

The Isfahan Comprehensive Elderly Study: Objectives, research design, methodology, and preliminary results

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Background: This paper presents the objectives, research design, methodology, and primary findings of the Isfahan Comprehensive Elderly Study (ICES). **Materials and Methods:** In this cross-sectional study, 603 elderly persons (aged 60 and over) were selected by multistage cluster sampling method from Isfahan, Iran, in 2016 comprehensive questionnaires along with a detailed interview were used to collect information on personal, family, socioeconomic, health and social services characteristics, life styles, physical illnesses and chronic diseases, mental, emotional and cognition disorders, quality of life, disabilities, sleep quality, social supports, life satisfaction, self-efficacy, and of participants. **Results:** The mean \pm standard deviation (SD) age of participants was 69.66 ± 6.31 years, consisting of 50.75% females. About 23% of elderly persons were at the risk of malnutrition and 4.5% were current smoker. Severe and mild depression were documented in 9.3% and 30.2% among included study subjects, respectively. About half of the participants had hypertension, and 26.8% suffered from cardiovascular disease. The mean \pm SD of total score of Geriatric Depression Scale, Perceived Stress Scale, Older People's Quality of Life, Physical Activity Scale for the Elderly and Pittsburg Sleep Quality Index was 8.84 ± 6.79 , 14.76 ± 5.92 , 133.99 ± 10.55 , 142.04 ± 120.53 , and 6.17 ± 3.44 , respectively. Elderly males had significantly higher life satisfaction and self-efficacy and better cognitive function than females ($P < 0.01$). **Conclusion:** The findings of current study provided a comprehensive overview of the current health status and lifestyle of older adults in Isfahan city. The ICES could help policy makers to design appropriate prevention and interventional programs and policies to cover the specific needs of the elderly population.

Key words: Disabilities, elderly, Isfahan, life styles, memory and cognitive impairment, methodology, physical and mental illnesses, quality of life

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INTRODUCTION

The world's population is aging rapidly as a result of both longer life expectancy and declining fertility rates.^[1] According to the World Health Organization report, the proportion of the world's population over 60 years will nearly double from 12% to 22% (2 billion people), between 2015 and 2050.^[2] Such as other countries in the world, Iran's elderly population is also growing. In 2016, nearly 9.1% of

Iranians were aged over 60 years, and it is expected to increase to 10% until 2020.^[3,4]

The gradual accumulation of molecular and cellular damage over time leads to aging with a gradual decrease in physical and mental capacity, an increased risk of multiple diseases at the same time (known as multimorbidity), and ultimately, death.^[5-8] Due to these changes, most elderly peoples need significant help from their family and suffer from age-related disabilities and impairments which not only significantly reduce

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well-being and quality of life and but also increase health-care costs.^[6,9] Many changes in physical and mental functioning and related problems are strongly influenced by the behaviors and environment of the individual,^[6] so they can be prevented or delayed with making healthy behaviors. For instance, good nutrition and physical activity have a lot of benefits for health body and well-being in the aging period. On the other hand, early detection is an effective approach for prohibiting these problems.^[6] For example, the early detection of mental illnesses such as mild cognitive impairment is one of the most important steps in the prevention and treatment of dementia and depression in the aging period.^[10]

Several studies have been conducted to assess health status in Iranian elderly population, but they focused separately only on specific aspects of aging such as depression,^[11-14] Alzheimer and dementia,^[15,16] quality of life,^[17-20] sleep quality,^[21-23] chronic diseases,^[24-29] lifestyles (physical activity and nutrition),^[30-33] and social support.^[34] Although the proportion of Iran's elderly population is lower compared to most countries, the necessity for a comprehensive survey of health status of the older persons is fully recognized to help health providers to design appropriate programs and policies to cover the specific needs of the elderly population.^[35] This paper presents the objectives, research design, methodology, and primary findings of the Isfahan Comprehensive Elderly Study (ICES) as one of the studies that comprehensively investigated different aspects of aging in the form of single survey in Iran. The ICES framework focuses on evaluating different dimensions of health status of older peoples, including personal, family, socioeconomic, health and social services, lifestyles (e.g., physical activity, nutrition, and life-space mobility), physical illnesses and chronic diseases (e.g., hypertension, cardiovascular, diabetic, osteoporosis, and arthritis), mental, emotional and cognition disorders (e.g., depression, anxiety, Alzheimer, memory, and cognitive impairment), quality of life, disabilities, sleep quality, social supports, life satisfaction, and self-efficacy because we believed that any health status assessment for elderly population should take all these dimensions into consideration.

