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Family ties and late-life well-being: a cross-sectional analysis of the association between number of children and life satisfaction among Iranian older adults: findings from the Neyshabur Longitudinal Study on Aging

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Family ties and late-life well-being: a cross-sectional analysis of the association between number of children and life satisfaction among Iranian older adults: findings from the Neyshabur Longitudinal Study on Aging

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Abstract

Background: Population aging is a global demographic process that Iran is experiencing at an accelerated pace. Life satisfaction is a key marker of successful aging. Although family support has traditionally been considered an important determinant of well-being in later life, the association between the number of children and life satisfaction remains unclear, particularly in the Iranian context.

Methods: This cross-sectional study used data collected during the registration phase of the Neyshabur Longitudinal Study on Aging (NeLSA), a population-based cohort study in northeastern Iran. Of 7,462 participants aged ≥50 years, 7,167 with available data were included. Life satisfaction was assessed using the Persian version of the Satisfaction With Life Scale (SWLS). The main exposure variable was the number of children. Data were analyzed using multivariable linear regression, adjusting for age, sex, marital status, education, income, job status, BMI, smoking, hypertension, diabetes, and physical

activity. Restricted cubic splines were used to model the functional form of the association. **Results:** In the crude model, having more children was associated with higher life satisfaction. However, after full adjustment, the association reversed: participants with five or more children had significantly lower life satisfaction than those with 0–2 children (β = −0.40, 95% CI: −0.73 to −0.07, P = 0.017). Each additional child was associated with a 0.08-point decrease in life satisfaction (β = −0.08, P = 0.003). The association was approximately linear, with the steepest decline observed beyond four children.

Conclusions: After adjusting for potential confounders, life satisfaction was relatively higher among older adults with a moderate number of children (up to four), whereas having five or more children was associated with lower life satisfaction. This finding challenges the traditional assumption that larger families inherently provide greater support in old age. Policies should focus on strengthening formal social support systems and addressing the socioeconomic burdens that may accompany larger families.

Keywords: Aging; Family Characteristics; Iran; Life Satisfaction; Cross-Sectional Studies; Social Support

Introduction

Population aging is widely regarded as one of the most significant demographic transitions of the 21st century. Globally, the proportion of adults aged 60 years and over was 12% in 2015 and is projected to reach 22% by 2050, exceeding two billion people [1–7]. Iran is undergoing this transition at an accelerated rate, with the share of older adults expected to rise to 21% by 2050 [6].

This demographic shift poses considerable challenges to social welfare, health systems, and the economy. Identifying modifiable determinants of well-being in later life has therefore

become a public health priority, particularly in developing countries where formal social support structures are still emerging. Life satisfaction, defined as a cognitive, subjective evaluation of one's life as a whole, is considered a key marker of successful aging and quality of life [7–9]. A substantial body of evidence indicates that social support from family contributes positively to mental tranquility, reduces the threats associated with aging, and enhances emotional stability [7]. In Iran, the family remains the primary source of support for older adults [6], and the number of children is often treated as a proxy for available social support. The migration of offspring, both internal (rural-to-urban) and external, disrupts traditional intergenerational relationships and places additional pressure on the health and social well-being of older adults [6, 10]. From a health promotion and education perspective, a clear understanding of how family size and structure affect health is essential for designing effective interventions. Health educators and decision-makers therefore need to move beyond the simplistic view that extended families are inherently beneficial and instead focus on the quality of relationships, the care provided by loved ones and household members, and the broader socioeconomic context that shapes the well-being of older adults [11]. The link between fertility and satisfaction in later life has not been fully explored and appears to vary considerably across cultures. A previous study in Iran found that the number of children was among the significant predictors of relationship satisfaction among older adults [2, 8]. Perceived social support has also been shown to predict life satisfaction to a notable extent [9]. Studies conducted in Neyshabur revealed that perceived social support among older adults is moderate and correlates positively with physical activity and negatively with depression [7]. Although social support has been investigated, the specific effect of the number of children on life satisfaction—and the potential negative aspects of having many children from an economic perspective—remains insufficiently understood. Meanwhile, the number of children and the associated family support structure in old age are changing in Iran as fertility rates decline. The

