adopting longitudinal approaches to assess causal effects of caregiving on health and labour market outcomes.

Originality/significance/value: This study combines nationally representative survey data on caregiver characteristics in Slovenia with macroeconomic valuation of unpaid caregiving, providing novel evidence for policy and research.

Keywords: informal caregiving, employment, workability, health status, quality of life, Slovenia, long-term care

Dokazi o socialnih in ekonomskih razsežnostih neformalne oskrbe v Sloveniji

POVZETEK

Namen: članek obravnava ključne socio-demografske in zdravstvene značilnosti neformalnih oskrbovalcev v Sloveniji ter izbrane kazalnike njihovih življenjskih vzorcev. Poleg tega podaja oceno ekonomske vrednosti neplačane oskrbe.

Zasnova/metodologija/pristop: na podlagi nacionalno reprezentativnih podatkov ($n = 1.075$), zbranih leta 2025 s celovitim vprašalnikom, z uporabo logistične regresije predstavljamo dokaze o profilih oskrbovalcev.

Ugotovitve: rezultati kažejo, da višja starost ter vključenost v prožne ali samostojno usmerjane oblike zaposlitve pomembno povečujeta verjetnost zagotavljanja neformalne oskrbe. Med oskrbovalci in neoskrbovalci se kažejo tudi opazne razlike v razširjenosti posameznih zdravstvenih stanj, kazalnikih duševnega blagostanja in življenjskih vzorcih. Samooocenjeno splošno zdravstveno stanje se med skupinama ne razlikuje pomembno, vendar so med oskrbovalci pogostejše mišično-skeletne mo-

tnje, poškodbe in nekatera kronična stanja. Z združitvijo podatkov iz vprašalnika z ocenami iz drugih obsežnih študij o oskrbovalcih in času, ki ga namenjajo oskrbi, ekonomsko vrednost neplačane oskrbe ocenjujemo na 2,1–4,1 milijarde evrov, kar je približno 3–6 % slovenskega BDP.

Akademski prispevek k področju: študija prispeva k akademski literaturi s prvimi nacionalno reprezentativnimi dokazi o socio-demografskih, zdravstvenih in življenjskih značilnostih neformalnih oskrbovalcev v Sloveniji. Raziskovanje ekonomike oskrbe nadgrajuje s povezovanjem profiliranja oskrbovalcev z makroekonomskim vrednotenjem ter tako povezuje podatke o zdravju in zaposlenosti na mikro ravni z ocenami stroškov neplačane oskrbe na makro ravni.

Implikacije za raziskave: ugotovitve poudarjajo velik, toda večinoma nepriznan prispevek neformalnih oskrbovalcev k nacionalnemu sistemu dolgotrajne oskrbe. Hkrati poudarjajo pomen upoštevanja bremena neformalne oskrbe pri oblikovanju socialnih in zdravstvenih politik ter ukrepov na trgu dela, ki zajemajo blagostanje in delovno zmožnost oskrbovalcev. S tem je mogoče podpreti trajnostno dopolnjevanje neformalne oskrbe in formalnih sistemov oskrbe. Dokazi kažejo na potrebo po vključevanju podpore neformalnim oskrbovalcem v socialne, zdravstvene in delovno-tržne politike, da bi ohranili njihovo zmožnost za delo ter zagotovili komplementarnost neformalne in formalne oskrbe. Prihodnje raziskave bi lahko te ugotovitve nadgradile z longitudinalnimi pristopi, ki bi omogočili oceno vzročnih učinkov oskrbovanja na zdravje in izide na trgu dela.

Izvirnost/pomen/vrednost: študija nacionalno reprezentativne anketne podatke o značilnostih oskrbovalcev v Sloveniji združuje z makroekonomskim vrednotenjem neplačane oskrbe ter s tem ponuja nove dokaze za oblikovanje politik in nadaljnje raziskave.

Ključne besede: neformalna oskrba, zaposlenost, delovna zmožnost, zdravstveno stanje, kakovost življenja, Slovenija, dolgotrajna oskrba

JEL: C25, D13, I18, J22

1 Introduction

Population ageing and the increasing prevalence of chronic diseases are placing growing demands on healthcare systems (OECD, 2023). While formal care services play a crucial role in supporting older and vulnerable individuals, the rising need for assistance extends beyond institutional settings. Informal caregivers—family members, friends, and neighbours who provide unpaid care—have become essential in bridging the gap between the demand for care and the capacity of formal healthcare providers (Hlebec et al., 2024; Szenkurök et al., 2024). Informal care has also been gaining increasing recognition in international policy circles as a key issue for future welfare policy. The European Pillar of Social Rights (2021) makes explicit the commitment to people providing care, including their rights to flexible working and access to care services.

Informal care comes with significant costs to both caregivers and the society. Although the estimates of these costs are rare, one example from Sweden (Ekman et al., 2021) shows that such care costs amount to roughly 3% of

GDP annually, although this figure obviously also depends on the institutional framework of a given country. So far, there are no estimates of the societal costs of informal care in Slovenia, although some studies indicate that they are comparable to other countries that share geographical and especially institutional characteristics (Baji et al., 2019; Costa-Font and Vilaplana, 2025). Costs of informal care occur both in terms of direct costs of care, but more importantly as opportunity cost in terms of either forgone income of caregivers (Ekman et al., 2021) or value of unpaid work. Moreover, considerable research and public discourse on family caregiving portrays it as a stressful and burdensome experience with serious negative physical, psychological, and emotional consequences for caregivers, including elevated risks of depression, burnout, social isolation, and long-term health deterioration, effectively rendering them secondary patients (Del-Pino-Casado et al., 2021; OECD, 2023; Keramat et al., 2025). Yet, population-based studies (Mehri et al., 2021; Roth, Fredman and Haley, 2015) picture different story, as they report reduced mortality and extended longevity for caregivers as a whole compared with non-caregiving controls. Gaining insight into caregivers' profiles and health outcomes is essential for developing more effective support systems and interventions.

Based on the findings of existing research on socio-economic characteristics of informal caregivers, we set the following hypothesis about key socio-demographic characteristics of informal caregivers:

- H1:** Women are more likely than men to provide informal care services.
- H2:** Older individuals are more likely than younger individuals to provide informal care services.
- H3:** Individuals with lower levels of education are more likely to provide informal care services compared to those with higher education levels.

Although empirical evidence from Mehri et al. (2021), Ashare et al. (2022), and Baji et al. (2019) highlights both protective and harmful effects depending on context and individual characteristics, we set the following research hypothesis founded on the stress process model that views caregiving as chronic stressor:

- H4:** Informal caregiving is associated with poorer physical and mental health outcomes of caregivers compared to non-caregivers.
- H5:** Informal caregivers less likely engage in healthy lifestyle behaviours in terms of balanced meals, regular physical activity etc. compared to non-caregivers.

