ASAUMS Press

AJAH
Avicenna Journal of Aging and Healthcare

Avicenna Journal of Aging and Healthcare. 2024;2(2):53-61. doi:10.34172/ajah.4029
https://ajah.asaums.ac.ir

Original Article

Relationship of Human Capital Resources and Health Status With the Quality of Service Provided by Untrained Caregivers to Elderly in Qaemshahr: A Cross-sectional Study

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Article history:
Received: : October 29, 2024
Revised: November 28, 2024
Accepted: December 15, 2024
ePublished: December 29, 2024

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Abstract

Introduction: Informal caregiving is highly valued by most people in society. Nonetheless, it is considered an unpaid job that is often not given much attention, except in cases where care is not provided adequately. The purpose of this study was to determine the relationship between human capital resource variables and the outcomes of informal caregivers providing services to the elderly aged 65 and older.

Methods: This cross-sectional descriptive-correlation study was conducted on 360 elderly aged 65 and older, who had at least one chronic disease, and 194 caregivers. Sampling included a two-stage cluster classification. The data were collected through a questionnaire in the form of face-to-face interviews and analyzed using descriptive statistics and multiple regression tests.

Results: The response variable of the number of hours of assistance provided per week by the caregiver had the most significant relationship with the number of human capital resources, demographic variables, and health variables. Human capital resource variables included the elderly's usefulness to the caregiver ($P=0.03$), the elderly having supplementary insurance ($P=0.02$), and the elderly being covered by insurance ($P=0.01$). Demographic variables were the elderly's place of residence ($P<0.001$), the caregiver's cohabitation with the elderly ($P=0.02$), and the caregiver's age ($P=0.02$). Finally, health variables consisted of impairments in daily living activities with the help of tools ($P=0.04$) and the elderly's cognitive impairment ($P=0.004$).

Conclusion: Human capital resource variables had the most impact on the quantity of care, and demographic and health variables affected the elderly's quality of life. Therefore, it is essential to take basic and infrastructural measures in designing and implementing support programs for the elderly and their families, who are considered primary caregivers.

Keywords: Elderly, Untrained caregivers, Informal care, Human capital

Please cite this article as follows: Khatty Dizabadi F, Makvandi Z, Yazdani Charati J. Relationship of human capital resources and health status with the quality of service provided by untrained caregivers to elderly in Qaemshahr: a cross-sectional study. Avicenna Journal of Aging and Healthcare. 2024;2(2):53-61. doi: 10.34172/ajah.4029

Introduction

Today, technological advances, declining fertility rates, and increasing life expectancy have led to an increase in the number of elderly people worldwide (1,2). According to the United Nations Population Division, the number of people over 65 years of age will reach more than two billion, or 22% of the population, in 2050 (3).

The aging of the world has become one of the most important public health challenges because older people are exposed to potential threats, such as increased incidence of chronic diseases, loneliness, isolation, and lack of social support (4). The inability to perform activities of daily living (ADLs) is one of the most common physical problems of older people with chronic diseases, such that they are unable to perform some of their daily activities without a caregiver (5). Therefore, the need for formal and informal caregivers increases since older people face different problems and deficiencies (6). Informal or family caregivers are considered the mainstay of the long-term care system, which is performed by family members, friends, and relatives (7). Caring for an elderly person with a chronic illness causes caregiver pressure or

burden, reducing time for usual activities and self-care in caregivers (8). Caregiving pressure or burden refers to the psychological, physical, and social pressures that caregivers experience as a result of caring for vulnerable elderly people. Thus, it creates many problems, such as burnout, anxiety, and depression, for caregivers, thereby decreasing the quality of care for the elderly under care (8-10). It also negatively affects the quality of life of caregivers (11). Hence, significant changes in the elderly population have led to increased public and scientific concern about how to maintain the workforce to meet the needs of the entire population (12). Studies show that in the United States, while the proportion of working-age people to the total population will decrease by about 10% by 2050, the old-age dependency ratio will increase by 16% (13). On the other hand, the increase in life expectancy among the elderly has increased concerns about access to resources for the elderly population who suffer from chronic diseases such as cardiovascular diseases, cancer, respiratory diseases, diabetes, and disability (14,15). Human capital plays a major role in providing health care services (16). The concept of human capital can be considered a set of intangible resources needed by the labor force to improve productivity (17). In other words, human capital is defined as a set of knowledge, skills, competencies, and abilities that are embodied in individuals and acquired through education, new learning, medical care, and experience (18) and can be a stimulus that causes economic growth in the long term and facilitates the allocation of resources needed for the retired population. From a demographic perspective, increasing human capital compensates for the decline in the working-age population (19).

Constructive interaction in life has significant positive effects on older people, families, and society. The challenging question is how to support the increase in human capital among the elderly population. Suggestions are made to increase the development of aging policy and programs to create social interaction among the elderly, and the strategies discussed in this context are how to increase investment in volunteer activities, social entrepreneurship, and human community development (20). Briefly, population aging can create a new opportunity for human capital development because, on the one hand, due to changing social values today, young people are more focused on education and are interested in the rapid development of new technologies. On the other hand, the increase in the number of older people will allow young people to use their knowledge and specialized experience. Therefore, investment in human capital becomes important in the context of increasing the elderly population (21).