Iranian Longitudinal Study on Ageing (IRLSA), also known as the Neyshabur Cohort Study (NeLSA), offers a valuable opportunity to investigate this issue. IRLSA was initiated in 2017 as part of the PERSIAN cohort study, focusing on adults aged ≥50 years in Neyshabur, northeastern Iran, with a target of 7,462 respondents [4]. It collects information on socioeconomic status, health conditions, lifestyle components, and psychosocial issues, enabling robust cross-sectional analyses of the aging process. Against this background, the present study attempts to examine the association between the number of children and life satisfaction in older adults using data from the Neyshabur Cohort Study. Through cross-sectional analysis and statistical modeling, this study aims to contribute to a broader understanding of how family size relates to life satisfaction across different societies. The findings are expected to support the development of health education programs, community services, and supportive policies aimed at enhancing the quality of life of the aging population in Iran and to highlight the value of comprehensive, multilevel support systems.

Methods

A cross-sectional analysis was carried out using data from the registration phase of the Neyshabur Longitudinal Study on Aging (NeLSA), the first longitudinal cohort study on aging in Iran. Individuals aged ≥50 years in Neyshabur contributed data as part of this project, which began in 2017 as part of the PERSIAN cohort study [4]. The target population consisted of all older adults aged 50 years and above enrolled in the present cohort. Of all individuals registered at baseline in NeLSA, 7,167 with complete information on the variables of interest were eligible for the final analysis based on the inclusion and exclusion criteria. Inclusion criteria were age ≥50 years; residency in Neyshabur for at least three years; Iranian nationality (verified by national ID card and birth certificate). Exclusion criteria were failure to complete the required questionnaires.

Data collection instruments

Life satisfaction was assessed using the Persian version of the Satisfaction With Life Scale (SWLS). The SWLS consists of five items scored on a 7-point Likert scale (1 = strongly dissatisfied to 7 = strongly satisfied), yielding a total score ranging from 5 to 35, with higher scores indicating greater life satisfaction. The Persian version of the SWLS has been validated in Iranian older adults, with a reported Cronbach's alpha of 0.83 and acceptable construct validity [14–16]. In the present sample, the internal consistency of the SWLS was acceptable. Physical activity was measured using the PASE, a validated self-report instrument designed specifically for older adults [8]. The PASE assesses the frequency and duration of leisure, household, and occupational activities over the preceding seven days. Item weights are applied according to the original scoring algorithm, and the total PASE score is calculated by summing the weighted item scores, with higher scores indicating greater physical activity. The Persian version of the PASE has been validated in Iranian older adults [17]. Social support was assessed using the Duke Social Support Index (DSSI), an 11-item instrument comprising two subscales: social interaction (4 items) and satisfaction with received support (7 items). Each item is scored on a 3-point scale (1 = rarely/very dissatisfied to 3 = most of the time/satisfied), yielding a total score ranging from 11 to 33, with higher scores indicating greater perceived social support. The DSSI has demonstrated acceptable reliability in Iranian older adults [18]. Additional demographic and social information regarding the number of children was collected as the main independent variable, along with information on age group (60–69 and ≥70 years), sex, marital status, education level, employment status, body mass index (BMI), history of cardiovascular disease, diabetes, hypertension, high cholesterol, smoking habit, and physical activity (measured using the PASE). These data were extracted from the demographic and clinical records of the cohort study [1]. Medical conditions diagnosed during life were assessed through self-report and verified against medical records and prescribed medications.