By using logit regression models, our aim is to examine key socio-demographic (e.g. age, sex, education, and employment status) of informal caregivers, their health characteristics and selected life-style pattern indicators. We use data from a comprehensive questionnaire, conducted in February 2025 with a representative sample of 1,075 individuals aged 25–75 years, to identify caregiver profiles and analyse how caregiving associates with caregivers' own health issues to identify potential disparities in health status between carers

and non-carers. Further, by combining the results of the questionnaire with supplementary estimates from the Survey of health, ageing and retirement in Europe (SHARE-ERIC, 2024) and long-term care report by European Commission (2021), we estimate the value of informal care services in Slovenia based on opportunity costs of the caregiving hours. This is crucial for Slovenia, where the policy measures introduced by new Long-term Care Act (ZDok-1, 2023) are starting to take effect, mostly in 2026.

This paper is organised as follows. In the next section, we review the literature, then we present the methodology. The fourth section analyses the results, which are then discussed in the fifth section. The last section concludes.

2 Literature Review

Informal caregivers are individuals who provide unpaid support, often to family members or friends, to help them manage daily activities that are impaired due to physical, cognitive, or emotional limitations (Vitaliano, Zhang and Scanlan, 2003; OECD, 2023). These activities include both basic activities of daily living (ADLs), such as feeding, bathing, dressing, or toileting, and instrumental activities of daily living (IADLs), like managing finances, preparing meals, shopping, and house cleaning (Roth, Fredman, and Haley, 2015; Van den Berg and Spauwen, 2006; Hu et al., 2024). In contrast to formal caregivers—paid professionals like home health aides—informal caregivers aid without financial compensation.

2.1 Socio-economic and Health Dimension of Informal Caregivers in Europe

In the European context, the prevalence of informal caregiving varies considerably. According to Verbakel et al. (2017), the share of adults providing informal care ranges from 8.2% to 43.6%, with an average of 34.3% across countries. Women dominate informal caregiving roles in most countries (European Commission, 2021). The 2016 European Quality of Life Survey (Eurofound, 2025) shows that in most EU countries, more women than men provide care, with the gender gap reaching up to 13 percentage points in Belgium, followed by the Netherlands and Greece (10 percentage points). However, in the Czech Republic, caregiving is evenly distributed between genders, a pattern possibly influenced by higher female labour market participation in Eastern Europe. Regarding age, the youngest adult group (18–34) generally has the lowest caregiving rates, with Spain being a notable exception (Elayan et al., 2024; Zigante, 2018). The working-age population typically exhibits lower caregiving rates than the general population, except in France, where 26% of working-age adults are caregivers compared to 16% of the total population. In the Czech Republic, these rates are identical. Additionally, in all surveyed countries except the Czech Republic, working-age caregivers are more likely to be employed than unemployed. France shows the most pronounced difference: 18% of the working-age population are employed caregivers compared

to 8% who are caregivers outside the labour force. Moreover, Ciccarelli and Soest (2018) report on significant and negative effect of daily caregiving on employment status and work hours, which is particularly strong for women.

Baji et al. (2019) conducted a cross-national study in Hungary, Poland, and Slovenia, reporting that 14.9% of adults in Hungary, 15% in Poland, and 9.6% in Slovenia were informal caregivers. In Slovenia, women provided significantly more care hours—on average 18 more hours than men. In Poland, being married and living in a smaller household correlated with higher caregiving hours. In Slovenia, higher income levels were negatively associated with time spent on caregiving. Despite diverse socio-demographic profiles, caregivers in these countries typically fall within the 35–64 age group and most often care for parents or parents-in-law. For Slovenia, additional evidence based on SHARE data is provided by Nagode and Srakar (2013), who document the socio-demographic profile of informal caregivers and patterns of care provision (i.e. who provides care, to what extent, and for whom). Their findings offer an important national reference point for interpreting caregiving prevalence and caregiver characteristics in Slovenia.

Studies also show that informal caregiving raises important health related concerns. A useful conceptualization of caregiver burden is provided by Elmet (2001), who distinguishes physical strain, psychological and emotional strain, social strain, and financial strain. This multidimensional burden framework helps explain why caregiving may translate into heterogeneous health and well-being outcomes across caregivers. The health effects of caregiving on caregivers' health are debated through two main frameworks: the stress process model and the healthy caregiver hypothesis (Mehri et al., 2021). Stress theory views caregiving as a chronic stressor with negative physical and mental health consequences, including elevated mortality risks. Bennett et al. (2013) argue that long-term stress can accelerate immunological decline, leading to disease and premature death. Conversely, the healthy caregiver hypothesis suggests a selection bias in which healthier individuals are more likely to become caregivers and remain in the role. Moreover, caregiving may foster physical and cognitive activity and offer emotional rewards, such as gratitude and meaning, that improve overall well-being (Fredman et al., 2010; Roth et al., 2015; Tough et al., 2022). These benefits may mitigate the adverse effects of caregiving-related stress.

A recent meta-analysis by Mehri et al. (2021) finds a 16% lower all-cause mortality among caregivers compared to non-caregivers, supporting the healthy caregiver hypothesis. However, subgroup analyses show that this mortality advantage is not consistent across all studies. For instance, U.S.-based studies did not find significant differences in mortality, and studies using more precise definitions of caregiving (e.g., ADL/IADL support) failed to show strong benefits. When adjusting for covariates, the results favoured the stress model, emphasizing that caregiving often entails long-term strain, unpredictability, role conflict, and a high degree of vigilance (Vitaliano et al., 2003). Consistent with this, Methi (2024) shows that new caregivers experience significant

short-term reductions in psychological well-being, including increased anxiety and reduced happiness, highlighting the immediate mental health costs. Ashare et al. (2022) find that psychological health moderates the relationship between caregiving and physical health: caregivers with poor mental health are at significantly higher risk of poor physical health, while those with better psychological resilience fare better than non-caregivers. Janson et al. (2022), based on 22 studies mainly from the U.S. and Europe, report lower mortality among caregivers but also higher risks of stress-related disorders, musculoskeletal issues, depression, hypertension, diabetes, and diminished quality of life. Baji et al. (2019) assessed the quality of life using EQ-5D-5L and CarerQol-7D questionnaires in Hungary, Poland, and Slovenia. They report significantly lower health scores among caregivers, particularly in Slovenia and Poland. The most burdensome issues included difficulties in balancing care with daily life, physical strain, and tensions in the caregiver-recipient relationship. Financial stress and mental health issues were comparatively less reported. The findings underscore the substantial burden of caregiving, especially when combined with paid employment, and highlight the need for policies that address its long-term health impacts.

2.2 The value of informal care from the societal perspective

Informal caregiving, although unpaid, entails substantial societal and economic costs. Based on systematic literature review, Fast et al. (2013) classify these costs into three domains. First, employment consequences (labour force exit, preclusion, restricted working hours, absences, decreased productivity and career limitations) result in forgone income, lost benefits and reduced pension. Second, care-related out-of-pocket expenses for housing, services, supplies and transportation lead to reduced ability of carers to meet expenses and reduces their savings and investments. Third, caregiving labour, which includes time spent with care receivers, care management, time spent getting to care receivers and time spent monitoring, creates a trade-off with other benefit-creating unpaid activities of informal activities.