Objectives

The objectives of ICES were:

- To present a comprehensive profile of sociodemo and economic status of Isfahan elderly population (e.g., personal, family, social, health services, history of smoking, history of taking certain medications, and preventive cares)
- To determine the prevalence of mental, emotional, and cognition disorders (e.g., depression, anxiety, stress, Alzheimer, cognitive impairment, and sleep disorders) in the Isfahan elderly population
- To determine the prevalence of physical illnesses and chronic diseases (e.g., hypertension, cardiovascular,

diabetic, osteoporosis, arthritis, and vision problems) in the Isfahan elderly population

- To identify different determinants of mental, emotional, and cognition disorders in the Isfahan elderly population
- To identify different determinants of physical illnesses in the Isfahan elderly population
- To identify factors associated with quality of life in the Isfahan elderly population
- To classify the studied elderly population in terms of different outcomes such as mental illnesses and quality of life
- To provide insights regarding to implement of health promotion and prevention intervention strategies for both of illnesses in the aging period.

MATERIALS AND METHODS/DESIGN

Study design and participants' recruitment

This population-based cross-sectional study was conducted on 603 elderly persons (aged 60 and over) living in Isfahan, Iran, in 2016. The samples were selected from urban health centers of Isfahan through multistage cluster sampling, among elderly people who had medical records in the centers. First, the health centers as first-stage clusters were chosen from Isfahan health centers I and II (two main clusters). Isfahan health center I covers 23 urban health centers including approximately 20778 elderly persons medical records, and Isfahan health center II covers 22 urban health centers with nearly 16750 medical records on older adults. We selected randomly 8 and 6 urban health centers as the second-stage cluster from Isfahan health center I and II, respectively. Next, in each selected center, a list of all persons aged 60 and over was prepared, and then, among them individuals who lived with their spouse, were identified. Totally, 1008 elderly couples, that capture our inclusion criteria, were identified. In the next stage, we contacted to all the selected households through phone, and explained the purposes of study, then invited them to participate in our study. Finally, 603 elderly persons (including 278 couples and 47 individual) by considering the relevant inclusion and exclusion criteria agreed to participate in the study. Inclusion criteria were as follows: having over than 60-year-old, living with his/her elderly spouse and feeding by mouth. Excluding criteria were as follows: stay in nursing homes, hospitalization during the last 3 months, history of major surgery, amputation, and existing major problems of cognitive at the time of interview. Those people who agreed to participate in our study were invited to attend in a structured interview by trained interviewers in health centers. All participants received enough information about the study and also provided written informed consent. The confidentiality of all obtained information was administered carefully by researchers of the ICES. The design of the ICES was

approved by Ethics Committee of Isfahan University of Medical Sciences (Project Number: 394832).

Study instruments

The Geriatric Anxiety Scale

The Geriatric Anxiety Scale (GAS) was used to assess current anxiety in older persons. It consisted of 25 items based on the 4-point Likert scale (range: From 0 (not at all) to 3 (all of the time)). The GAS comprises three components "somatic, cognitive, and affective symptoms," with 8–9 items for each of them. The sum of the total components scores yields one score with the range of 0 through 75 while higher scores represent greater anxiety.^[36] This scale was validated in Iranian older adults and showed good construct validity, high test-retest, and inter-rater reliability (Cronbach's $\alpha = 0.92$).^[37]

The Geriatric Depression Scale

Depression was measured by the Yesavage Geriatric Depression Scale (GDS). It consisted of 30 yes or no questions which divided participants into three subgroups: Without depression (score range: 0–9), moderately depressed (score range: 10–19), and severely depressed (score range: 20 and more).^[38] This scale was translated into Persian and validated in 380 Iranian older adults. The reliability and internal consistency were calculated 0.75 and 0.77, respectively, using Cronbach's alpha and Spearman split test, respectively.^[39]

The Perceived Stress Scale

The Perceived Stress Scale-10 Item was used to measure subjective stress of participants. Respondents could indicate how much they had experienced or perceived stress during the recent month of his/her life, based on a 5-point Likert scale (range: From 0 [never] to 4 [very often]).^[40] Scale scores range from 0 to 40 by reverse scoring four positively-worded items (4, 5, 7, and 8) and summing all item scores, while higher scores indicate higher levels of stress. This scale was validated and translated into Persian by Maroufizadeh *et al.*, with acceptable reliability coefficient of 0.80.^[41]