Statistical analysis

Continuous variables were expressed as medians (interquartile range) and categorical variables as frequencies (percentages), with baseline comparisons across number-of-children's categories (0–2, 3–4, and ≥5) performed using the Kruskal–Walli's test and chi-square test, respectively. For descriptive purposes, the number of children was categorized into three groups (0–2, 3–4, and ≥5 children). In regression analyses, however, the number of children was primarily modeled as a continuous variable to preserve information and avoid arbitrary categorization. A categorized analysis using the same three groups was additionally performed for ease of interpretation. Multivariable linear regression models were fitted to estimate the association between number of children (both as a three-level categorical variable and as a continuous variable) and life satisfaction score, with two sequential models: a crude unadjusted model and an adjusted model that included age, sex, marital status, education, income status, current job status, body mass index, smoking, hypertension, diabetes, and physical activity as prespecified confounders. To examine effect modification, a multiplicative interaction term between sex and number of children (continuous) was entered into the fully adjusted model, with a P-value <0.10 considered suggestive of effect modification. Additionally, to flexibly model the functional form of the association without relying on arbitrary categorization, restricted cubic splines with 4 knots placed at the 5th, 35th, 65th, and 95th percentiles of the distribution were employed within the same adjusted linear regression framework, and the overall significance as well as the non-linearity component were assessed via ANOVA F-test. All analyses were conducted using R software (version 4.3.0, with the rms, ggplot2, and dplyr packages) for regression and spline modelling, and SPSS (version 26.0) for descriptive comparisons, with complete-case analysis applied to handle missing data and a two-sided P-value <0.05 considered statistically significant.

Results

As shown in Table 1, participants with a higher number of children (≥5) were substantially older, more likely to be female, and had a significantly higher prevalence of illiteracy (41.9% vs. 8.0% in the 0–2 group) and financial difficulties (25.1% vs. 12.6%). They also exhibited poorer health profiles, including higher rates of hypertension (27.1% vs. 18.5%) and diabetes (28.6% vs. 23.9%), worse self-rated health (52.2% rating it as "bad" or "very bad" vs. 34.5% in the 0–2 group), and significantly lower physical activity levels (median PASE score: 54.4 vs. 92.2). Interestingly, unadjusted life satisfaction scores were slightly higher in the ≥5 group (median 14.0 vs. 13.0), suggesting that these sociodemographic and health disadvantages were initially masked.

Table 1. Baseline characteristics of participants according to number of children

Variable	**Overall (N=7167)**	**Number of children**			**p-value**
		0–2 (N=932)	**3–4 (N=2767)**	**≥5 (N=3468)**	
Age, years, Median (IQR)	59.25 (54.92–65.33)	55.7 (53.7–60.2)	57.2 (53.7–61.8)	62.4 (57.7–69.3)	<0.001
Sex, n (%)					<0.001
Male	3358 (46.9)	509 (54.6)	1360 (49.2)	1489 (42.9)	
Female	3809 (53.1)	423 (45.4)	1407 (50.8)	1979 (57.1)	
Marital status, n (%)					<0.001
Single	700 (9.9)	64 (7.0)	197 (7.2)	439 (12.8)	
Married	6397 (90.1)	852 (93.0)	2546 (92.8)	2999 (87.2)	
Education, n (%)					<0.001

Illiterate	1869 (26.2)	74 (8.0)	350 (12.7)	1445 (41.9)	
Literate	5255 (73.8)	853 (92.0)	2399 (87.3)	2003 (58.1)	
Current job status, n (%)					0.010
Full- or part-time employment	1634 (23.0)	271 (29.2)	690 (25.1)	673 (19.5)	
Housewife	3201 (45.0)	264 (28.5)	1083 (39.4)	1854 (53.8)	
Retired	1737 (24.4)	342 (36.9)	825 (30.0)	570 (16.6)	
Unemployed	546 (7.7)	50 (5.4)	150 (5.5)	346 (10.0)	
Income status, n (%)					<0.001
Have difficulties	1442 (20.3)	117 (12.6)	461 (16.8)	864 (25.1)	
No problem	1365 (19.2)	344 (37.2)	666 (24.3)	355 (10.3)	
Sufficient for basic needs	4307 (60.5)	464 (50.2)	1618 (58.9)	2225 (64.6)	
BMI, kg/m², median (IQR)	27.60 (24.70–30.70)	27.3 (24.6–29.9)	27.7 (24.9–30.7)	27.6 (24.5–30.8)	0.01
Current smoking, n (%)					<0.001
No	5995 (89.1)	768 (86.7)	2272 (87.8)	2955 (90.8)	
Yes	732 (10.9)	118 (13.3)	315 (12.2)	299 (9.2)	
History of Diabetes, n (%)					<0.001
No	5302 (74.0)	710 (76.2)	2115 (76.4)	2477 (71.4)	
Yes	1865 (26.0)	222 (23.9)	652 (23.6)	991 (28.6)	