The caregiver population is also considered a human capital, which is a kind of transcendental view of humans. In fact, it is a positive action perspective that focuses on investing in the future workforce, which are caregivers (22). Thus, this study seeks to determine the relationship between human capital resource variables and the outcomes of informal caregivers providing services to the elderly aged 65 and older. In other words, it aims to investigate the relationship between human capital resources, health status, and the quality of services provided by untrained caregivers to the elderly over 65 years of age in Qaemshahr county in 2016. It is hoped that by using human capital theory, public capital can be applied to informal caregivers to achieve greater satisfaction in the caregiver and the elderly.

Materials and Methods

This cross-sectional descriptive-correlational study was performed on 360 elderly people aged 65 and over in Qaemshahr county in 2016. The sampling method in this study included a two-stage cluster classification that was separately conducted at two city and countryside levels. Urban health centers, health stations, and selected health homes were referred to identify the first sample (elderly). Then, the first cluster head was identified based on the household number and address of the last vaccinated child on that day. Moving from the right side of the selected address and visiting the door of the house if the elderly person was 65 years and over and other conditions for entering the study were met, the questionnaire was completed in the form of a face-to-face interview. If the intended elderly person had a caregiver, his or her caregiver was interviewed as well (a total of 194 elderly people had caregivers). It should be noted that before conducting the interview, a consent form was given to the elderly and their caregivers so that they could be interviewed if they wished. The inclusion criteria for the study were being at least 65 years old, having at least one chronic disease according to self-report (out of 18 chronic diseases considered according to the questionnaire), showing a willingness to participate in the study, and being able to speak or read and write. Moreover, if the elderly had a caregiver, the inclusion criteria for the caregiver were also willingness to participate in the study and ability to read and write or speak. On the other hand, the exclusion criterion was the unwillingness of the elderly or their caregiver to continue cooperating in completing the questionnaire.

The data collection tool was a questionnaire. Yang's doctoral dissertation (22) was used to develop questionnaire items. The questionnaire consisted of questions related to the demographic and health characteristics of the elderly and caregivers, human capital resource variables of the caregiver and the elderly, and response variables of the elderly and caregivers (Table 1).

Data Collection

The questionnaire utilized for data collection consisted of two separate sections that were related to the elderly (the first section) and the caregiver (the second section), if any. In the section related to the elderly, the first section was associated with socio-demographic questions of the elderly (6 questions). The second part was related to questions on the health variables of the elderly, including

Table 1. Independent Variables

Human Capital Variable Related to Caregiver	Human Capital Variable Related to the Elderly	Elderly Demographic Variable	Caregiver Demographic Variable	Health Variable
- Caregiver's burden of responsibility - Usefulness of the elderly person to the caregiver - Alternative to having a caregiver - Perceived health of the caregiver - Number of times the caregiver has access to helpers - Number of times the caregiver has received help from others	- Being insured for the elderly - Having supplementary insurance - Number of areas of access to a caregiver	- Age - Gender - Residence - Sufficiency of income - Marital status - Cohabitation of the elderly with the caregiver in the caregiver's home	- Age - Gender - Marital status - Adequacy of income - Cohabitation of caregiver with the elderly person in the elderly person's home	- Inability to perform ADLs - Inability to perform ADLs with the help of devices - Cognitive disability - Number of chronic diseases

ADLs, activities of daily living.

an inability to perform ADL (6 items in the range of 0–6), an inability to perform instrumental ADL (9 items, with code 1 or 0 if having or not having a disability in the range of 0–9, respectively), and cognitive disability/brief cognitive status (10 items, with code 1 or 0 if having or not having a disability, respectively); if the total disability was 0 or 1, it was placed in the category of no disability or mild cognitive disability, and if the total disability was in the range of 2–5 or 6–10, it was placed in the category of moderate/relative or severe disability, respectively. The other health variable was the number of chronic diseases involved, according to the elderly's statements (out of 18 chronic diseases mentioned). The third part included questions associated with human capital in the elderly, including the number of access to caregivers, insurance, and supplementary insurance (8 items identified with codes 0 and 1). The fourth was related to dependent variables (response variables) in the elderly, with 3 items, including perceived happiness (on a scale from very happy [code 3] to not happy [code 1]), perceived health (from excellent [code 4] to bad [code 1]), and healthy life satisfaction (from very satisfied [code 3] to not satisfied [code 1]).

