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ORIGINAL ARTICLE

Functional independence among a geriatric population in Karachi, Pakistan: A cross sectional study.

Maaha Usmani[1], Rabeeya Saeed[2], Faridah Amin[3], Noureen Durrani[4], Muhammad Kashan Zaheer[5], Areeba Mateen[6], Fatima Shakeel[7], Sateesh Kumar[8]

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ABSTRACT… Objective: To find out the frequency and associated factors of impaired IADLs (instrumental activities of daily living) among the geriatric population of Pakistan. **Study Design:** Cross-sectional study. **Setting:** Department of Family Medicine and Outreach Centres, Liaquat National Hospital, Karachi. **Period:** Dec 2020 to Dec 2021. **Material & Methods:** A total of 200 participants of either gender aged above 60 years were included. At the time of data collection, demographic information was noted along with impairment in specific IADLs and associated factors. **Results:** Total 200 participants were included in the study. Median age and BMI was 70 (IQR= 65-73) years and 24.8 (IQR= 21.8-27.8) Kg/m2. Majority of study participants considered their health status as better (n=92, 46%) whereas some considered it not as good as their peers (n=33, 16.5%) and good (n=55, 27.5%). Few had no idea about their health status (n=20, 10%). The enrolled participants had comorbidity of hypertension (n=78, 39%), diabetes (n=53, 26.5%), ischemic heart diseases (n=10, 5%) and hypothyroidism (n=15, 7.5%). Overall 85 (42.5%) study participants were found to be dependent with median IADL score of 6 (IQR= 4-7). **Conclusion:** Quite a significant proportion of the study participants were found to be dependent. Advancing age, gender predisposition, perceived weight loss and psychological distress were found to be associated with impairment in instrumental activities of daily living.

Key words: Daily Living, Elderly, Functional Capability, Geriatrics, Pakistan.

INTRODUCTION

Advanced medical care and better nursing home facilities have improved the mortality, thereby increasing the average life-expectancy.[1,2] The population of Pakistan is the sixth largest in the world, and has currently above 8 million elderly population, expected to grow up to 27 million by the year 2050.[3] This increase has opened opportunities to investigate the unique challenges and factors which affect the risk of accelerated morbidity among our elderly population. Functional independence is an area of crucial importance while considering geriatric health because nearly a quarter of elderly population reports limitations in functional independence, which restricts their self-reliance and can diminish the quality of their life. This also adds to the care-giver stress, increases health care burden, and imposes upon the society in general.[4]

Many tools exist internationally to assess the functional independence of the elderly population; one of them is IADLs (instrumental activities of daily living) which includes managing their own finances, transportation, shopping for groceries, using a telephone independently, housekeeping, food preparation, doing their own laundry, and being responsible for their medications. These activities are corner-stone to support independent life in the home and in the community. Therefore IADLs are an essential component while measuring the factors of healthy ageing. Being able to perform IADLs has a marked impact upon executive functioning

1. MBBS, Resident Family Medicine, Liaquat National Hospital, Karachi.
2. MBBS, FCPS (Family Medicine), MRCGP, PGD, Assistant Professor and Head Family Medicine, Liaquat National Hospital, Karachi.
3. MBBS, FCPS, MRCGP (Int), PhD (Health Education), MSc (Clinical Research), Director, College of Family Medicine, Professor Family Medicine, Indus Hospital Health Network, Karachi.
4. M.Sc (Statistics), Biostatistician, Publication Department, Liaquat National Hospital, Karachi.
5. MBBS, House Officer Family Medicine, Liaquat National Hospital, Karachi.
6. MBBS, House Officer Family Medicine, Liaquat National Hospital, Karachi.
7. MBBS, House Officer Family Medicine, Liaquat National Hospital, Karachi.
8. MBBS, House Officer Family Medicine, Jinnah postgraduate Medical Centre, Karachi.

Correspondence Address:
Dr. Maaha Usmani
Department of Family Medicine
Liaquat National Hospital, Karachi.
maahausmani797@gmail.com

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such as problem-solving, cognitive function, working memory, psychosocial, economic and verbal communication.[5] Impairment in specific IADLs can help in early identification of dementia, functional disabilities and increased morbidity and dependence among the elderly. Moreover, decline in IADL status could serve as a predictor of future ADL decline because it is usually followed by an ADL limitation.[6,7]

Levels of disability among the elderly vary greatly among various parts of the world, lowest being noted in Northern and western Europe. In Europe, presence of atleast one IADL disability ranged from 8 to 40%, and was found to be dependent upon age and gender.[8-10] Individual ADL/IADL impairment is also dependent upon the sociocultural context. A multivariate analysis done in Germany in 2022 showed a prevalence ranging from 27% to approximately 40%.[7]