History of Hypertension, n (%)					<0.001
No	5504 (76.8)	760 (81.5)	2215 (80.1)	2529 (72.9)	
Yes	1663 (23.2)	172 (18.45)	552 (18.5)	939 (27.1)	
Self-rated health, n (%)					<0.001
Very good	430 (6.1)	94 (10.2)	206 (7.5)	130 (3.8)	
Good	1033 (14.6)	180 (19.5)	483 (17.6)	370 (10.8)	
Moderate	2387 (33.6)	330 (35.8)	914 (33.3)	1143 (33.3)	
Bad	2689 (37.9)	269 (29.1)	979 (35.7)	1441 (42.0)	
Very Bad	558 (7.9)	50 (5.4)	159 (5.8)	349 (10.2)	
PASE score, Median (IQR)	64.1 (35.7–143.4)	92.2 (45.8–173.7)	72.9 (39.0–152.6)	54.4 (32.3–115.7)	<0.001
Social support score, Median (IQR)	26.0 (24.0–28.0)	27.0 (25.0–28.0)	27.0 (24.0–28.0)	26.0 (24.0–28.0)	<0.001
Life satisfaction score, Median (IQR)	13.0 (11.0–17.0)	13.0 (10.0–16.0)	13.0 (11.0–17.0)	14.0 (11.0–17.0)	0.02

In the age- and sex-adjusted model (Table 2), participants with 3–4 children had higher life satisfaction than those with 0–2 children (β = 0.38, 95% CI: 0.14 to 0.62, P < 0.001), and the corresponding association for participants with ≥5 children was also positive (β = 0.66, 95% CI: 0.32 to 1.01, P < 0.001). However, after comprehensive adjustment for sociodemographic and health-related covariates, the direction of the association changed. The adjusted model revealed that participants with ≥5 children had a significantly lower life satisfaction score than

the reference group (β = −0.40, 95% CI: −0.73 to −0.07, P = 0.07). No statistically significant difference remained between the 3–4 group and the reference group (β =- 0.35, P = 0.74).

Taken together, these findings suggest a monotonic pattern: life satisfaction tended to be higher among older adults with a moderate number of children (up to four), whereas having five or more children was associated with lower life satisfaction after adjustment.

Table 2. Association between number of children and life satisfaction among older adults

	Age- and sex-adjusted Model		**Fully adjusted Model**	
Number of children	**β (95% CI)**	**P value**	**β (95% CI)**	**P value**
0–2	Reference	–	Reference	–
3–4	0.38 (0.04, 0.72)	0.023	-0.35 (-0.36, 0.26)	0.74
≥5	0.66 (0.32, 1.01)	<0.001	-0.40 (-0.73, -0.07)	0.018

Fully adjusted Model: Adjusted for age, sex, marital status, education, income status, current job status, BMI, current smoking, hypertension, diabetes, and physical activity.

Shape of the relationship using restricted cubic splines

To move beyond arbitrary categorization and to flexibly characterize the functional form of this association, we employed restricted cubic splines with 4 knots within the fully adjusted model. Restricted cubic spline analysis showed evidence of an overall association between number of children and life satisfaction (P=0.003), but there was no statistically significant evidence of nonlinearity (P for nonlinearity=0.055).