In the section associated with the caregiver, the first part was attributed to socio-demographic questions (n = 5). The second part was related to the human capital in the caregiver (perceived health of the caregiver, usefulness and usefulness of the elderly for the caregiver, caregiver burden, substitution, access to the helper, and help from the helper; n = 35). The caregiver's burden of responsibility (n = 15) was coded 0 or 1 if there was no problem or there was a problem, respectively. According to the agreement, if the total number of problems was 0–3, the caregiver was classified as having no problem or a mild problem. The caregiver was classified as having moderate, severe, or very severe problems if the total number of problems was 4–7, 8–11, or 12–15, respectively. Other items were also coded 0 and 1 according to the type of questions. The third part was associated with dependent variables in the caregiver, which consisted of 18 items regarding the number of hours of help per week, help provided in daily activities of life, and daily activities with the help of tools. The content validity method was used to determine the validity of the questionnaire. The questionnaire was prepared from the relevant thesis and translated into fluent Persian. Then, it was studied by several professors. Finally, it was revised and compiled after several revisions. To measure the reliability of this test, the test-retest method was utilized, and the correlation coefficient (0.96) was calculated. For this purpose, the relevant questionnaire was first completed for 15 elderly people and their caregivers in the form of face-to-face interviews. Next, two weeks after the initial completion of the questionnaire, the same individuals were interviewed again. Subsequently, with the help of health liaisons from each of the selected centers as interviewers, the data were collected and analyzed by the SPSS statistical program (version 22) using descriptive statistical tests and multiple case regression. The significance level in this study was considered to be 0.05.

Results

The mean (± standard deviation) age of the elderly participants in this study was 74.32 (± 7.57), of which 60% had a caregiver at home (Table 2). About 12.20% had severe cognitive impairment, 5.00% had difficulty performing 6 ADLs, and 10.60% had difficulty performing 9 ADLs with the help of tools (Table 3). Nearly 43.60%, 59.70%, and 67.22% of the elderly reported average perceived health, perceived happiness, and life satisfaction, respectively (Table 4). Approximately 56.39% of the elderly had access to a caregiver in six ADLs, and 82.99% of them were useful to their caregiver in one to five activities. Overall, 94.40% were covered by insurance, and 25.29% had supplementary insurance. In addition, 78.87% of caregivers had a substitute for themselves in providing care to the elderly. Finally, 52.06% of caregivers had access to an assistant in providing care to the elderly, and 52.06% of them assessed their health as good (Table 5).

This study examined the existence of a statistical relationship between independent variables (human capital resources, demographic variables, and health variables of the elderly and caregiver) and the number of hours of help provided per week by the caregiver to the elderly (response variable). The results revealed that human capital resource variables, including being useful to the caregiver on the part of the elderly ($P = 0.03$), having supplementary insurance ($P = 0.02$), and being insured by the elderly ($P = 0.01$), had a statistically significant relationship (equal to 0.10, 0.40 less, and 0.88 more than the average number of hours of help provided per week by

Table 2. Frequency of Demographic Characteristics of the Elderly and Caregivers

Variable	Characteristics	No. (%)
Gender of the elderly	Male	154 (42.80)
	Female	206 (58.20)
Age groups of the elderly	65-74 years	189 (52.20)
	75-84 years	134 (37.20)
	85 years and above	37 (10.30)
Marital status	Married	241 (66.90)
	Single (single, divorced, and the like)	119 (33.10)
Residence	Urban	216 (60.00)
	Rural	144 (40.00)
Adequacy of income of the elderly	Insufficient	93 (25.80
	To survive	174 (48.30)
	Enough	84 (23.30)
	Don't know	9 (2.50)
Cohabitation with a caregiver	Yes	55 (28.40)
	No	139 (71.60)
Gender of caregiver	Male	67 (34.50)
	Female	127 (65.50)
Age groups of the caregiver	20-29	13 (60.60)
	40-49	45 (23.20)
	50-59	31 (16.00)
	60-69	26 (13.40)
	70-79	30 (15.50)
	80-94	16 (8.20)
Marital status	Married	146 (75.30)
	Single (single, divorced, and the like)	48 (24.70)
Adequacy of income of caregiver	Insufficient	54 (27.80)
	To survive	99 (51.10)
	Sufficient	41 (21.10)
Cohabitation with the elderly	Yes	116 (61.10)
	No	74 (38.90)

Table 3. Frequency of Health Variables in the Elderly

Variables	Characteristics	No. (%)
Number of chronic diseases	1-5 diseases	189 (52.60)
	6-10 diseases	145 (40.20)
	11-18 diseases	26 (20.7)
Cognitive impairment	No disability-mild	204 (70.56)
	Moderate	112 (31.10)
	Severe	44 (20.12)
Impairment in ADLs	No disability	185 (51.40)
	1-5 activities	157 (43.60)
	6 activities	18 (5.00)
Impairment in instrumental ADLs	No disability	19 (5.30)
	1-8 activities	303 (84.20)
	9 activities	38 (10.60)

ADLs, activities of daily living.