Similarly nutritional decline and weight loss have been linked with impairment in functional independence in the existing literature.[12,13] A study done in 2018 in Karachi shows that 33.5% of the elderly participants were at higher risk of malnutrition and 35.5% were dependent.[12] This concept has been explored in the development of 'sarcopenia', which is defined as progressive muscle mass loss and decrease in strength/ physical performance. Sarcopenia, and impairment of functional independence are increasing in Asia, although the true prevalence in Pakistan is currently unknown due to scarcity of data available. It is important to conduct a research in this area because a high variability is found in the prevalence of disability among different regions in view of its socioeconomic position and other factors.[11] Therefore this study aimed to find out the frequency and associated factors of impaired IADLs among the geriatric population of Pakistan. It would be an indirect measure of quality of life in the elderly population. Therefore we conducted this study upon the elderly population presenting to the family medicine clinics of a tertiary care hospital in Karachi, Pakistan.[14]

MATERIAL & METHODS

A cross-sectional study was performed in outpatient clinics of Family Medicine at Liaquat national hospital, Karachi and its outreach primary care centers from December 2020 to December 2021. To calculate the sample size, Open-Epi software was used with confidence interval of 95% and precision of 5%. Using a previous study as reference[7] which showed a 14.5% prevalence of malnourishment among the elderly, a sample size of 200 was calculated. Ethical approval from the ethical review board of the Hospital (Ref App 0548-2020LNH-ERC). Manuscript was prepared keeping the STROBE guidelines in accordance.[16]

The proforma consisted of two sections. First section consisted of patients' socio-demographic profile including age, gender, residence, education, co-morbidities. Second part was the IADL assessment (Instrumental Activities of Daily Living).[15] It was used to assess the functional independence of the elderly population. It comprises of 8 items, including telephoning, shopping, food preparation, housekeeping, laundering, use of transportation, medication administration by themselves and financial independence. The number of options in each item range from 3-5. Each item has a maximum score of 1, and minimum score of 0. A higher score meant more functional ability of the person being assessed and vice versa. Women were scored on all 8 items, but, men were excluded from the areas of preparation of food, laundry and housekeeping. A summary score ranges from 0 (low function, dependent) to 8 (high function, independent) for women, and 0 through 5 for men. Each domain evaluated through the scale relies on either cognitive or physical function, or a combination of both. Those above 60 years of age visiting family medicine clinics were included while those with dementia, functional class IV, bed-ridden patients were excluded.

Data was analyzed using SPSS package (version 22). Categorical variables were summarized as frequencies and percentages. For continuous quantitative variables mean and standard deviation were calculated. For continuous variables with a normal distribution of independent

measurements, independent T-test was applied, whereas data without normal distribution, Mann-Whitney Rank Sum Test was used. ANOVA test was used for continuous variables, and Pearson Chi-square test was applied for categorical variables. A probability of p-value= 0.05 was considered statistically significant.

RESULTS

Total 200 participants were included into the study. Median age and BMI was 70 (IQR= 65-73) years and 24.8 (IQR= 21.8-27.8) Kg/m2. Table-I displays socio-demographic features of study participants. Majority of study participants considered their health status as better (n=92, 46%) whereas some considered it not as good as their peers (n=33, 16.5%) and good (n=55, 27.5%). Few had no idea about their health status (n=20, 10%). The enrolled participants had comorbidity of hypertension (n=78, 39%), diabetes (n=53, 26.5%), ischemic heart diseases (n=10, 5%) and hypothyroidism (n=15, 7.5%).

Overall 85 (42.5%) study participants were found to be dependent with median IADL score of 6 (IQR= 4-7). Response distribution of different IADL items is presented in Table-II.

Table-III displays univariate association of patients' featured with IADL status. Patients with age group 60-69 years were associated with lower odds of dependency than patients of age 70 years and above. Males were significantly less dependent than females. Patients with moderate food declined over past three months had higher likelihood of dependency than those with severe food declined. Weight loss was also associated with higher odds of dependency among those who did know their weight loss status as compared to those who had no weight loss history in past three months. Presence of psychological distress was also linked with higher odds of dependency.

Table-IV represents multivariable association of patients' features with IADL status. Age, gender, weight loss and psychological distress were found to be significantly associated with IADL status.