As illustrated in Figure 1, the adjusted predicted life satisfaction score exhibited a steady, gradual decline with increasing number of children. For instance, the predicted scores were

14.45 for individuals with no children, 14.25 for those with 5 children, 14.20 for those with 10 children, and 14.10 for those with 15 children. Notably, the decline was consistent across the entire distribution, and the confidence bands widened slightly at higher numbers of children (≥10) due to reduced sample sizes, indicating less precision in that range. There was no evidence of a threshold effect, a J-shaped curve, or any plateau that would suggest a protective effect of having more children.

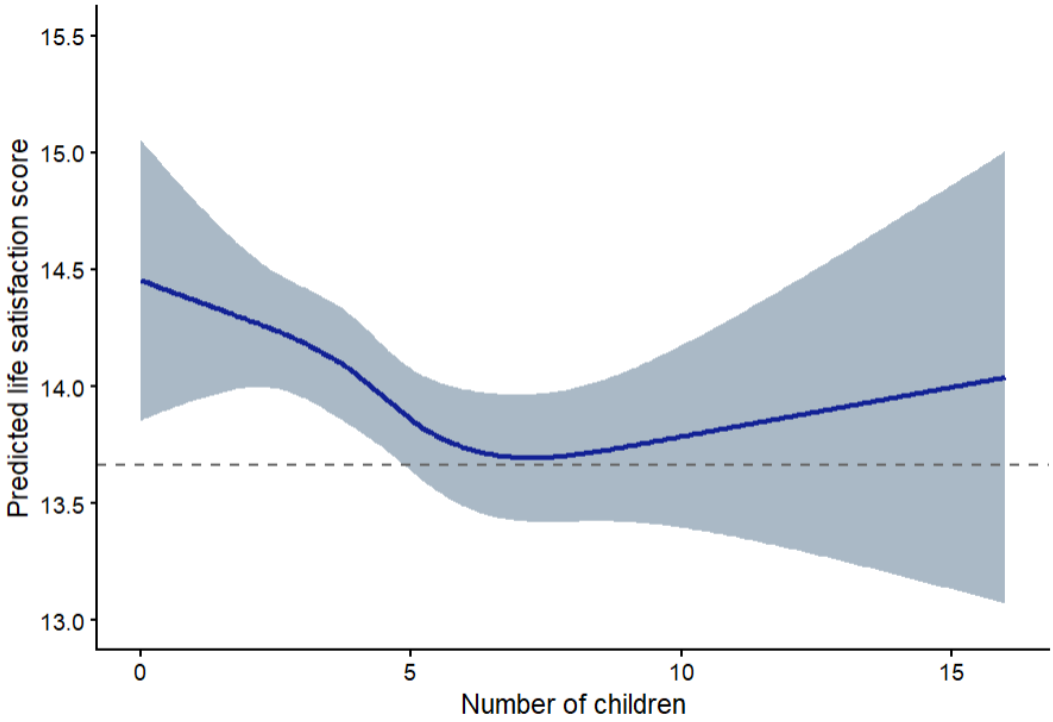


Figure 1. Adjusted predicted life satisfaction score (solid blue line) and 95% confidence bands (shaded area) across the number of children, derived from a restricted cubic spline model with 4 knots. The model was adjusted for age, sex, marital status, education, income status, current job status, BMI, smoking, hypertension, diabetes, and physical activity. The dashed horizontal line indicates the overall mean life satisfaction score. The relationship is approximately linear with a modest downward slope (P for non-linearity = 0.055)

Discussion

In this cross-sectional study of the Neyshabur Longitudinal Aging Cohort, the association between the number of children and life satisfaction among Iranian older adults revealed a