The activities of daily living and instrumental activities of daily living

In the ICES study, measures of functional disability included the activities of daily living (ADL), which established by Katz *et al.*, and instrumental ADL (IADL), which introduced by Lawton and Brody. The ADL consisted of 7 items (eating, dressing, walking, grooming, bathing or showering, transferring [getting in and out of bed], and toileting) and the IADL consisted of 9 items (telephoning, traveling through car or public transportation, shopping, preparing meals, doing housework, doing laundry, doing minor repairs at home, taking medicines, and managing money). For each item, the interview asked whether the participant is "independent," "dependent" or "needs help" to perform the

task and based on a sum score of all items, participants were classified into three subgroups: "Dependent," "moderately dependent," and "independent."^[42]

Older People's Quality of Life

Older People's Quality of Life (OPQOL) was used to assess the quality of life. It consisted of 33 items over eight dimensions including: "life overall," "health," "social relationships," "independence, control over life, and freedom," "home and neighborhood," "psychological and emotional well-being," "financial circumstances," "leisure and social activities." Each item is based on 5-point Likert scale ("strongly disagree [1]," "disagree [2]," "neither agree nor disagree [3]," "agree [4]," and "strongly agree [5]). Total OPQOL score ranges from 33 to 165 while higher scores indicate higher quality of life. This instrument has been validated in several older adult population with appropriate validity and reliability.^[43,44]

Physical Activity Scale for the Elderly

In the ICES survey, physical activity of older adults was measured through the Physical Activity Scale for the Elderly (PASE).^[45] The PASE is a self-administered questionnaire that evaluates the physical activity of the past 7 days in three life domains: recreational (e.g., walking outside the home), household (e.g., home repairs), and work-related activities. Scoring for each activity is based on multiplying an activity frequency value by a task-specific weight. The sum of all activities together shows the PASE total score and ranges between 0 and 400 or more^[46] while higher scores mean higher physical activity. PASE has been validated in several older adult populations,^[47] and it has shown to have appropriate test-retest reliability (intraclass correlation [ICC] = 0.89) and good validity ($r = 0.68$).^[47,48]

Pittsburgh Sleep Quality Index

The Pittsburgh Sleep Quality Index (PSQI) was used to assess self-reported sleep quality over 1 month.^[49] The PSQI consisted of 19 items with 7 components (each from 0 [no difficulty] to 3 [severe difficulty] points) including subjective sleep quality, latency, sleep duration, efficiency, sleep disturbance, use of sleep medications, and daytime dysfunction. The total sleep quality score (range from 0 to 21) was computed by summing up the scores of the seven components while higher scores indicate poorer sleep quality. The PSQI scores more than 5 represent poor sleep quality.^[49] The validity and reliability of PSQI were previously evaluated.^[50] It is validated by Farrahi Moghaddam *et al.* (Cronbach's $\alpha = 0.77$) in Iran.^[50]

Insomnia Severity Index

To measure the participant's perception of his/her insomnia, the Insomnia Severity Index (ISI) was used. The ISI is a brief self-report instrument, which includes seven items (each from 0 to 4 points). The total score ranges from

0 to 28 while higher score indicate more severe insomnia. It is a validated instrument with acceptable the internal consistency reliability (Cronbach's $\alpha = 0.83$).^[51]

Social Support Appraisals

In current study, the Social Support Appraisal (SSA) scale was used to measure social support of elderly persons.^[52] The SSA is a 23-item instrument with 18 positively worded items (e.g., my family really respects me) and five negatively worded items (e.g., I don't feel close to members of my family). The SSA includes three dimensions: "family (8 items), friends (7 items), and others (8 items); which the sum of the dimensions scores yields SSA total score. It is demonstrated that the SSA is a valid measure for appraising social support (consistency coefficient: 0.89 [SSA total]).^[53] According to the results of Ebrahimi Ghavam's study, this instrument has good internal stability with Cronbach's $\alpha = 0.90$ for overall social support.^[53]

Mini Nutritional Assessment

Nutritional status of participants was assessed using the Mini Nutritional Assessment (MNA) test.^[54] In the present study, a MNA short form (MNA-SF) was used which consisted of six items for different dimensions including eating problems, weight loss, mobility, acute illness or stress, neuropsychological problems, and body mass index (BMI). The total score of MNA-SF ranges from 0 to 14 points. Participants who received 11 or fewer scores were classified as malnourished or at risk of it.^[55] This instrument has high sensitivity and validity for elderly population.^[54]