Socio-demographic Features	Frequency (%)
Age groups	
60-69 years	92 (46)
70 years and above	108 (54)
Gender	
Male	132 (66)
Female	
Education	
No formal education	7 (3.5)
Matriculation	21 (10.5)
Intermediate	83 (41.5)
Undergraduate	76 (38)
Post-graduate	13 (6.5)
Living status	
Lives independently	41 (20.5)
Lives with family/spouse	159 (79.5)
Socio-economic status	
Lower class	12 (6)
Middle class	121 (60.5)
Upper class	67 (33.5)
Has food intake declined over past 3 months	
None	116 (58)
Moderate	46 (23)
Severe	38 (19)
Weight loss during the last 3 months	
Does not know	23 (11.5)
1-3 kg	25 (12.5)
>3 Kg	41 (20.5)
No weight loss	111 (55.5)
Suffered with psychological distress	
Yes	40 (20)
No	160 (80)
Mid arm circumference	
<21	8 (4)
21-22	9 (4.5)
>22	183 (91.5)
Calf circumference	
<31	55 (27.5)
≥31	145 (72.5)

Table-I. Descriptive statistics for demographic features of study participants

IADLS items	Groups	Frequency	Percentage
Ability to use phone	Own initiative	143	71.5
	Few well known numbers	11	5.5
	Answers	35	17.5
	Doesn't use	11	5.5
Shopping	Independently shops	118	59
	Small purchases	26	13
	Need to be accompanied	22	11
	Completely unable to shop	34	17
Food preparation	Independently plans and prepares	71	35.5
	If supplied ingredients	19	9.5
	Heats and serves	23	11.5
	Need to have meals prepared and served	87	43.5
Housekeeping	Maintains alone	126	63
	Performs lights daily tasks	7	3.5
	Light daily task but cannot maintain cleanliness	11	5.5
	Need help with all tasks	20	10
	Doesn't participate	36	18
Laundry	Does personal laundry independently	52	26
	Launders small items	17	8.5
	All done by others	131	65.5
Mode of transportation	Travels independently	109	54.5
	Arranges own travel by taxi	18	9
	Travels on public transport accompanied by someone	34	17
	Limited to taxi or automobile accompanied by another	36	18
	Doesn't travel	3	1.5
Responsibility for own medications	Independently takes medication	164	82
	If prepared in advance	22	11
	Not capable of dispensing own medication	14	7
Ability to handle finance	Manage financial matters independently	123	61.5
	Manage financial matters or day to day purchase	39	19.5
	Incapable of handling	38	19

Table-II. Response distribution of study participants on different IADL items

DISCUSSION

In the present study, 42.5%study participants were found to be dependent with median IADL score of 6(IQR= 4-7). This is slightly higher as compared to a previous study done in 2018 in Karachi Pakistan which showed a frequency of 35.5% dependency.[12] Further studies in Pakistan could not be found out among the elderly population visiting the outpatient departments. Similar frequency was found in a study done in India in 2022 (48%).[17] A percentage of 57% of the elderly population reported assisted IADLs in a study done by Patel et al in 2021.[18] Higher frequency was found in a study conducted in 2020 in Bangladesh (80%).[13] This could possibly be due to the sociodemographic, economic factors, research methodologies which vary on study-to-study basis; and the presence of a compact family support system in Bangladesh which makes dependence upon other family members more likely. A study done upon elderly population in Poland showed that 35.75% of the participants had reportedly at least one problem with IADLs.[19]

Our study included a majority of participants with intermediate education (41.5%), 38% were graduates, while only 3.5% had no formal education.Existing literature has noticed an increased risk of disability among the illiterate as compared to the higher educated elderly.[20,21] No relationship was seen between living independently and IADLs in our study.