Table 4. Frequency of Response Variables

Variables	Characteristics	No. (%)
Perceived health of the elderly	Excellent	23 (6.40)
	Good	110 (30.60)
	Average	157 (43.60)
	Bad	70 (19.40)
Perceived happiness of the elderly	Very happy	35 (9.70)
	Somewhat happy	215 (59.70)
	Unhappy	110 (30.60)
Satisfaction with life of the elderly	Very satisfied	58 (16.11)
	Somewhat satisfied	242 (67.22)
	Unsatisfied	60 (16.67)
Number of hours of assistance provided to the elderly per week	1-6 hours	73 (37.62)
	7-15 hours	60 (30.92)
	16-30 hours	35 (18.06)
	31-49 hours	13 (6.70)
	50-99 hours	13 (6.70)
Number of assistance provided to the elderly in ADLs	Lack of assistance	46 (23.71)
	1-5 activities	125 (64.43)
	6 activities	23 (11.86)
Number of assistance provided to the elderly in instrumental ADLs	1 activity	1 (0.52)
	2-10 activities	145 (74.74)
	11 activities	48 (24.74)

ADLs, activities of daily living.

the caregiver, respectively).

Demographic variables, including the elderly's place of residence ($P < 0.001$), the caregiver's cohabitation with the elderly ($P = 0.02$), and the caregiver's age ($P = 0.02$), had a considerable relationship (equal to 0.63, 0.41, and 0.10 more than the average number of hours of help provided per week by the caregiver, respectively). Health variables, including impairments in ADLs with the help of tools ($P = 0.04$) and elderly cognitive impairments ($P = 0.004$), were significantly related to the average number of hours of assistance provided per week by the caregiver, which was 0.08 and 0.09, respectively (Table 6).

The existence of a statistical relationship between independent variables and the number of assistance provided in daily activities of life (response variable) was examined, and the results showed that human capital resource variables had a statistically significant relationship (equal to 0.08%, 0.09%, 0.96% more, and 0.53% less than the average number of assistance provided in daily activities of life). These capital resource variables included caregiver responsibility burden ($P = 0.001$), number of areas of assistance received by the caregiver from others ($P = 0.03$), being insured ($P = 0.01$), and having supplementary insurance ($P = 0.01$). Demographic variables, including the elderly's place of residence ($P < 0.001$), demonstrated a statistically significant relationship with 0.76 more than the average number of assistance provided in daily activities. Additionally, health variables, including impairments in daily activities

Table 5. Relative and Absolute Frequency Variables of Elderly and Caregiver Human Capital Resources

Variables	Characteristics	No. (%)
Insurance of the elderly	Yes	340 (94.40)
	No	20 (5.60)
Having supplementary insurance	Yes	86 (25.29)
	No	254 (74.71)
Number of areas of access to the caregiver	Lack of access	37 (10.28)
	1-5 activities	120 (33.33)
	6 activities	203 (56.39)
Alternative to having a caregiver	Yes	41 (21.13)
	No	153 (78.87)
Caregiver's responsibility burden	No burden or-mild	88 (45.36)
	Moderate	59 (30.41)
	Severe	37 (19.07)
	Very severe	10 (5.15)
Number of areas of access to the helper	Lack of access	43 (22.17)
	1-5 areas	50 (25.77)
	6 areas	101 (52.06)
Number of areas of help received from helpers	No assistance	46 (23.71)
	1-5 areas	84(43.30)
	6 areas	64(32.99)
Usefulness of the elderly to the caregiver	Lack of usefulness	15 (7.73)
	1-5 areas	161 (82.99)
	6 areas	18 (9.28)
Perceived health of the caregiver	Excellent	4 (2.07)
	Good	101 (52.06)
	Average	70 (36.08)
	Bad	19 (9.79)

($P<0.001$) and daily activities with the help of tools ($P<0.001$), had a meaningfully significant relationship with 0.50 and 0.21 more than the average number of assistance provided in daily activities, respectively (Table 6).

The existence of a statistical relationship between independent variables and the number of assistance provided in daily activities of life with the help of tools (response variable in caregiver) underwent investigation. Based on the results, human capital resource variables, including caregiver responsibility burden, represented a noticeably significant relationship of 0.15% more than the average number of assistance provided in instrumental activities of life ($P<0.001$). Demographic variables, including the adequacy of the elderly's income ($P=0.007$) and the elderly's place of residence ($P=0.004$), had a statistically significant relationship of -0.49 less and 0.73 more than the average number of assistance provided in instrumental activities of life, respectively. Among the health variables, impairments in performing daily activities of life with the help of tools ($P<0.001$) had a considerably significant relationship of 0.55 more than the average number of assistance provided in instrumental activities of life (Table 6).

In examining the existence of a statistical relationship between independent variables and the perceived health of the elderly (response variable in the elderly), human capital resource variables, including the number of areas of access to informal caregivers by the elderly, had a statistically significant relationship of 0.13% more in the perceived health level of the elderly ($P=0.003$). Demographic variables, including the age of the elderly ($P=0.03$) and income adequacy ($P=0.02$), had a meaningfully significant relationship of 0.01% and 0.10% more in the perceived health level of the elderly, respectively. Health variables, including disability in daily activities of life ($P=0.004$) and cognitive disability of the elderly ($P=0.001$), demonstrated a considerably significant relationship of -0.10 and -0.07 lower in the perceived health level of the elderly, respectively (Table 7).