The Multifactorial Memory Questionnaire

The Multifactorial Memory Questionnaire (MMQ) was used to assess subjective memory complaint of participants during the previous 2 weeks. The MMQ has three dimensions including contentment, ability, and strategy. The contentment scale contains 18 items on a 5-point Likert scale which address positive emotions, negative emotions, and subjective ability ratings. For each item, 0–4 points are scored based on the level of agreement such that higher scores represent a greater level of contentment. The ability subscale includes 20 items that address the frequency of forgetting phone numbers, appointments, and names based on a 5-point Likert scale (all of the time [0], often [1], sometimes [2], rarely [3], never [4]); while higher scores represent fewer memory mistakes. The strategy subscale contains 19 items, which address strategies such as using diaries and timers and repeating information to oneself, based on a 5-point Likert scale while higher scores indicate more frequent use of memory strategies.^[56]

Life Satisfaction Index

Life Satisfaction Index (LSI), which developed by Wood *et al.*,^[57] was used to measure life satisfaction of participants. The LSI-Z consisted of 13 items asking about subjective feeling as "agree (2 points), disagree (0 point), and do not

know (1 point)." The total scores range from 0 to 26 while higher scores represent greater life satisfaction. It has acceptable validity and reliability (Cronbach's $\alpha = 0.79$).^[57]

General Self-efficacy Scale

General Self-efficacy Scale (GSE-10) was used to measure perceived self-efficacy of participants.^[58] GSE has 10 items based on a 4-point scale (not at all true [1], hardly true [2], moderately true [3], exactly true [4]).^[58] The responses to the 10 items have to be summed up to yield the total score ranging from 10 to 40.^[58] The validity and reliability of GSE have been reported in some studies with the Cronbach's alphas between 0.76 and 0.90.^[58] Ellie Nezami *et al.* in 1996 adapted the Persian version of GSE.

Stressful life events

In the ICES survey, the stressful life events were based on reported items in the Tsolaki *et al.*'s study.^[59] We considered 13 stressful events as "yes or no" question, including "spouse death," "parents' death," "death of son, daughter, grandchild," "death of sibling and other beloved persons," "surgical intervention – serious health problems," "illness of spouse, parents, son, daughter, grandparents," "problems within the family, stressful situations," "financial difficulties, professional problems," "retirement, loneliness," "change in familiar environment," "road accident," "stroke," and "traumatic brain injury."

Mini-Mental State Examination

In the ICES survey, the cognitive status of participants was evaluated using the Mini-Mental State Examination (MMSE) test. MMSE consisted of seven aspects of cognition including time orientation, place orientation, registration, attention and calculation, recall, language and repetition, and complex commands. The maximum possible score is thirty that it indicates no cognitive problem; however, the scores <20 show that the cognitive disabilities are deeper. In addition, the scores between 20 and 25 represent that the existence of cognitive trauma is trivial.^[60] The Persian style of MMSE showed appropriate reliability (Cronbach's $\alpha = 0.81$).^[61]

Life Space Assessment

Life Space Assessment was used to assess life-space mobility of participants. It consisted of five main levels of questions over the past 4 weeks. For instance, have you been to other rooms in your home besides the room where you sleep? For each level, participants were asked how many days during the week they stayed to that level and whether they used special devices or had help from another person to go to that level. A total score obtained by multiplying the life-space level (1–5), degree of independence in achieving each level (independent [2]; if equipment was used (1.5); if personal assistance was reported [1]), and the frequency of going in each level (less than once a week [1]; 1–3 times a week [2]; 4–6 times a week [3]; and daily [4]).^[62] Finally, the level-specific scores are

summed to obtain a score ranging from 0 to 120 while higher scores indicate greater mobility.^[62] A previous study showed acceptable test-retest reliability (ICC coefficient of 0.96).^[63]

Assessment of sociodemographic and anthropometric variables

Comprehensive questionnaires were used to collect information about sociodemographic (e.g., age, sex, level of education, job, type of house,...), personal, family, health services, history of smoking, and health-related characteristics such as history of physical and mental illnesses (e.g., hypertension, cardiovascular, diabetic, osteoporosis, hyperlipidemia, arthritis, cancer, depression,...), history of taking certain medications, and preventive cares.

In the health centers, trained health professionals measured anthropometric indices including height, weight, and mid-arm circumference. Height was measured without shoes to the nearest 0.1 cm using a tape meter against a wall. Weight was measured to the nearest 0.1 kg on an electronic scale which was placed on a flat ground and elderly persons wearing light clothing and standing motionless. The mid-arm circumference was measured to the nearest 0.1 cm with a tape meter. BMI was calculated by dividing the weight in kilograms by height in meters squared.