complex and inverse pattern after adjusting for potential confounders. In the crude analyses, a higher number of children appeared to be positively associated with greater life satisfaction—a finding broadly consistent with societal norms in Iran, where larger families are often perceived as providing greater emotional, material, and instrumental support to parents in later life [6]. However, this association disappeared and reversed once covariates were taken into account. Specifically, participants with five or more children had considerably lower life satisfaction compared with those with fewer children ($\beta = -0.40$, $P = 0.017$) and each additional child was associated with a small but statistically significant 0.08-point decrease in life satisfaction ($\beta = -0.08$, $P = 0.003$). Restricted cubic spline analysis confirmed a linear, dose-response decline with no evidence of a threshold effect. This suggests that each additional child contributes a certain burden rather than providing protection beyond a certain point, and no protective role of having many children was identified in this elderly sample. The reversal of the association after adjustment is important, as it illustrates the distinction between correlation and underlying association. The life satisfaction scores observed in the crude analysis likely reflected, to a substantial degree, confounding factors (Table 1). Older adults with a large number of children were considerably older, more likely to be female, less formally educated, more likely to be housewives, and more likely to have two or more chronic conditions (hypertension and diabetes)—all of which are significant determinants of poorer subjective well-being. In contrast, individuals with two or fewer children were on average younger, more educated, more likely to be employed, and financially better off. After adjusting for these confounding influences, the association reversed to show an inverse dose-response pattern in adults with more than four children. Several mechanisms may help explain this finding. First, economic burdens may play a role. When a family's economic base is narrow, a very large family size may contribute to financial strain in old age. Older adults with five or more children may feel pressure to assist their children and grandchildren well into adulthood—a

phenomenon often described as the "sandwich generation." In a context where effective financial protection services are limited, older adults are more often forced to draw on their savings and assets [6, 12]. Many Iranian families also face high inflation and rising housing costs [13]. Second, the migration of children away from home can leave older parents without social, practical, or economic support when needed [6]. As more people move from rural areas to cities for housing or work, their elderly parents in villages are often left without support [13]. Similarly, some parents have children living abroad and feel disappointed or neglected when unable to visit or receive support from them [6, 13]. Third, the quality of marital, social, and parent-child relationships matters. The quality—rather than the quantity—of family relationships has a substantial impact on the well-being of older adults. Although a larger number of siblings may provide more potential sources of support, it may also be associated with negative emotional and behavioral outcomes, such as more frequent arguments or conflicts [13]. A systematic review indicated that an effective family support network contributes to the well-being of older adults, but the number of children alone is not sufficient [11]. In addition, a smaller family size may increase the likelihood that aging parents do not receive an equitable share of care. Our finding of a linear trend supports this argument. Our results are broadly consistent with some recent studies in Iran and the Middle East [2, 12]. For example, a study in Urmia showed that although the number of children predicted marital satisfaction among older men, its contribution was relatively weak compared with other factors [2]. A systematic review of social factors affecting the well-being of older adults reached a similar conclusion: the mere number of children does not guarantee protection against stress [11]. However, our findings are in contrast with studies conducted in developed European countries where fertility was positively associated with well-being in later life [14]. These results may be explained by the fact that most Western countries have established adequate old-age pension systems, reducing the financial dependence of older adults on their children

[6, 13]. Although the interaction between sex and number of children was not statistically significant (P for interaction = 0.075), the analysis by sex indicated no interaction effect, meaning the relationship pattern was similar among men and women. Nevertheless, some studies have suggested that women bear a greater burden of care and may therefore be less satisfied with a large family [15]. In Iranian culture, however, being the mother of many children is traditionally regarded as a valued status in old age [16], which may help ameliorate or neutralize some negative effects [15]. Health education planners in Iran should pay considerable attention to this issue. The key message from this study for healthcare providers—including primary care and specialist services—and health promotion practitioners is that a large family does not necessarily entail significant added social support or increased life satisfaction among Iranian older adults. First, the quality of family relationships is a better predictor than the quantity of children. Efforts should therefore encourage effective communication and conflict resolution within the family [11]. Programs aimed at improving family relations—through family meetings and discussions among spouses and children about care roles—can address potential intergenerational tension and mitigate the negative impacts of having a large number of children [6, 13]. Family-based interventions can target both older adults and their children. Second, instead of relying on the expectation of support from children, emphasis should be placed on community-based support networks for older adults [7]. Since supporting a large family is costly and increasingly prevalent in Iranian society—where social and welfare support is in constant demand—policies that support the financial health of parents, such as government assistance, are needed [5, 6, 13], along with healthcare services that reduce expenses [5]. Older adults can also find support in various community settings, such as religious centers, neighborhood groups, and their children's families [7]. "Elder care" is gaining increasing attention at the local level, particularly in developing countries such as Iran, to create a better community for healthier aging and to support elderly