More frequently, studies focus on measurement and valuation of the informal care services. Since the costs of informal care are to an important extent related to the time inputs of informal caregivers, valid (time-specific) ways of measuring are necessary for the valuation of informal care. Two frequently applied methods of collecting time data are the diary method and the recall method, with the former being considered a golden standard (see discussion in Van den Berg et al, 2004). Verbakel et al. (2017) highlight that around 7.6% of Europe's population are "intensive caregivers" who provide more than 11 hours of care per week. For Hungary, Poland, and Slovenia, Baji et al. (2019) estimate that caregivers provide on average 27.6, 35.5, and 28.8 hours of care per week in Hungary, Poland and Slovenia, respectively. They find that caregivers who were employed or studying provided significantly fewer hours of care than those without a paid job—13 hours less in Hungary and 20 hours less in Slovenia. These findings highlight the opportunity costs of caregiving, particularly in terms of labour market attachment (Li, 2023).

Various methods for the valuation of in-formal care have been discussed in the literature and have been applied in previous research (review in Van den Berg et al, 2004 and Kim, 2025), based either on stated preferences, revealed preferences, opportunity cost, proxy good method or well-being valuation. In this paper we use the most widely used opportunity costs method, measuring the value of informal caregiving time based on the shadow value of activities given up (leisure or working time) (Oliva-Moreno et al., 2017). The opportunity cost of providing unpaid care is most often measured as the income caregivers forgone when they provide care to their family members or friends (Cès et al., 2019). Kim (2025) lists several possibilities that include separate valuation of time inputs for employed and unemployed, differentiating between educational attainment and other characteristics of caregivers. Oliva-Moreno et al. (2019), using data from two Spanish regions, found that annual opportunity costs per caregiver ranged from € 14,000 to € 80,000, depending on the valuation method. Ekman et al. (2021) provide one of the few comprehensive national estimates, showing that approximately 15% of Sweden's adult population are informal caregivers. The total cost of this care is about € 14.5 billion annually—approximately 3% of GDP—with more than half attributable to caregivers' lost income. Replacing informal care with professional services would raise costs to € 18.5 billion per year. Based on the well-being method, Costa-Font and Vilaplana (2025) estimate that engaging in informal caregiving reduces average subjective wellbeing by approximately 1% compared to the mean, with co-residential caregivers experiencing a more pronounced reduction of about 6%.

3 Methodology

3.1 Data

This study draws on data from a comprehensive questionnaire, a nationally representative survey conducted in Slovenia in February 2025 among 1,075 adults aged 25 to 75. The questionnaire was developed and administered as part of a research project examining the economic burden of cancer in Slovenia, funded by the Slovenian Research and Innovation Agency. To ensure measurement reliability, validity, and cross-country comparability, the questionnaire incorporates established, validated instruments, including the Work Ability Index (Tuomi et al., 1998), the CINDI Health Monitor Survey, and the European Health Interview Survey (EHIS). It also follows the typologies and methodologies used by the Statistical Office of the Republic of Slovenia, which are aligned with EU standards.

The questionnaire enabled collection of comprehensive information on respondents' employment status, self-assessed work ability, physical and mental health conditions, personal circumstances, lifestyle behaviours, general well-being, and demographic characteristics such as gender, age, region of residence, education, and citizenship. Data collection was conducted via an online survey administered by Valicon, a reputable Slovenian commercial

agency with an established panel of respondents. Prior to fieldwork, the questionnaire underwent expert review by Valicon, drawing on their substantial experience in web-based survey design and implementation, thereby enhancing its methodological robustness.

The final sample consisted of 1,075 respondents, the vast majority of whom were Slovenian citizens (98%). Informal caregivers were identified based on respondents' self-reported provision of unpaid care to family members or others requiring assistance with daily activities. Nearly one-quarter (i.e. 24.4%) of surveyed adults aged 25–75 reported providing informal care, which is similar to SHARE survey from 2024. This finding aligns with previous estimates by Baji et al. (2019), who observed similar proportions of informal care providers in Slovenia and neighbouring countries. To estimate the value of the informal caregiving in Slovenia, we additionally use data from SHARE (Survey of Health, Ageing and Retirement in Europe; SHARE-ERIC, 2024) and estimates from European Commission (2021) to estimate the hours of services per person per year based.

3.2 Descriptive Statistics and Characteristics of Informal Caregivers

Table 1 shows descriptive statistics of continuous and binary variables, while sample structure according to the categorical variables are only described in the text. The gender distribution of the sample is balanced, with 49.0% male and 50.8% female respondents and no statistically significant differences between informal caregivers and others ($\chi^2(2)=0.853$, $p=0.03$). Younger adults (30–39 years) made up approximately 25% of respondents; middle-aged adults (40–49 years) accounted for about 31.5%; and adults aged 50–59 years comprised a similar share (31.5%). Individuals aged 60 and above represented roughly 8.5% of the total sample. Informal caregivers tend to be slightly older (on average 50 years vs. 48 years average for non-caregivers) and the t-test confirms that difference is statistically significant ($p=0.007$). In terms of educational attainment, among all surveyed individuals less than 15% had completed only primary or vocational education, around one-third had completed secondary education, and approximately 50% had attained education beyond the secondary level. Caregivers are somewhat more likely to have a vocational or secondary education (16.7%) compared to non-caregivers (13.6%), while non-caregivers more often report having post-secondary or higher education. For instance, 45% of caregivers have post-secondary or higher education, compared to 53% of non-caregivers. Pearson χ^2 test shows a statistically significant association between caregiver status and the highest level of formal education ($\chi^2(4) = 9.89$, $p = 0.042$).

Table 1: Descriptive statistics of continuous and binary variables

Variable	Obs	Mean	Std. dev.	Min	Max
Gender (0=male, 1=female)	1,073	0.5089	0.5002	0	1
Caregivers	260	0.5038	0.5009	0	1
Non-caregivers	813	0.5105	0.5002	0	1
Age (continuous)	1,074	48.774	11.396	27	72
Caregivers	262	50.282	10.964	32	72
Non-caregivers	812	48.287	11.496	27	72
Enjoying daily activities	1,075	3.5051	0.9389	1	5
Caregivers	262	3.4046	0.9651	1	5
Non-caregivers	813	3.5375	0.9285	1	5
Feeling lively	1,075	3.4270	0.9331	1	5
Caregivers	262	3.4580	0.9286	1	5
Non-caregivers	813	3.4169	0.9349	1	5
Feeling hopeful for the future	1,075	3.3340	0.9949	1	5
Caregivers	262	3.3282	0.9899	1	5
Non-caregivers	813	3.3358	0.9971	1	5
Suppl. health insurance (0=no, 1=yes)	1,033	0.7154	0.4514	0	1
Caregivers	257	0.7656	0.4244	0	1
Non-caregivers	811	0.6988	0.4591	0	1
Designated GP (0=no, 1=yes)	1,068	0.9766	0.1513	0	1
Caregivers	256	0.9805	0.1384	0	1
Non-caregivers	812	0.9753	0.1552	0	1

Source: Survey data and own calculations.