Data collection, entry, handling and quality assurance

The process of interviews was monitored continuously by ICES directors over the data collection period (4 months). The validity of the data was examined in different stages. A project director (ZH) verified weekly 5%–10% of the questionnaires to ensure the data accuracy. After that, to increase the data quality, ZH entered the data into the electronic sheets using the computerized process (1 month). Then, she rechecked the computerized data to confirm that subjects meet inclusion and exclusion criteria and to identify missing values and outlier items. Then, scores of total scale and subscales were calculated based on the valid instructions of each questionnaire. In addition, new variables were established from main variables based on the objectives of ICES. The duration of data handling was lasted nearly 1 month. AF as principle instigator (PI), supervisor of PhD thesis, supervised the process and verified the quality of data handling and variables construction.

Statistical analysis

In this paper, quantitative and qualitative variables were expressed as mean \pm standard deviation (SD) (or median [range], as appropriate), and number (percent), respectively. Independent Student's *t*-test was used to compare quantitative variables across sexes. Distribution of study participants in the term of categorical variables was compared between males and females using the Chi-square test. Data analyses were performed using Statistical Package for Social Sciences version 21 (SPSS Inc., Chicago, IL, USA). $P < 0.05$ was considered statistically significant.

Plan for future data analysis

According to objectives of the ICES project, various statistical methods such as independent Student's *t*-test, Chi-square test, analysis of variance, analysis of covariance, correlation analysis, univariate and multivariate linear regression, logistic regression analysis, factor analysis, latent class analysis, and mixture factor models will be used for the future data analysis. On the other hand, the collected data in ICES project have a hierarchical (multilevel) structure so that elderly couples are considered as the level 1 unit which nested within households, as the level 2 units. Considering the multilevel structure of data, sophisticated multilevel analyses such as random effects models, multilevel latent class model, multilevel mixture factors model, and multilevel structural equation modeling are applicable in the future data analysis.

PRELIMINARY RESULTS

A total of 603 elderly persons (aged 60 and over) participated in the ICES survey. Table 1 shows the distribution of the main personal, sociodemographic, and health-related characteristics by gender. Mean age \pm SD of the participants was 69.66 ± 6.31 years (males: 73.18 ± 5.77 , females: 66.18 ± 4.69 ; $P < 0.0001$) and 50.75% were female gender. 21.3% of participants (males: 17.2%, females: 25.2%; $P < 0.001$) were actually illiterate, moreover 14.1% of participants also should be considered as approximately illiterate because they had ability of reading and writing without completing primary school. Income status distribution had not significant difference between males and females ($P = 0.86$), but only 4.2% of participants had adequate income. 55.7% of participants were living with his/her spouse, and 41.6% were sharing the household with his/her spouse and unmarried children. Only, 7.3% of elderly persons were currently employed. There was a significant difference between males and females in the term of smoking status ($P < 0.0001$), but only, 4.5% of elderly persons were current smoker. The mean \pm SD of BMI was 25.83 ± 3.3 kg/m² for males and 28.19 ± 4.2 kg/m² for females ($P < 0.0001$). According to MNA, 2% of elderly persons suffered from malnutrition, and 23.4% were at the risk of malnutrition. Approximately 11% (males: 6.8%, females: 15%; $P < 0.001$) of participants reported that they suffer from depression, but based on GDS instrument, 9.3% and 30.2% of elderly persons had severe and mild depression, respectively. In addition, the anxiety and sleep disorders were detected among 19% and 22.2% of participants, respectively. About half of participants had hypertension (males: 48.6%, females = 57.2%, $P = 0.036$), and 26.8% suffered from cardiovascular disease [Table 1].

Table 2 present the mean scores of total scale and subscales of study instruments in total and both genders. For instance, the mean \pm SD of GAS total score was 9.07 ± 8.17 and

Table 1: Sociodemographic, and health-related characteristics of participants in Isfahan Comprehensive Elderly Study