The existence of a statistical relationship between independent variables and perceived happiness of the elderly (response variable in the elderly) was studied, and the results confirmed that the human capital resource variables, including caregiver burden ($P=0.03$) and insurance of the elderly ($P=0.03$), had a statistically significant relationship of 0.02 lower and 0.41 higher in the perceived happiness level of the elderly, respectively. The demographic variable, including the coexistence of the elderly with the caregiver ($P=0.01$), had a noticeably significant relationship of 0.22 higher in the happiness level of the elderly. In addition, the health variable, including cognitive disability of the elderly ($P=0.006$), had a statistically significant relationship with the level of happiness of the elderly (Table 7).

The results related to the existence of a statistical relationship between independent variables and the elderly's satisfaction with life (response variable in the elderly) indicated that the health variable, including cognitive disability of the elderly ($P<0.001$), had a considerably significant relationship with the level of satisfaction of the elderly with life (Table 7).

Discussion

This study evaluated the relationship between human capital resources and health status with the quality of services provided by untrained caregivers to the elderly. Based on the findings, elderly people who were more beneficial to their caregivers received fewer hours of help by 0.1% of the mean number of hours per week, which could be due to the lower functional and cognitive impairments of this group of people. Because elderly people who have more physical and cognitive abilities can help their caregivers in matters other than financial matters. Further, elderly people who had supplementary insurance received less help by 0.4% of the mean hours per week. Usually, people who are financially at a higher level are covered by supplementary insurance. As a result, they can easily meet their care needs in various ways, such as hiring a nurse. However, in Yang's study, caregiver burden was a human capital resource variable that had

Table 6. Multivariate Regression (Investigating the Relationship Between Demographic Variables, Health of the Elderly and Caregiver, and Human Capital Resource Variables With Response Variables in the Caregiver)

Dependent Variables	Independent Variables (Significant Determinants)								
	Human Capital			Health Variable			Demographic Variable		
	Variable	Regression Coefficient	*P* value and Effect Size	Variable	Regression Coefficient	*P* value and Effect Size	Variable	Regression Coefficient	*P* value and Effect Size
Number of hours of assistance provided to the elderly per week	Usefulness of the elderly person to the caregiver	-0.10	0.03 & 0.05	Impairment in IADLs	0.08	0.04&0.17	Elderly place of residence (urban)	0.63	<0.0001 &0.06
	Being insured for the elderly	0.88	0.01& 0.02	Cognitive impairment	0.09	0.004& 0.24	Cohabitation of caregiver with the elderly	0.41	0.02 & 0.69
	Having supplementary insurance	-0.41	0.02 & 0.08	NS	NS	NS	Caregiver age	0.10	0.02 & 0.07
	Caregiver's burden	0.08	0.001& 0.31	Impairment in ADLs	0.50	<0.0001 & 0.60	Elderly place of residence (urban)	0.76	<0.0001 & 0.10
Number of assistance provided to the elderly in ADLs	Number of times the caregiver has received help from others	0.09	0.03 & 0.20	Impairment in IADLs	0.21	<0.0001 & 0.44	NS	NS	NS
	Being insured for the elderly	0.96	0.01 & 0.03	NS	NS	NS	NS	NS	NS
	Having supplementary insurance	-0.53	0.01 & 0.03	NS	NS	NS	NS	NS	NS
Number of assistance provided to the elderly in IADLs	Caregiver's burden	0.15	<0.0001 & 0.29	Impairment in IADLs	0.55	<0.0001 & 0.51	Sufficiency of income for elderly	-0.49	0.007 & 0.18
	NS	NS	NS	NS	NS	NS	Elderly place of residence (urban)	0.73	0.004 & 0.29

Note. IADLs, instrumental activities of daily living; ADLs, activities of daily living.

Table 7. Multivariable Regression (Investigating the Relationship Between Demographic Variables, Health of the Elderly and Caregivers, and Variables of Human Capital Resources With Response Variables in the Elderly)

Dependent Variables	Independent Variables (Significant Determinants)								
	Human Capital			Health Variable			Demographic Variable		
	Variable	Regression Coefficient	*P*-value and Effect Size	Variable	Regression Coefficient	*P*-value and Effect Size	Variable	Regression Coefficient	*P*-value and Effect Size
Perceived health of the elderly	Number of areas of access to a caregiver	0.13	0.003 & 0.03	Impairment in ADLs	-0.10	0.004 & 0.26	Elderly age	0.01	0.03 & 0.10
	NS	NS	NS	Cognitive impairment	-0.07	0.001 & 0.26	Sufficiency of income for elderly	0.10	0.02 & 0.03
Perceived happiness of the elderly	Caregiver's burden	-0.02	0.03 & 0.07	Cognitive impairment	-0.04	0.006 & 0.11	Cohabitation of elderly with the caregiver	0.22	0.01 & 0.01
	Being insured for the elderly	0.41	0.03 & 0.04	NS	NS	NS	NS	NS	NS
Satisfaction with life of the elderly	NS	NS	NS	Cognitive impairment	0.07	<0.0001 & 0.08	NS	NS	NS

Note. ADLs, activities of daily living.

a statistically significant relationship with the number of hours of assistance provided (22).