As evident from table 2, the dominant employment status is employment in a company or organization, accounting for 79.8% of respondents. Other employment forms (e.g., self-employment, contract work) are relatively less common. However, informal caregivers are less likely to be employed in traditional company-based jobs and more likely to be in flexible or self-employed arrangements ($\chi^2(9)=19.46$, $p=0.022$). When asked to estimate their satisfaction with the current job (summary statistics in table 1) on the scale from 1-10, an average score was 7.04. Informal caregivers were, however, more satisfied

with their current job (7.3 average) compared to the group of non-caregivers (average estimate of 6.8). The difference is not statistically significant at the 5% level, yet suggestive ($\chi^2=18.09$, $p = 0.053$).

Table 2: Current employment status by caregivers and non-caregivers

Employment status	Non-caregiver		Caregiver	
	Number	%	Number	%
Employed in a company or organization	662	81,4	196	74,8
Employed by a self-employed person	31	3,8	19	7,3
Self-employed (own business)	31	3,8	14	5,3
Freelancer	10	1,2	0	0,0
Contract-based work	10	1,2	6	2,3
Other forms of work (farmers, student work, internship etc.)	6	1	8	3.1
Unemployed	60	7,4	19	7,3
Total	813	100	262	100

Source: Survey data and own calculations.

Respondents were also asked to assess their general health status: roughly one-quarter (24%) rated it as very good, half (51%) as good, 7.5% as poor, and none as very poor. Most respondents in both groups—caregivers and non-caregivers—rated their health as either very good or good. A slightly larger proportion of caregivers reported lower health ratings, although the differences between the two groups were not statistically significant ($\chi^2(4) = 2.74$, $p = 0.602$). For example, the response “neither good nor poor” was selected by 19% of caregivers compared to 17% of non-caregivers, while “poor” was reported by 9% of caregivers versus 7% of non-caregivers.

In addition to general health ratings, respondents were asked to report all current health conditions, whether self-identified or diagnosed by a medical professional. Table 3 presents the results of χ^2 tests comparing the prevalence of specific health conditions between caregivers and non-caregivers. Statistically significant differences were found in several conditions: injuries, musculoskeletal diseases, urinary and/or reproductive system diseases, and congenital disorders were all reported more frequently among caregivers.

Table 3: Descriptive statistics for health conditions

Health condition (0=no, 1=yes)	Obs	Mean	Std. dev.	Min	Max	Difference between caregivers and others	
						Pearson $\chi^2(2)$	p
Injuries	1,075	0.2316	0.4221	0	1	8.8071	0.012**
Musculoskeletal disorders	1,075	0.4753	0.4996	0	1	6.1229	0.047**
Cardiovascular diseases	1,075	0.2493	0.4328	0	1	1.5939	0.451
Respiratory diseases	1,075	0.1544	0.3615	0	1	2.4318	0.296
Mental illnesses	1,075	0.2353	0.4244	0	1	1.6584	0.436
Neurological diseases or sensory disorders	1,075	0.1535	0.3606	0	1	1.8481	0.397
Gastrointestinal diseases	1,075	0.1569	0.3859	0	1	3.4166	0.181
Diseases of the urinary and/or reproductive organs	1,075	0.0949	0.2932	0	1	7.1250	0.028**
Skin diseases	1,075	0.2037	0.4030	0	1	1.3988	0.497
Tumours (neoplasms)	1,075	0.0540	0.2260	0	1	2.9008	0.234
Endocrine and metabolic diseases	1,075	0.0865	0.2812	0	1	0.1381	0.933
Blood disorders	1,075	0.0884	0.2840	0	1	0.3417	0.843
Congenital anomalies	1,075	0.0419	0.2004	0	1	6.3132	0.043***

, ** and *** denote statistical significance at 10, 5 and 1% level, respectively.

Source: Survey data and own calculations.

The mental status of the respondent was measured by frequency of enjoying daily activities, of feeling lively, and frequency of feeling hopeful about the future, and the frequency. Frequencies were measured categorically with a 1-5 Likert scale, 1 being “never” and 5 being “very often”. Summary statistics of the three measures are reported in table 1. Enjoying daily activities is statistically significantly less likely for caregiver compared to the group of non-caregivers, as Pearson χ^2 shows a statistically significant association between caregiver status and the frequency of enjoying daily activities ($\chi^2(4) = 17.42$, $p = 0.002$). This indicates that caregivers and non-caregivers differ significantly in how often they report enjoying their daily routines. Caregivers report feeling lively slightly more often compared to non-caregivers. However, the difference can be only statistically confirmed at 9% level ($\chi^2(5) = 9.51$, $p = 0.090$). Further, caregivers tend to report feeling hopeful less frequently than non-caregivers with border line statistically significant difference between

caregivers and non-caregivers in how frequently they felt hopeful about the future ($\chi^2(4) = 16.02$, $p = 0.056$).

The survey also included questions about lifestyle patterns, regarding regularity of meals (never, 1-3 times per month, 1-3 times per week, 4-6 times per week, every day), physical activity during the day (mostly sitting, mostly standing, mostly physically active). Caregivers appear somewhat less likely to eat breakfast every day (48% compared to 53% among non-caregivers) and slightly more likely to report eating breakfast occasionally or rarely, although the differences between the two groups are not statistically confirmed at 5% confidence level ($\chi^2(4) = 7.94$, $p = 0.094$). More statistically significant differences are found between the two groups, when the frequency of reported eating lunch is observed. Among non-caregivers, a larger proportion report eating lunch every day (78% compared to 72% of caregivers). In contrast, caregivers are more likely to report eating lunch less frequently, particularly in the "1–3 times per week" category (13% of caregivers versus 6% of non-caregivers). Pearson χ^2 test confirms that caregivers and non-caregivers differ significantly with negligible risk in how often they report eating lunch ($\chi^2(4) = 14.29$, $p = 0.006$). Caregivers and non-caregivers also differ significantly in how they typically spend their day in terms of physical activity. Caregivers are more likely to report being mostly physically active or mostly standing compared to non-caregivers, who more often report mostly sitting throughout the day (58% versus 48% among caregivers). Pearson χ^2 confirms a statistically significant association between caregiver status and the type of physical activity during the day ($\chi^2(2) = 11.26$, $p = 0.004$). Moreover, caregivers are more likely to have supplementary health insurance (75% compared to 67% for non-caregivers) and the differences are confirmed with Pearson χ^2 test ($\chi^2(2) = 6.68$, $p = 0.035$), possibly indicating a perceived need for additional health protection, consistent with the economic burden discussed by Ekman et al. (2021) and Elayan et al. (2024). Further, when observing whether the respondents have a selected general practitioner or not, results show that a slightly higher proportion of caregivers either do not have a selected general practitioner (5 out of 262) or are unsure about it (5 out of 262), compared to non-caregivers (20 and 2 out of 813, respectively). The differences between the two groups are statistically significant ($\chi^2(2) = 8.69$, $p = 0.013$) indicating that caregivers and non-caregivers differ significantly in terms of whether they have a designated physician, although the absolute differences are relatively small.