Characteristics	Total (n=603)	Males (n=297)	Females (n=306)	P*
Age	69.66±6.31	73.18±5.77	66.18±4.69	<0.0001
Number of children	4 (3-6)	5 (3-6)	4 (3-6)	-
Height	162±8.30	167.59±6.32	156.59±6.10	<0.0001
Weight	70.76±10.56	72.54±10.35	69.03±10.50	<0.0001
Mid-arm circumference	28.61±2.82	28.10±2.60	29.11±2.94	<0.0001
Systolic BP	12.85±1.48	12.92±1.49	12.78±1.48	0.262
Diastolic BP	8.07±0.77	8.04±0.80	8.10±0.74	0.370
Housemate				
Spouse	336 (55.7)	165 (55.6)	171 (55.9)	0.851
Spouse and unmarried children	251 (41.6)	123 (41.4)	128 (41.8)	
Spouse and married children	16 (2.7)	9 (3.0)	7 (2.3)	
Education level				
Illiterate	128 (21.3)	51 (17.2)	77 (25.2)	<0.001
Ability of reading and writing	85 (14.1)	31 (10.5)	54 (17.7)	
Primary school	176 (29.3)	87 (29.4)	89 (29.2)	
Under diploma	80 (13.3)	48 (16.2)	32 (10.5)	
Diploma	85 (14.1)	47 (15.9)	38 (12.5)	
Academic	47 (7.8)	32 (10.8)	15 (4.9)	
Current job				
Employed	44 (7.3)	41 (13.9)	3 (1.0)	<0.0001
Retired	248 (41.3)	209 (71.1)	39 (12.7)	
Housekeeper	265 (44.2)	2 (0.7)	263 (85.9)	
Unemployed	35 (5.8)	35 (11.9)	0	
Other	8 (1.4)	7 (2.4)	1 (0.3)	
Income status				
Inadequate	262 (44.5)	130 (44.7)	132 (44.3)	0.86
Middle	302 (51.3)	150 (51.5)	152 (51.0)	
Adequate	25 (4.2)	11 (3.8)	14 (4.7)	
Type of house				
Rental	27 (4.7)	15 (5.3)	12 (4.2)	0.511
Owner	544 (95.3)	267 (94.7)	277 (95.8)	
Insurance				
Yes	544 (92.8)	269 (92.8)	275 (92.9)	0.945
No	42 (7.2)	21 (7.2)	21 (7.1)	
Supporting in daily activities by family				
Yes	110 (18.5)	39 (13.3)	71 (23.5)	0.005
No	28 (4.7)	16 (5.5)	12 (4.0)	
No need	457 (76.8)	238 (81.2)	219 (72.5)	
Main sponsor				
Spouse	343 (59.8)	144 (51.6)	199 (67.5)	<0.0001
Children	231 (40.2)	135 (48.4)	96 (32.5)	
Need to health services in the past year				
Yes	570 (94.5)	272 (91.6)	298 (97.4)	0.002
No	33 (5.5)	25 (8.4)	8 (2.6)	
Smoking (hookah and cigarette)				
Nonsmoker	522 (86.7)	219 (74.0)	303 (99.0)	<0.0001
Former smoker	53 (8.8)	50 (16.9)	3 (1.0)	
Current smoker	27 (4.5)	27 (9.1)	0	
Physical illnesses				
Hypertension (yes)	318 (53.0)	143 (48.6)	175 (57.2)	0.036
Cardiovascular (yes)	191 (26.8)	88 (29.7)	73 (23.9)	0.109
Osteoporosis (yes)	267 (45.7)	70 (24.2)	197 (66.8)	<0.0001
Diabetic (yes)	165 (27.7)	78 (26.7)	87 (28.6)	0.603
Arthritis (yes)	324 (54.1)	113 (38.3)	211 (69.4)	<0.0001

Contd...

Table 1: Contd...

Characteristics	Total (n=603)	Males (n=297)	Females (n=306)	P*
Hyperlipidemia (yes)	258 (43.0)	101 (34.2)	157 (51.5)	<0.0001
Mental illnesses				
Depression (yes)	66 (11.0)	20 (6.8)	46 (15.0)	0.001
Anxiety (yes)	114 (19.0)	39 (13.2)	75 (24.6)	<0.0001
Alzheimer and cognitive impairments (yes)	19 (3.2)	9 (3.1)	10 (3.3)	0.879
Parkinson (yes)	34 (5.7)	10 (3.4)	24 (7.8)	0.018
Sleep disorders (yes)	133 (22.2)	42 (14.2)	91 (30.0)	<0.0001
Nutritional status				
Normal	450 (74.6)	219 (73.7)	231 (75.5)	0.649
At risk of malnutrition	141 (23.4)	72 (24.2)	69 (22.5)	
Malnourished	12 (2.0)	6 (2.0)	6 (2.0)	
BMI (kg/m ²)				
<19	8 (1.4)	5 (1.7)	3 (1.0)	0.002
19-20.9	21 (3.6)	15 (5.2)	6 (2.0)	
21-22.9	53 (9.0)	36 (12.4)	17 (5.7)	
≥23	508 (86.1)	235 (80.8)	273 (91.3)	

*P values are based on the independent t-test or Chi-square test. BMI = Body mass index; BP = Blood pressure