The results of the study demonstrated that the impairment in instrumental activities and cognitive impairment of the elderly in life caused them to receive more assistance during the week. Considering that cognitive impairment could have a great impact on the functional impairment of the elderly, they would also require extensive care from the caregiver. In the present study, the cohabitation of the elderly with the caregiver also had a positive statistical relationship with the response variable because the caregiver spent more time with the elderly, and it was possible to provide assistance whenever the elderly asked for help, which is in line with the results of the study performed by Yang (22).

The place of residence and the age of the caregiver were also effective in receiving more hours of assistance per week. This is because older people living in urban areas are more likely to become disabled or disabled earlier due to their lifestyle, which can lead to more sedentary lifestyles

than older people living in rural areas and, therefore, require more care from caregivers. As caregivers age, they are more likely to be retired and have more free time than younger caregivers, which can affect the length of time they provide care. However, the results of Taylor's study revealed that male caregivers spent fewer hours per week providing care on average and were more likely to provide more care (40 hours or more) to people aged 65 and older (23).

In the study of Yang (22), impairment in performing daily activities and instrumental living was significantly related to the response variable (assistance provided in daily activities), which conforms to the results of the present study. The results of Godwin's study also showed that parents were more likely to receive care from their children if they had more severe disabilities (24).

In the present study, the burden of responsibility and the number of areas of assistance received by the caregiver from others increased the assistance provided in daily activities to the elderly by 0.08% and 0.09% of the average number of assistance, respectively. In fact, caregivers who provided more assistance in daily activities had an increased burden of responsibility, which could be due to the greater functional impairment of the elderly under their care. Based on our findings, the elderly who were insured received 0.96% more help in daily activities than the average, while the elderly who had supplementary insurance received 0.53% less help in daily activities than the average. This difference can be explained by the fact that the elderly who have supplementary insurance in addition to regular insurance may be at a higher social and economic level. Therefore, these individuals may be less dependent on others for help in daily activities.

In this study, the burden of responsibility and the number of areas of help received by the caregiver from others had a significant positive relationship with the help provided to the elderly in daily activities, which is in line with the results obtained from the study of Yang (22). In fact, caregivers who provided more assistance with daily activities had an increased burden of responsibility, which could be due to the greater functional impairment of the elderly under their care.

According to the results of the present study, impairments in instrumental activities and caregiver burden had a significant relationship with the assistance received in instrumental activities, which matches the results of the study by Yang (22). As the elderly's disability in instrumental activities increased, the amount of assistance received from the caregiver was greater, which could have had a direct impact on the caregiver's burden. However, in the study performed by Gaugler and Kane, it was shown that families living with the elderly provided them with a large amount of instrumental assistance (25).

Our results revealed that the number of areas of access for the elderly to the caregiver increased the perceived health of the elderly by 0.13% of the health level. It is likely that the elderly who had access to a caregiver in all areas of need for assistance could more easily solve their problems; as a result, it was possible that they were not too concerned about their health issues.

In the present study, cognitive impairment and impairment in daily activities caused the elderly to have a poorer perception of their health because these people had more disability and, as a result, more limitations in their lives. In Yang's study, impairment in daily activities also led to a poorer perception of health (22). In our study, the adequacy of the elderly's income had an effect on their perceived health. This is natural because these people have more access to health and medical services and care, and thus, it can have a direct relationship with their health.

However, in the study conducted by Yang, there was a positive relationship between the perceived health of the elderly and the income of the caregivers (22). The caregivers who had higher incomes also reported that they perceived health better in the elderly under their care.

Age was another variable that had an effect on the perceived health of the elderly. It is possible that with increasing age, the meaning of life and surrounding events change, resulting in a different perception of health, which is in line with the results of Yang's study (22). On the other hand, in this study, the results confirmed that the burden of responsibility of the caregiver had a negative relationship with the perceived happiness of the elderly. In other words, when the burden of responsibility reported by the caregiver was greater, the perceived happiness of the elderly was in a more unfavorable state by 0.02% of the happiness level, which is in line with the results of Yang (22). In this study, the elderly's insurance was one of the effective factors in increasing the perceived happiness level by 0.41% of the happiness level. This is because being insured can create a sense of confidence in the elderly so that in cases of possible health problems, they can partially afford their treatment expenses. Therefore, the insurance of the elderly, considering the economic conditions and other issues related to this period, can be one of the factors affecting the perceived happiness of the elderly. In the present study, a cognitive disability could affect the perceived happiness of the elderly. In fact, the elderly who had more severe cognitive disability felt less happy, one of the reasons for which could be their incorrect perception of the surrounding events due to cognitive problems. It was also shown that the cohabitation of the elderly with the caregiver in the caregiver's home caused the elderly to perceive greater happiness, which may have been due to freedom from loneliness, thus leading to greater happiness for these people, which contradicts the results of Yang's study (22).