care for a more satisfied community overall [6]. Finally, health service provision policies should take extra precautions for older adults with five or more children—screening them in family and community care settings to identify those experiencing stress, depression, or loneliness and finding appropriate solutions, including counseling and referral. This would also help in planning services for the future, given the demographic projection of an aging Iran [3].

Conclusions

In this cross-sectional analysis of the Neyshabur Longitudinal Aging Cohort (NeLSA), we demonstrated that the number of children was inversely and statistically significantly related to life satisfaction after controlling for major confounders among the Iranian elderly population after 5 children. A positive association between the number of children and life satisfaction appeared in the crude analysis but disappeared after controlling for age, socioeconomic factors, and health. This negative relationship was linear, without a threshold effect, although there may be a moderate reduction in subjective well-being with each additional child. On the contrary, our findings support the role of other mediators, such as the reciprocity of family networks and socioeconomic barriers associated with a larger number of children, including additional caregiving burdens for older adults and increased expenditures. As the elderly population rises dramatically alongside decreasing fertility in Iran, there appears to be a need to encourage formal support networks, such as community care facilities, health services, and monetary transfers. Formal care providers should be sensitized to detect older adults with larger families and to offer support and interventions that reduce caregiver burden and promote social connection. However, family resources continue to exist as an informal support system, and policies aimed at making use of informal structures alongside formal ones will prove most effective in the future. Formal services should provide support to those who may need attention to decrease caring activities and improve their social connections. A coherent, multilevel system is essential for successful aging policy and for creating a higher quality of life. A well-

integrated system involving the community level is crucial for the success of our aging population.

Strengths and limitations

This study possesses several valuable methodological and substantive strengths. The data were obtained from a well-established, large, population-based cohort (NeLSA), with all participants providing comprehensive life histories, including medical histories and assessments of demographic, social, and personal resources [4]. The cohort included complete and rigorous recording of all components related to participants' lives and demographic data. Because all participants were older adults, they were asked to complete a questionnaire assessing the extent to which their lives were satisfactory—the very question this paper set out to explain. The study employed a well-selected method for choosing participants (a large population with stratified sampling for epresentativeness). It also included a restricted cubic spline regression approach to explore any linear association, with an alternative non-linear analysis using standard techniques had non-linear effects been detected. The choice of controlling for age group, sex, education, and other factors should have minimized confounding. Given that a number of studies have found conflicting results, having well-designed data controls can improve the reliability of the results in this study. This approach—from a developing country—has not previously been attempted in this context.

Limitation:

The main limitation is that the results are cross-sectional. In other words, no attempt to investigate causality has been made in this study. It is possible that other variables explain the relationship, and that an inverted relationship is more likely to be present—an older adult who is not satisfied with life may have a greater probability of having additional children, either biologically or through adoption, due to biological drives, cultural norms, or societal pressure.

These adults could then continue to feel less satisfied with this number. Additionally, while the number of children can explain to some extent the overall level of life satisfaction, it cannot fully explain this relationship. Also missing is consideration of the actual number of children the participant may have lost, and the associated grief. Consideration of a parent's relationship with his or her adult children (e.g., proximity and visiting schedule) would increase the ability of this investigation to explain the findings. The use of only self-report measures of life satisfaction might introduce bias due to socially desirable answers or the desire to maintain appearances. However, the number of data controls implemented should lessen the likelihood of such bias. In addition, the restriction of data collection to only one city (Neyshabur, in northeastern Iran) limits generalizability and may bias the sample if other cities with this population group are structurally different. Data on children were also restricted in this study: the economic and health status of sons or daughters was not measured, so we are unable to determine the effect of this variable's ability to provide resources, including education and the ability to provide financial support to aged and vulnerable parents [6]. Although controls were applied, there remains a possibility of some degree of bias due to omitted variables such as childhood experiences or personality type. The authors claim a unique approach from another culture, showing that findings may differ in the developing world, which should improve future research.