14.56 ± 11.26 for males and females, respectively ($P < 0.0001$). There were also significant differences between males and females in terms of sub-scales of GAS ($P < 0.0001$). The mean ± SD of GDS total score was 8.84 ± 6.79, 7.58 ± 6.41, and 10.07 ± 6.93 for total sample, males and female participants, respectively. Perceived stress score was significantly higher in females (15.35 ± 6.13) compared to males (14.16 ± 5.64) ($P = 0.013$). In the present study, elderly males had significantly higher quality of life compared to females. The mean OPQOL total score was 135.02 and 132.99 for males and females, respectively ($P = 0.018$). In addition, there were significant differences in the term of three OPQOL subscales, ("life overall," "independence" and "psychological)," between males and females ($P < 0.05$). According to PASE, elderly males (160.19 ± 137.98) were more physically active than females (124.60 ± 98.08) ($P < 0.0001$). The mean ± SD of PSQI total score was 5.30 ± 2.99 and 7.02 ± 3.63 for males and females, respectively ($P < 0.0001$). As it can be seen in the Table 2, the mean MMQ total and its subscales for elderly females are greater than males, suggesting better memory and fewer memory mistakes among elderly females ($P < 0.05$). In contrast, the mean MMSE Score for males was significantly greater than females, suggesting better cognitive status among elderly males ($P = 0.003$). Overall, according to our findings, males had higher life satisfaction and self-efficacy than elderly females ($P < 0.0001$). More details of the primary findings are presented in Table 2.

DISCUSSION

This paper described the rationale, objectives, research design, and methodology of a population-based cross-sectional study entitled "the ICES." In the survey,

different aspects of the health status of elderly persons were assessed among a large number of residents in Isfahan city, Iran. We expected the findings of ICES provide a comprehensive profile of different dimensions of health status of older peoples (including: Personal, family, socioeconomic, health and social services, life styles, physical illnesses and chronic diseases, mental, emotional and cognition disorders, quality of life, disabilities, sleep quality, social supports, life satisfaction, and self-efficacy) and identify different determinants of mental disorders and physical illnesses in the Isfahan elderly population.

There is only a study attempted to evaluate various aspects of health status of older people in Iran,^[35] and all other studies were performed to assess specific aspects of aging such as physical illnesses, psychological disorders, quality of life, etc., For instance, Tanjani *et al.* conducted an epidemiologic study on the evaluation of health status of Iranian elderly population. Although the aforesaid study had a larger sample size (1350 elderly persons) compared to our study and it was conducted at the national level; however, in comparison with ICES project, fewer variables have been evaluated.^[35] In the Hosseini *et al.*'s study on 1019 people aged 60 years and over, the prevalence of noncommunicable diseases and related risk factors among older people in Amirkola was described.^[26] In the Bakhshi *et al.*'s study on 4380 people aged 60 and older, factors associated with obesity in Iranian elderly people was investigated.^[29] The study of Nazemi *et al.* evaluated the prevalence of depression and some possible risk factors in 244 elderly residents of nursing homes in Tehran.^[13] Mousavi and Golestan evaluated the status of insomnia in the elderly Iranian population.^[23] Sadrollahi *et al.* investigated physical

Table 2: The scores of main measured variables of participants in Isfahan Comprehensive Elderly Study