In our study, cognitive disability was one of the factors influencing the satisfaction of the elderly. As cognitive disability increased, their perceived satisfaction with life was also in a more unfavorable state because as the level of cognitive disability of the elderly increased, there was a possibility that the disability in other functions was also greater. Moreover, the issue of cognitive disability itself

could affect their correct understanding of the reality of life and, consequently, their satisfaction with life.

A comparison between the results of the present study and those of Yang's study demonstrated that human capital resource variables played a greater role in the quality of life (perceived health, perceived happiness, and life satisfaction) in his study. Among the human capital resource variables, caregiver burden consistently had a significant relationship with the intended response variables. In addition, caregiver burden increased the quantity of care (providing more hours of help and more help in daily and instrumental activities). However, it had a negative relationship with the quality of life and caused a weaker perception of health, happiness, and life satisfaction (22).

However, in the present study, human capital resource variables had a greater effect on the quantity of care than on the quality of life. Demographic and health variables had a more noticeable impact on the quality of life of the elderly (perceived health, perceived happiness, and life satisfaction). Further, among the human capital resource variables, the burden of responsibility of the caregiver and the insurance of the elderly had a more effective role in response variables. The burden of responsibility of the caregiver, as in Yang's study, increased the amount of care, while it had a negative relationship with the quality of life. Nonetheless, the insurance of the elderly increased the amount of care and had a positive effect on the quality of life.

One of the limitations of the present study was the time-consuming nature of the interview with the elderly and their caregiver, given that the large volume of questions in the questionnaire could have caused boredom in the elderly or caregiver since it examined different dimensions. Furthermore, considering that the interview with the elderly and the caregiver was conducted at the door of the elderly's home, the presence of the caregiver and the elderly at the same time at home may have had an impact on the way they answered the relevant questions.

The lack of similar studies conducted domestically and internationally was another limitation, which made it impossible for us to properly compare the results of this study with those of similar studies.

Conclusion

Overall, a significant relationship was found between the human capital variables of the elderly and caregiver and the quantity of services received by the caregiver. The related human capital variables included the caregiver's burden of responsibility, usefulness of the elderly person to the caregiver, alternative to having a caregiver, perceived health of the caregiver for the caregiver and being insured for the elderly, having supplementary insurance, and number of areas of access to a caregiver. In other words, the caregiver feels less burdened with responsibility, and as a result, the quantity of care when the elderly have more human capital resources (e.g., better financial status to help their caregiver, insurance and supplementary insurance, and the like). Subsequently, the feeling of satisfaction in the elderly and their caregiver is more effective. In summary, human capital resource variables have the greatest impact on the quantity of care, and demographic and health variables have the greatest impact on the quality of life of the elderly. It should be mentioned that there is an increase in the elderly population and life expectancy in society. However, there is a decrease in the number of informal (family) caregivers due to changes in family structure, the decrease in the number of children, women working outside the home, apartment living, and the like. Accordingly, basic and infrastructural measures should be taken for designing and implementing support programs for the elderly and their families, who are considered primary caregivers. If this important matter is ignored, it will impose severe harm (mental, emotional, physical, and the like) on the elderly and their family caregivers. Therefore, proper planning should be used to help this period pass properly, so that by preserving the dignity and high status of the elderly, these loved ones can continue their lives in their original place (with their families) without causing any suffering or discomfort and imposing care pressure on family members. By developing expert programs to better preserve the independence of the elderly in their life affairs and minimize the burden of responsibility of caregivers, both groups can bring greater satisfaction to each other by preserving family honor and values. This is because any policy and planning for elderly issues, if implemented in the family framework, can have the greatest results in terms of the quantity and quality of care and satisfaction of the elderly at the lowest cost.

Acknowledgments

The authors express their gratitude to all the officials of Mazandaran University of Medical Sciences and the elders who participated in this study.

Authors' Contribution

FKH-D has contributed to the conception, design, data analysis, and manuscript preparation. In addition, ZM participated in the design, manuscript preparation, manuscript editing, and review. Further, JY-CH analyzed the data and prepared the first draft. All authors read and approved the final manuscript.

Competing Interests

This article has no conflict of interests.

Ethical Approval

This study was approved by the Research Ethics Committee of Mazandaran University of Medical Sciences (with ethical code IR.MAZUMS.REC. 94-515).

Funding

This study was performed with the financial support of Mazandaran University of Medical Sciences.