3.3 Model Specification

In our empirical analysis we investigate how demographic characteristic of individuals, such as age, gender and education, their employment status, health condition and lifestyle patterns impact the likelihood of a person providing informal care to others. In our model, the dependent variable is a dichotomous variable that takes value 1 when one provides informal care to others, and value of 0 otherwise. With the binary outcome variable, the model is estimated as logit regression, in which inverse standard normal distribution of the

probability is modelled as a linear combination of the predictors (Cameron and Trivedi, 2005).

The general model specification (Cameron and Trivedi, 2005) is:

$$\Pr(\text{caregiver}_i = 1) = \frac{1}{1 + \exp(-(\alpha + \mathbf{D}'_i\beta_D + \mathbf{E}'_i\beta_E + \mathbf{H}'_i\beta_H + \mathbf{L}'_i\beta_L))}$$

and in logit form:

$$\log\left(\frac{\Pr(\text{caregiver}_i = 1)}{1 - \Pr(\text{caregiver}_i = 1)}\right) = \alpha + \mathbf{D}'_i\beta_D + \mathbf{E}'_i\beta_E + \mathbf{H}'_i\beta_H + \mathbf{L}'_i\beta_L$$

caregiver_i is a binary dependent variable indicating whether individual *i* provides informal care (1 = yes, 0 = no) and **D'** is a vector of demographic variables, consisting of *gender_i*, which is a binary variable (0=male, 1=female), *age_i*, as a continuous variable and *edu_i*, as a categorical variable measuring highest educational attainment (primary, secondary, tertiary) of a respondent. **E'** is a vector of employment characteristics' variables. *ES_i* is a categorical variable, distinguishing between various employment statuses of respondents, shown in table 2. **H'** is a vector of health status variables, measured by either a categorical self-assessed *HS_i* (1-very good, 2-good, 3-neither good nor bad, 4-bad, 5-very bad), or existing health conditions in terms of dichotomous variables for each particular condition (0-without particular condition, 1-with particular condition). We also measure respondent's mental status three variables, i.e. *freq_enjoy_i*, *freq_lively_i*, and *freq_hopeful_i* for frequency of enjoying everyday activities, frequency of feeling lively, and frequency of feeling hopeful for the future, respectively. All three variables are measured on a Likert 1-5 scale. **L'** is vector of lifestyle pattern dichotomous variables that includes a variable measuring prevalent type of daily physical activity, i.e. *physical_activity_i* (0-mostly sitting or standing, and 1-mostly physically active), respondent's eating habits as frequency of *breakfast_i* and *lunch_i* (1=more than 4 times a week, 0=otherwise), and two variables *suppl_insurance_i* and *designated_GP_i*, measuring whether the respondent had supplementary health insurance or designated general practitioner (1=yes, 0=no), respectively.

3.4 Estimation of Informal Care Value

According to our survey, 24.4% of adults aged 25–75 in Slovenia provide informal care. The SHARE database (SHARE-ERIC, 2024) provides estimates on how frequently these caregivers offer their services—i.e., on a monthly, weekly, or daily basis. The European Commission (2021) reports that, on average, monthly care corresponds to 7 hours per week, weekly care to 15 hours, and daily care to 30 hours per week. These data allow us to estimate the total number of hours of informal care provided annually in Slovenia.

To assign a monetary value to these informal caregiving services, we apply several alternative measures for measuring opportunity cost of caregiving time:

- The minimum gross monthly wage in 2025: amounts to 1,277.72 euros (Government of the Republic of Slovenia, 2025).

- 1.2 × minimum wage rate: According to Article 23 of the Long-Term Care Act (Zakon o dolgotrajni oskrbi, ZDOsk-1), a family caregiver is entitled to partial compensation for lost income in the amount of 1.2 times the minimum wage in Slovenia. This compensation is administered by the Health Insurance Institute of Slovenia.
- Average wage-based rate: Based on the average gross monthly wage in Slovenia, which was 2,508.55 euros in May 2025 (Statistical Office RS, 2025a).

4 Results

4.1 Socio-economic, Health and Life-Style Pattern Characteristics of Informal Caregivers

Table 4 shows empirical results of the logit model, examining the probability of being an informal caregiver. The dependent variable is a dichotomous variable, that takes value 1 in case a respondent provides informal care to others, and 0 otherwise. We report odds ratios (exponentiated coefficients) and standard errors across six alternative model specifications, which are used to ensure the robustness of empirical results. Table A1 in the appendix presents the corresponding average marginal effects (AMEs) for ease of interpretation as they show how a unit change in a predictor translates into a change in the probability of informal caregiving.

Among the demographic factors, age is the only statistically significant and consistent predictor of informal caregiving, with quite stable statistically significant marginal effects of 0.003. With each additional year, the likelihood of being informal caregiver increases by 0.3% on average, which confirms our H2. This aligns with previous research showing that caregiving responsibilities often increase with age, especially among middle-aged adults (45–64) who often care for both children and older parents (Pickard, 2015; Verbakel et al., 2017). Although several studies suggest that women are more likely to perform informal care services (Pacheco-Barzallo and Wingenbach, 2024), our study does not reveal differences in likelihood of informal caregiving between men and women. While bivariate statistical testing reveals significant statistical differences in the level of educational attainment between caregivers and others, with informal caregiving being less likely for respondents with tertiary education, the differences are no longer significant in the multivariate setting in our regression models. Therefore, the regression model does not confirm H1 nor H3 from our literature review.