Characteristics	Total (n=603)	Males (n=297)	Females (n=306)	P*
GAS total	11.86±10.23	9.07±8.17	14.56±11.26	<0.0001
GAS somatic	5.71±4.72	4.23±3.72	7.14±5.13	<0.0001
GAS cognitive	1.90±2.72	1.30±2.06	2.48±3.13	<0.0001
GAS affective	4.25±3.99	3.55±3.58	4.93±4.24	<0.0001
GDS score	8.84±6.79	7.58±6.41	10.07±6.93	<0.0001
PSS total	14.76±5.92	14.16±5.64	15.35±6.13	0.013
Perceived self-efficacy	8.32±2.45	8.06±2.48	8.58±2.40	0.009
Perceived helplessness	6.46±4.32	6.10±4.14	6.80±4.46	0.047
ADL/IADL score	29.28±3.67	29.78±4.02	28.80±3.22	0.001
OPQOL total	133.99±10.55	135.02±10.88	132.99±10.13	0.018
OPQOL life overall	12.32±2.88	12.64±3.00	12.00±2.72	0.007
OPQOL health	12.76±1.64	12.72±1.54	12.79±1.73	0.616
OPQOL social relationships	22.95±2.87	22.81±3.13	23.08±2.58	0.243
OPQOL independence	15.61±2.24	15.84±2.18	15.39±2.28	0.013
OPQOL home neighborhood	18.62±2.15	18.66±2.08	18.57±2.22	0.616
OPQOL psychological	15.52±2.53	15.75±2.52	15.30±2.52	0.027
OPQOL financial	12.09±2.22	12.19±2.23	11.99±2.22	0.282
OPQOL leisure	24.21±2.63	24.41±2.75	24.02±2.49	0.068
PASE score	142.04±120.53	160.19±137.98	124.60±98.08	<0.0001
PSQI score	6.17±3.44	5.30±2.99	7.02±3.63	<0.0001
ISI score	5.17±5.70	3.46±4.53	6.82±6.20	<0.0001
SS total	86.69±14.27	86.60±14.38	86.78±14.19	0.880
SS family	31.86±5.35	31.63±5.34	32.08±5.35	0.296
SS friends	23.45±5.86	23.57±5.78	23.33±5.95	0.613
SS others	31.36±5.18	31.41±5.15	31.32±5.22	0.836
MNA score	12.35±1.87	12.44±1.77	12.26±1.95	0.237
MMQ total	56.28±29.84	53.60±29.68	58.88±29.81	0.030
MMQ contentment	26.43±14.50	25.16±14.67	27.65±14.26	0.035
MMQ ability	17.93±12.06	16.86±12.07	18.97±11.99	0.032
MMQ strategies	11.92±9.26	11.58±8.79	12.26±9.70	0.366
LSI score	13.28±4.96	14.03±4.98	12.55±4.84	<0.0001
GSE score	25.21±7.52	26.40±7.68	24.05±7.20	<0.0001
Life style score	60.25±7.72	61.01±8.38	59.51±6.94	0.017
MMSE score	23.24±4.45	23.78±4.47	22.71±4.37	0.003
LSA score	47.85±21.67	45.50±23.30	50.12±19.73	0.009

*P values are based on the independent t-test. SS = Social support; GAS = Geriatric Anxiety Scale; GDS = Geriatric Depression Scale; PSS = Perceived Stress Scale; ADL/IADL = Activities of daily living/instrumental activities of daily living; OPQOL = Older People's Quality Of Life; PASE = Physical Activity Scale for The Elderly; PSQI = Pittsburgh Sleep Quality Index; ISI = Insomnia Severity Index; MNA = Mini Nutritional Assessment; MMQ = Multifactorial Memory Questionnaire; LSI = Life Satisfaction Index; GSE = General Self-efficacy Scale; MMSE = Mini-Mental State Examination; LSA = Life Space Assessment

activity and associated factors among the elderly population in Kashan.^[30] In addition, some studies have focused on the quality of life and related factors in elderly Iranian population.^[17,19,20] In contrast to the previous studies, the ICES project investigated different aspects of aging in a relatively large sample of Iranian elderly, comprehensively, and provide a complete profile of various dimensions of mental and physical health status in the form of single survey.

It is important to recognize some strengths as well as potential limitations of the current study. The ICES survey can be considered as one of the most comprehensive studies using a relatively large sample of elderly people (with

considering of the geographical coverage of Isfahan city) to evaluate different aspects of their life not only in Iran but also in the Middle East. Most of the previous studies in Iran were based on limited features of aging; however, as it was mentioned, we studied wide spectrum of aging characteristics including personal, economic, health and social services, lifestyles, physical and mental illnesses, quality of life, disabilities, sleep quality, social supports, life satisfaction, self-efficacy, memory and cognitive impairment, simultaneously. Despite of gathering a lot of information from participants, high-quality of data collection was another strength point of this study. Considering the age condition of study population, to obtain more reliable data, validated SFs of questionnaires

were used in the ICES project. The final strong point and perhaps the most important strength point of the current study is the hierarchical structure of the ICES data, which provides the possibility for conducting advanced statistical methods.

Despite these strengths, the major limitations of this survey are as following: the cross-sectional design of ICES survey is its main limitation that does not provide cause – effect inference from relationships analyses. The second limitation is that all used information in the present study was collected by self-administered questionnaires. Due to financial constraints, we could not use biochemical and laboratory methods for assessing physical and mental illnesses.

CONCLUSIONS

The findings of the current study could be used by policy makers for amplification of the current health regulations, for conducting screening programs, for setting practical policies, and intervention strategies particularly through population-based educational programs for both health promotion and prevention of all kinds of illnesses in the aging period.

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Conflicts of interest

There are no conflicts of interest.

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