References

1. Hurjui I, Hurjui CM. Population aging and the influence on healthcare spending. Rom J Leg Med. 2018;26(4):453-6. doi: 10.4323/rjlm.2018.453.
2. McMaughan DJ, Oloruntoba O, Smith ML. Socioeconomic

status and access to healthcare: interrelated drivers for healthy aging. Front Public Health. 2020;8:231. doi: 10.3389/fpubh.2020.00231.
3. Yavari K, Basakha M, Sadeghi H, Naseri A. Economic aspects of ageing. Iran J Ageing. 2015;10(1):92-105. [Persian].
4. Saffarinia M, Dortaj A. Effect of group logotherapy on life expectancy and mental and social wellbeing of the female elderly residents of nursing homes in Dubai. Iran J Ageing. 2018;12(4):482-93. doi: 10.21859/sija.12.4.482. [Persian].
5. Koohestani HR, Baghcheghi N. Burn out in caregivers of patients with stroke and its related factors. Hakim Journal. 2012;14(4):242-8. [Persian].
6. Griffiths AW, Wood AM, Tai S. The prospective role of defeat and entrapment in caregiver burden and depression amongst formal caregivers. Pers Individ Dif. 2018;120:24-31. doi: 10.1016/j.paid.2017.08.026.
7. Shahrestanaki M, Alaee N, Heravi Karimooi M, Zaeri F. The burden of caring for family caregivers of the elderly with chronic diseases in Tehran, 1398. J Geriatr Nurs. 2018;5(1):28-40. [Persian].
8. Bachner YG. Preliminary assessment of the psychometric properties of the abridged Arabic version of the Zarit Burden Interview among caregivers of cancer patients. Eur J Oncol Nurs. 2013;17(5):657-60. doi: 10.1016/j.ejon.2013.06.005.
9. Almasi M, Koosheshi M, Mahmoudian H, Torabi F. Care pressure arising from caring for elderly parents among single girls in Ilam. J Ilam Univ Med Sci. 2023;30(6):73-82. doi: 10.52547/sjimu.30.6.73. [Persian].
10. Rajabi M, Bastami M, Shahvaroughi Farahani N, Tavanaie AH, Ghanbari B, Alasti H. Religious coping as a predictor of the burden of care in the caregivers of end-stage cancer patients. Iran Journal of Nursing. 2018;31(114):6-16. doi: 10.29252/ijn.31.114.6. [Persian].
11. Tajvidi M, Dalvandi A, Sahaf R, Rahgozar M. Relationship between general health and demographic characteristics of family caregivers of stroke survivors. Iran J Ageing. 2018;12(4):494-505. doi: 10.21859/sija.12.4.494. [Persian].
12. Bloom DE, Sousa-Poza A. Human capital and aging: introduction. J Econ Ageing. 2016;7:61-3. doi: 10.1016/j.jeoa.2016.04.003.
13. Geppert C, Ludwig A. Risky Human Capital, Aging, the Equity Premium, and Welfare. Mimeo; 2015.
14. Larsen PD. Geroscience: the intersection of basic aging biology, chronic disease, and health. Rehabil Nurs. 2019;44(4):187-8. doi: 10.1097/rnj.0000000000000231.
15. Valieiny N, Poorcheraghi H, Pashaeypoor S. Nursing interventions in prevention of fall in older adults; an Integrated review study. J Gerontol. 2022;6(4):14-27. [Persian].
16. Sheikhy-Chaman M, Danaei N, Saniee N. Education and distribution of human capital in the health system. Zanko J Med Sci. 2022;22(75):1-4. [Persian].
17. Goldin C. Human capital. In: Diebolt C, Haupert M, eds. Handbook of Cliometrics. Heidelberg: Springer; 2016. p. 1-40.
18. Benos N, Zotou S. Education and economic growth: a meta-regression analysis. World Dev. 2014;64:669-89. doi: 10.1016/j.worlddev.2014.06.034.
19. Philipov D, Goujon A, Di Giulio P. Ageing dynamics of a human-capital-specific population: a demographic perspective. Demogr Res. 2014;31:1311-36. doi: 10.4054/DemRes.2014.31.44.
20. Mui AC. Productive ageing in China: a human capital perspective. China J Soc Work. 2010;3(2-3):111-23. doi: 10.1080/17525098.2010.492634.
21. Čiutienė R, Railaitė R. A development of human capital in the context of an aging population. Procedia Soc Behav Sci. 2015;213:753-7. doi: 10.1016/j.sbspro.2015.11.463.
22. Yang P. A Pro-Active Approach to Conceptualize the Informal Caregiving Process and Outcomes: An Application of Human Capital Theory [dissertation]. Columbia University; 1997.
23. Taylor CS. Older men's experience of informal caregiving [dissertation]. The University of North Carolina at Greensboro (UNCG); 2010.
24. Godwin JW. Elderly Parents' Expectations and Realizations of Informal Care from Adult Children: An Economic Perspective [dissertation]. College Park: University of Maryland; 2004.
25. Gaugler JE, Kane RL. Families and assisted living. Gerontologist. 2007;47(Suppl 1):83-99. doi: 10.1093/geront/47.Supplement_1.83.