Table 4: Logit regression results based on alternative model specifications

	Variable	(1)	(2)	(3)	(4)	(5)	(6)
D'	age _i	1.014**	1.015**	1.015**	1.015**	1.017**	1.018**
		(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)
	gender _i	0.998	1.072	1.013	1.080	1.077	1.130
		(0.147)	(0.167)	(0.150)	(0.169)	(0.167)	(0.184)
	2.edu _i (secondary)	1.342	1.189	1.364	1.215	1.438	1.293
		(0.776)	(0.695)	(0.791)	(0.711)	(0.848)	(0.770)
E'	3.edu _i (tertiary)	1.100	0.962	1.154	1.016	1.196	1.059
		(0.638)	(0.564)	(0.671)	(0.597)	(0.710)	(0.637)
	2.ES _i (employed by self-employed)	1.981**	1.646	1.957**	1.638	2.068**	1.842*
		(0.609)	(0.523)	(0.606)	(0.527)	(0.680)	(0.626)
	3.ES _i (self-employed)	1.593	1.575	1.645	1.630	1.796*	1.785*
		(0.536)	(0.541)	(0.558)	(0.563)	(0.621)	(0.628)
	4.ES _i (freelancer)	1.000	1.000	1.000	1.000	1.000	1.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	5.ES _i (contract-based)	1.865	1.846	1.848	1.853	1.941	1.914
		(0.991)	(0.991)	(0.990)	(1.005)	(1.049)	(1.049)
	6.ES _i (other emp status)	2.696	2.836*	2.778*	2.947*	3.018*	3.131*
		(1.664)	(1.761)	(1.720)	(1.837)	(1.912)	(1.988)
	7.ES _i (unemployed)	0.970	1.027	1.013	1.059	1.085	1.172
		(0.275)	(0.298)	(0.290)	(0.310)	(0.322)	(0.354)

	Variable	(1)	(2)	(3)	(4)	(5)	(6)
H'	2.HS _i (good)	0.884 (0.161)		0.892 (0.168)		0.892 (0.172)	
	3.HS _i (neither good nor bad)	1.014 (0.236)		0.995 (0.253)		0.976 (0.256)	
	4.HS _i (bad)	1.113 (0.336)		1.100 (0.369)		1.102 (0.383)	
	5.HS _i (very bad)	1.000 (0.000)		1.000 (0.000)		1.000 (0.000)	
	injuries _i		1.426** (0.256)		1.376* (0.249)		1.285 (0.242)
	musculoskeletal _i		-0.759* (0.126)		-0.764 (0.127)		-0.755 (0.130)
	cardiovascular _i		0.967 (0.177)		0.964 (0.177)		0.972 (0.184)
	respiratory _i		1.131 (0.236)		1.126 (0.236)		1.126 (0.245)
	mental _i		-0.692* (0.141)		-0.691* (0.148)		-0.690* (0.152)
	neurological/ sensory _i		1.175 (0.262)		1.139 (0.256)		1.163 (0.269)
	gastrointestinal _i		1.012 (0.226)		0.987 (0.222)		1.095 (0.251)
	urinary and/or reproductive _i		1.074 (0.290)		1.081 (0.294)		1.168 (0.328)
	skin _i		1.275 (0.243)		1.262 (0.242)		1.235 (0.246)
	Tumours _i		0.872 (0.296)		0.901 (0.307)		0.781 (0.276)
	endocrine and metabolic _i		0.845 (0.232)		0.836 (0.232)		0.775 (0.225)
	blood _i		1.037 (0.285)		1.024 (0.283)		1.065 (0.304)
	congenital anomalies _i		1.993* (0.713)		2.022* (0.728)		2.015* (0.763)
	freq_enjoy _i			-0.755*** (0.082)	-0.759** (0.083)	-0.749** (0.086)	-0.757** (0.088)
	freq_lively _i			1.358** (0.174)	1.307** (0.168)	1.387** (0.184)	1.333** (0.177)
	freq_hopeful _i			0.953 (0.100)	0.948 (0.102)	0.942 (0.103)	0.938 (0.106)

	Variable	(1)	(2)	(3)	(4)	(5)	(6)
L'	physical_activity _i					1.371*	1.309
						(0.248)	(0.238)
	breakfast _i					0.768	0.753*
						(0.124)	(0.124)
	lunch _i					-0.460***	-0.476***
						(0.113)	(0.119)
	GP _i					1.029	1.055
						(0.548)	(0.571)
	suppl_ins _i					1.183	1.192
						(0.210)	(0.213)
	Constant	0.133***	0.133***	0.133***	0.154**	0.157**	0.171*
		(0.088)	(0.089)	(0.102)	(0.118)	(0.145)	(0.162)
	Observations	1,058	1,060	1,058	1,060	1,014	1,016
	Pseudo R ²	0.0175	0.0298	0.0249	0.0361	0.0461	0.0568
	LR x ²	28.19	37.12	29.29	42.58	52.27	64.53
	df	13	24	16	27	23	34
	Prob > x ²	0.0098	0.0359	0.0220	0.0288	0.0005	0.0012

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Source: Survey data and own calculations.

Regarding employment status (*ES*), regression results indicate that informal care often overlaps with flexible or self-directed work pattern. For example, work by self-employed individual makes informal caregiving for 10-14% more likely compared to the base employment status, i.e. employed in a company or organization. More flexible forms of work compared to classical employment thus increase probability of informal caregiving, suggesting that caregivers and non-caregivers differ in their employment patterns. This supports findings by Bauer and Sousa-Poza (2015), who observed that self-employment allows greater flexibility in combining work with caregiving tasks. However, not all employment types were significant—freelancers and unemployed individuals did not differ significantly, echoing mixed evidence in prior research (Zhou and Qian, 2021).

Self-reported health status (*HS*) does not significantly affect the probability of informal caregiving. This means that caregivers and non-caregivers report similar distributions of their perceived health status. However, there are statistically significant differences between caregivers and non-caregivers in several specific health conditions. At the 10% level, reporting injuries is associated with a significant increase in the likelihood of being a caregiver: about 6 percentage points in marginal effect. Respondents with musculoskeletal disorders and mental illness are less likely to be caregivers for around 5 and

6.5 percentage points, respectively, which is in line with Verbakel et al. (2017), who found that poorer health often limits caregiving capacity. By contrast, individuals with congenital anomalies are more likely to engage in informal caregiving, with an estimated increase of 12 percentage points in likelihood. Due to their marginal statistical significance, these results should be interpreted cautiously. Further, a higher frequency of enjoying daily activities significantly decreases the probability of being a caregiver, with a marginal effect of around 5 percentage points. In contrast, feeling lively is associated with a higher probability of caregiving of 5 to 6 percentage points, depending on the model specification, supporting “the healthy caregiver hypothesis” (Mehri et al., 2021). This duality may suggest that caregiving affects emotional wellbeing in complex, bidirectional ways, as also noted by Pinquart and Sörensen (2003). H4 is thus confirmed only partially.

Informal caregivers less likely engage in healthy lifestyle behaviours in terms of balanced meals, which partially confirms our H5. Among lifestyle characteristics and behavioural patterns, regular lunch intake is most pronounced. Having lunch at least 4 times per week is negatively associated with the informal caregiver status. Respondent who lunch regularly are 13 percentage points less to give care to others, possibly reflecting disrupted daily routines among caregivers, consistent with the time-burden literature (Schulz and Sherwood, 2008). Although with weak statistical significance, the respondents that regularly have breakfast and are more physically active, on the other hand more often provide informal care to others.