Implications for policy, health education, and practice

Health education and promotion programs There is evidence supporting the significant impact this study can have on health education and promotion programs that cater to older adults and their relatives. Health educators are therefore advised to use evidence-based learning that facilitates improvement in the quality—not the quantity of relationships within the family. Older adults and their families, particularly those belonging to large families, can be relieved of the negative impacts of large families if they attend family-based educational workshops

focused on effective communication, conflict resolution, and fair distribution of care duties among siblings [11]. Since the program will target Iranian families, it should be structured and culturally grounded so that it accommodates specific norms and values, and improves mutual understanding alongside realistic expectations regarding support for older adults. In addition, health promotion programs should encourage older adults to create diverse social networks beyond the family. Social well-being among older adults increases when they can actively participate in community center activities, religious events, peer support groups, and voluntary events [7]. The government should also initiate public health campaigns that reduce the stigma associated with seeking professional help and encourage productive aging.

Clinical practice and healthcare systems various healthcare professionals—including physicians, geriatric specialists, psychologists, and psychiatrists—should regularly screen patients who may be suffering from psychological distress and depression related to having many children. During routine checkups, healthcare providers can inquire about family support among older adults using validated question sets. After identifying those at risk, providers should encourage them to undertake counseling, brief psychological interventions, specialized mental health care, and other needed referrals [3]. Caregiving needs can be addressed through home-based care programs, supplementary home-based care services, and caregiver support networks. Geriatric care professionals and social workers on multidisciplinary teams should assess existing family support networks and help connect older adults with community care.

Policy-level interventions

The study points to an increasing need to reduce the financial reliance of older adults on family members. With rapid declines in fertility rates and quick demographic transitions, there is a need for the state to reconsider its dependence on the family for aged care needs. This may

further necessitate increased investment in formal social security programs, such as long-term care insurance, reliable pensions, affordable housing assistance, and the availability of appropriate healthcare facilities for older adults [5]. Support groups for older adults and their families should be made available, along with increased funding and provision of elderly day care facilities. Support can also be improved if the government makes efforts to ensure intergenerational support systems, such as providing financial support through income tax for caring children or for home-based care of older adults. In this scenario, if one has many children, their economic circumstances can improve and they can provide better care to the aged person by helping to cover costs. Similarly, for parents who do not have children or who have only one child, care provision could be difficult, and specialized support should be provided to them.

Future research

A longitudinal study would be required to explore the underlying mechanisms related to this phenomenon. The variables that need to be considered include the migration of children, the flow of financial resources, interaction within the family, and the health status of children, so that meaningful intervention measures can be devised. Qualitative research is needed to gain more in-depth insight into the perceived issues related to the living styles and difficulties of older adults who have a large number of children. Evidence-based interventional studies that focus on enhancing life satisfaction through family-based education and support are highly recommended. As older citizens belong to different cohorts with varying attitudes, it is important to observe how relationships between family size and life satisfaction change across generations, as this would reflect changing social structures, gender roles, and economies of society.

Declarations

Ethics approval and consent to participate: The Neyshabur Longitudinal Study on Ageing (NeLSA) was conducted in accordance with the principles of the Declaration of Helsinki. Ethical approval for this study was obtained from the Ethics Committee of Neyshabur University of Medical Sciences (Approval No. IR.NUMS.REC.1402.0501). Written informed consent was obtained from all participants prior to enrollment.

Consent for publication: Not applicable.

Availability of data and materials: The datasets generated and/or analyzed during the current study are not publicly available due to confidentiality agreements with participants but are available from the corresponding author on reasonable request.

Competing interests: The authors declare that they have no competing interests.

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