4.2 Value of Informal Caregiving in Slovenia

In 2025, there were 1,420,150 people aged between 25 and 75 years in Slovenia, which we consider the adult population (Statistical Office RS, 2025b). According to our survey, 24.4% of this adult population provides informal care to others. This means that approximately 346,517 people in Slovenia are informal caregivers. As shown in Table 5, based on SHARE data, 17% of caregivers reported providing care on a monthly basis, 29% on a weekly basis, and 26% on a daily basis. According to the European Commission (2021), monthly caregiving corresponds to an average of 7 hours of informal care per week, weekly caregiving to 15 hours, daily caregiving to 30 hours. For 28% reporting to provide informal care less of the than monthly, we assumed 0.5 hour of service per week. Using the reported frequency of care provision from the SHARE survey as weights, we calculated the average number of informal care hours provided per caregiver per week.

Table 6 shows the cost of labour, which is calculated by adding 16.1% in employer social security contributions to the gross wage, in accordance with the Contributions for Social Security Act. Considering that there are 2,088 working hours in 2025 and the corresponding annual labour costs, we calculated the value of one working hour based on different assumed wage levels. We then used the estimated number of informal care hours from Table 5, i.e. 13.57 hours per week, to calculate the value of informal care services per car-

egiver per year in euros that amount from 6 to almost 12 thousand euro per year per caregiver.

Table 5: Average weekly hours of informal services per caregiver

LTC	Number of respondents from SHARE 2024	% of respondents from SHARE 2024	Hours per week	Average weekly hours of informal services per caregiver
Daily	239	26%	30	7.85
Weekly	268	29%	15	4.40
Monthly	153	17%	7	1.17
Less often	253	28%	0.5	0.14
				13.57

Source: SHARE-ERIC (2024), own calculations.

Table 6: Value of informal care services per carer

2025	Minimal wage	1.2 times minimal wage	Average wage
Monthly wage in €	1,277.72	1,533.26	2,508.55
Monthly cost of labour in €	1,483.43	1,780.00	2,912.42
Number of working hours	2088	2088	2088
Hourly cost of labour in €	8.52	10.22	16.74
Number of hours per week	13.57	13.57	13.57
Number of hours per year	705.64	705.64	705.64
Value of informal care services per carer per year in €	6,012.05	7,211.64	11,812.41
Number of informal carers in Slovenia	346,517	346,517	346,517
Value of informal care services per year in million €	2,083.27	2,498.96	4,093.20

Source: Statistical Office (2025a, 2025b), Government of the Republic of Slovenia (2025), own calculations.

Based on our survey data we assume that approximately 346,517 people in Slovenia are informal caregivers. Accordingly, value of informal care services per year varies between 2.1 to 4.1 billion euros or 3-6% of GDP projection in

2025 (Banka Slovenije, 2025) in Slovenia depending on the assumed opportunity cost of hour of informal care. This value includes only the monetised direct time of service provision and does not include lost productivity of employed informal caregivers and other societal costs of informal caregiving.

5 Discussion

The estimated annual value of informal caregiving time in Slovenia, ranging from approximately €2.1 to €4.1 billion, highlights the substantial economic contribution made by informal caregivers. At an opportunity cost of 1.2 times the minimum wage, which corresponds to the Long-term care act, the value is around € 2.5 billion (3.4% of GDP), which significantly exceed annual public expenditures for formal health and social long-term care in Slovenia, representing 1.3 to 1.5% of GDP since 2019 (OECD, 2025), underscoring the central role of informal care in sustaining the national care system (Ekman et al., 2021; Oliva-Moreno et al., 2019). Importantly, these estimates bring visibility to a largely hidden segment of the care economy and provide a compelling case for policy recognition and support for informal caregivers (Costa-Font and Vilaplana, 2025). Informal caregivers, many of whom provide care daily or weekly, shoulder a considerable time and opportunity cost that can reduce their labour market participation, income security, and long-term well-being. From the societal viewpoint, the potential productivity losses from paid work also need to be considered. These findings underscore the need for comprehensive policy interventions that not only support formal care infrastructure but also recognize, compensate, and relieve the burden on informal caregivers through financial, legal, and institutional mechanisms (Colombo et al., 2011; Vermeer and van Houtven, 2024).

For the policy measures to be tailor made as possible, we need to identify the characteristics of informal caregivers. Therefore, this study also analyses them in Slovenia using survey data and logit regression analysis, with a focus on demographic, employment, health, wellbeing, and lifestyle characteristics. The findings largely align with previous literature but also highlight some context-specific nuances (Baji et al., 2019; Mehri et al., 2021).

Age consistently emerged as a significant predictor across model specifications: older individuals were more likely to provide care. This is consistent with established evidence that caregiving roles are most prevalent among middle-aged and older adults (Verbakel et al., 2017; Pickard, 2015). The descriptive statistics similarly show that caregivers tend to be older than non-caregivers, and bivariate tests confirm this difference is statistically significant. Employment status also plays an important role. Caregivers often work in more flexible employment arrangements as being self-employed or employed by a self-employed person significantly increases the probability of being a caregiver. This suggests that flexibility in working hours is key to balancing paid work and caregiving duties, as noted by Bauer and Sousa-Poza (2015). Interestingly, unemployment was not significantly associated with caregiving, contrasting

with studies suggesting that caregiving may push individuals out of the labour force (Zhou and Qian, 2021).

The role of health status is multifaceted. Although caregiver and others report similar overall health status as non-caregivers, caregivers more frequently experience specific health conditions such as musculoskeletal disorders, injuries, and genitourinary illnesses. This is consistent with the notion that individuals in poorer health may be less capable of fulfilling caregiving responsibilities (Verbakel et al., 2017; Jacobs et al., 2014). Study suggests that although caregivers' self-rated general health is not significantly worse than that of non-caregivers—corroborating findings by Fredman et al. (2010, 2015) and Roth et al. (2015) supporting the “healthy caregiver” hypothesis—we identify a statistically significant overrepresentation of certain specific health conditions among caregivers, particularly musculoskeletal disorders, injuries, and genitourinary issues. These results are in line with Janson et al. (2022), who found more such conditions among caregivers across multiple European studies. The results regarding mental wellbeing reveal an interesting dual pattern. Those who reported frequently enjoying daily activities were less likely to be caregivers, while those who often felt lively were more likely, similar to findings from Pinquart and Sörensen (2003), who documented both positive and negative emotional outcomes of caregiving. The association with feeling lively may reflect resilience or intrinsic motivation among caregivers, whereas the lower enjoyment may indicate caregiving strain, also in terms of disrupted daily routines (Janson et al., 2022; Li and Ruan, 2022).

Despite these findings, some limitations of our research should be acknowledged. First, the comprehensive questionnaire used in this study offers only a limited snapshot of long-term care provision, particularly with respect to the intensity and types of services delivered. While this was partially addressed by supplementing with data from other relevant sources, future research would benefit from a more detailed measurement framework. Second, although the survey is based on a nationally representative sample, a larger sample size would allow for more robust subgroup analyses and improved reliability of the results. Importantly, our estimation of the value of informal care includes only the direct replacement value of caregiving time. It does not account for indirect societal costs such as loss of productivity from paid work, reduced labour market participation, or declines in caregivers' quality of life. These hidden costs are likely to be substantial, particularly for working-age caregivers, and may contribute to long-term social and economic inequalities. Future research should therefore aim to conduct a more comprehensive and integrated economic evaluation of informal care. This should not only value the unpaid services provided but also estimate the broader social costs borne by caregivers, including physical and mental health consequences, career disruptions, and financial strain. Such a holistic approach is essential for designing policies that effectively recognise, support, and sustain informal caregiving in its supporting role to the national long-term care system. An additional limitation of this study is the lack of detailed family network and household-level indicators, such as caregiver–recipient relationship, sibling availability, house-

hold composition, and household financial circumstances. These factors have been shown to influence both the likelihood of becoming an informal caregiver and the intensity and burden of caregiving. Their exclusion reflects data constraints rather than theoretical irrelevance and should be addressed in future research by using complementary national datasets and more detailed household-level information.

6 Concluding Remarks

This study provides empirical evidence on the socio-demographic, health, and economic aspects of informal caregiving in Slovenia. By combining survey data with supplementary national and European sources, the analysis shows that informal caregiving is a substantial and structurally embedded part of the care system, with significant implications for individual well-being and societal welfare. The findings indicate that caregiving is socially patterned and linked to notable differences in health and lifestyle outcomes, while the economic valuation identifies informal care as a major societal contribution, accounting for an estimated €2.1–€4.1 billion annually, or approximately 3–6% of Slovenia's GDP, depending on the valuation assumptions. These results position informal caregiving not as a marginal private activity, but as a central pillar of long-term care provision with systemic relevance for social policy and economic planning.

The results further show that informal caregiving is not only a private family matter but also a systemic pillar of long-term care provision, generating significant economic value while exposing caregivers to increased health, social, and economic risks. These findings highlight the need to explicitly integrate informal caregiving into national long-term care strategies, rather than treating it as a residual or supplementary form of care.

From a policy perspective, the results support the development of coordinated interventions linking long-term care policy, labour market regulation, and social protection systems. Effective policy frameworks should strengthen formal care infrastructure and provide institutional recognition, legal protection, and targeted support mechanisms for informal caregivers. Such integration is particularly relevant in the context of implementing the Slovenian Long-term Care Act, where informal caregiving will continue to play a critical complementary role within the national care system.

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Appendix

Table A1: Average marginal effects from logit regression
(corresponding to Table 4)

	Variable	(1)	(2)	(3)	(4)	(5)	(6)
D'	age _i	0.002**	0.003**	0.003**	0.003**	0.003**	0.003**
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
	gender _i	-0.000	0.012	0.002	0.014	0.013	0.021
		(0.027)	(0.028)	(0.027)	(0.028)	(0.027)	(0.028)
	2.edu _i (secondary)	0.052	0.031	0.054	0.034	0.062	0.044
		(0.095)	(0.101)	(0.093)	(0.099)	(0.092)	(0.097)
E'	3.edu _i (tertiary)	0.016	-0.007	0.024	0.003	0.029	0.009
		(0.095)	(0.101)	(0.093)	(0.099)	(0.092)	(0.097)
	2.ES _i (employed by self-employed)	0.140**	0.097	0.136*	0.095	0.144**	0.117
		(0.070)	(0.067)	(0.069)	(0.067)	(0.072)	(0.071)
	3.ES _i (self-employed)	0.091	0.088	0.097	0.094	0.113	0.110
		(0.072)	(0.072)	(0.072)	(0.072)	(0.073)	(0.073)
	4.ES _i (freelancer)	0.000	0.000	0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	5.ES _i (contract-based)	0.126	0.122	0.123	0.122	0.130	0.125
		(0.120)	(0.119)	(0.119)	(0.119)	(0.118)	(0.117)
	6.ES _i (other emp status)	0.214	0.222	0.218	0.229	0.231	0.236
		(0.150)	(0.149)	(0.149)	(0.148)	(0.149)	(0.147)
	7.ES _i (unemployed)	-0.005	0.005	0.002	0.010	0.014	0.028
		(0.049)	(0.051)	(0.050)	(0.052)	(0.052)	(0.054)

	Variable	(1)	(2)	(3)	(4)	(5)	(6)
H'	2.HS _i (good)	-0.022 (0.033)		-0.021 (0.034)		-0.020 (0.034)	
	3.HS _i (neither good nor bad)	0.003 (0.043)		-0.001 (0.047)		-0.004 (0.047)	
	4.HS _i (bad)	0.020 (0.058)		0.018 (0.064)		0.018 (0.065)	
	5.HS _i (very bad)	0.000 (0.000)		0.000 (0.000)		0.000 (0.000)	
	injuries _i		0.063** (0.032)		0.057* (0.032)		0.044 (0.033)
	musculoskeletal _i		-0.049* (0.029)		-0.048 (0.029)		-0.049 (0.030)
	cardiovascular _i		-0.006 (0.033)		-0.006 (0.033)		-0.005 (0.033)
	respiratory _i		0.022 (0.037)		0.021 (0.037)		0.021 (0.038)
	mental _i		-0.066* (0.036)		-0.065* (0.038)		-0.064* (0.038)
	neurological/sensory _i		0.029 (0.040)		0.023 (0.040)		0.026 (0.040)
	gastrointestinal _i		0.002 (0.040)		-0.002 (0.040)		0.016 (0.040)
	urinary and/or reproductive _i		0.013 (0.048)		0.014 (0.048)		0.027 (0.049)
	skin _i		0.043 (0.034)		0.041 (0.034)		0.037 (0.035)
	tumours _i		-0.024 (0.060)		-0.019 (0.060)		-0.043 (0.061)
	endocrine and metabolic _i		-0.030 (0.049)		-0.032 (0.049)		-0.044 (0.050)
	blood _i		0.006 (0.049)		0.004 (0.049)		0.011 (0.050)
	congenital anomalies _i		0.123* (0.063)		0.125** (0.063)		0.122* (0.065)
	freq_enjoy _i			-0.050*** (0.019)	-0.049** (0.019)	-0.051** (0.020)	-0.048** (0.020)
	freq_lively _i			0.055** (0.023)	0.047** (0.023)	0.058** (0.023)	0.050** (0.023)
	freq_hopeful _i			-0.009 (0.019)	-0.009 (0.019)	-0.011 (0.019)	-0.011 (0.020)

	Variable	(1)	(2)	(3)	(4)	(5)	(6)
L'	physical_activity _i					0.056*	0.047
						(0.032)	(0.032)
	breakfast _i					-0.047	-0.049*
						(0.028)	(0.028)
	lunch _i					-0.137***	-0.129***
						(0.043)	(0.043)
	GP _i					0.005	0.009
						(0.094)	(0.094)
	suppl_ins _i					0.030	0.031
						(0.031)	(0.031)
	Observations	1,058	1,060	1,058	1,060	1,014	1,016

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1
Source: Survey data and own calculations.