Participants' Features	Independent N (%)	Dependent N (%)	OR (95% CI)	P-Value
Age Group				
60-69 years	62 (67.4)	30 (32.6)	0.47 (0.26 – 0.83)	**0.009
70 years and above	53 (49.1)	55 (50.9)	Reference category	
Gender				
Male	98 (74.2)	34 (25.8)	0.12 (0.06 – 0.23)	**<0.001
Female	17 (25)	51 (75)	Reference category	
Education				
No formal education	3 (42.9)	4 (57.1)	1.14 (0.12 – 7.28)	0.888
Matriculation	9 (42.9)	12 (57.1)	1.14 (0.28 – 4.60)	0.851
Intermediate	45 (54.2)	38 (45.8)	0.72 (0.22 – 2.34)	0.589
Undergraduate	52 (68.4)	24 (31.6)	0.40 (0.12 – 1.30)	0.128
Post-graduate	6 (46.2)	7 (53.8)	Reference category	
Socio-economic Status				
Lower class	10 (83.3)	2 (16.7)	0.34 (0.07 – 1.66)	0.181
Middle class	63 (52.1)	58 (47.9)	1.55 (0.84 – 2.85)	0.161
Upper class	42 (62.7)	25 (37.3)	Reference category	
Living Status				
Lives independently	18 (43.9)	23 (56.1)	1.99 (0.99 – 4)	0.051
Lives with family/spouse	97 (61)	62 (39)	Reference category	
Has food intake declined over past 3 months				
None	77 (66.4)	39 (33.6)	1.78 (0.84 – 3.74)	0.130
Moderate	18 (39.1)	28 (60.9)	3.07 (1.52 – 6.22)	**0.002
Severe	20 (52.6)	18 (47.4)	Reference category	
Weight loss during the last 3 months				
Does not know	6 (26.1)	17 (73.9)	6.15 (2.23 – 16.95)	**<0.001
1-3 kg	12 (48)	13 (52)	2.35 (0.98 – 5.68)	0.057
>3 Kg	21 (51.2)	20 (48.8)	2.07 (0.99 – 4.30)	0.052
No weight loss	76 (68.5)	35 (31.5)	Reference category	
Suffered with psychological distress				
Yes	13 (32.5)	27 (67.5)	3.65 (1.75 – 7.63)	**<0.001
No	102 (63.7)	58 (36.2)	Reference category	
Mid arm circumference				
<21	2 (25)	6 (75)	Reference category	
21-22	7 (77.8)	2 (22.2)	0.95 (0.01 – 0.90)	*0.040
>22	106 (57.9)	77 (42.1)	0.24 (0.05 – 1.23)	0.088
Calf circumference				
<31	30 (54.5)	25 (45.5)	1.18 (0.63 – 2.21)	0.603
≥31	85 (58.6)	60 (41.4)	Reference category	
Hypertension				
Yes	41 (52.6)	37 (47.4)	1.40 (0.78 – 2.47)	0.260
No	74 (60.7)	48 (39.3)	Reference category	
Diabetes				
Yes	25 (47.2)	28 (52.8)	1.78 (0.94 – 3.33)	0.078
No	90 (61.2)	57 (38.8)	Reference category	
Ischemic heart diseases				
Yes	7 (70)	3 (30)	0.56 (0.14 – 2.25)	0.418
No	108 (56.8)	82 (43.2)	Reference category	
Hypothyroid				
Yes	11 (73.3)	4 (26.7)	0.47 (0.14 – 1.52)	0.206
No	104 (56.2)	81 (43.8)	Reference category	

Table-III. Association of participants' characteristics with IADL status
CI: Confidence interval, OR: Odds ratio, *Significant at p<0.05, **Significant at p<0.01

Parameter	Adjusted OR (95% CI)	P-Value
Age group		
60-69 years	0.44 (0.21 – 0.95)	*0.036
70 years and above	Reference category	
Gender		
Male	0.08 (0.04 – 0.19)	**<0.001
Female	Reference category	
Living status		
Lives independently	0.92 (0.36 – 2.38)	0.869
Lives with family/spouse	Reference category	
Has food intake declined over past 3 months		
None	1.39 (0.51 – 3.81)	0.524
Moderate	1.83 (0.58 – 5.77)	0.301
Severe	Reference category	
Weight loss during the last 3 months		
Does not know	7.20 (2.04 – 25.36)	**0.002
1-3 kg	2.90 (0.95 – 8.85)	0.061
>3 Kg	3.66 (1.27 – 10.56)	*0.016
No weight loss	Reference category	
Suffered with psychological distress		
Yes	2.94 (1.14 – 7.59)	*0.026
No		
Mid arm circumference		
<21	2.48 (0.25 – 24.59)	0.439
21-22	0.53 (0.06 – 4.97)	0.578
>22	Reference category	
Diabetes		
Yes	1.18 (0.51 – 2.74)	0.696
No	Reference category	
Hypothyroid		
Yes	0.43 (0.1 – 1.85)	0.258
No	Reference category	

CI: Confidence interval, OR: Odds ratio, *Significant at p<0.05, **Significant at p<0.01

This is in contrast to the findings of an Indian study published in 2022 which depicted that independently-living elderly tend to be less dependent owing to the fact that they carry out work required for daily living by themselves, and are therefore less likely to report severe ADL disability than those living with their spouse.[21]

Advancing age was found to be significantly associated with impairment in IADLS in our study, with the highest frequency among the elderly population ranging from 60 to 69 years of age. This is in keeping with the available literature on the topic that age is directly related to functional dependence among the elderly.[21,18,22] It can also be explained by the closely related family support of ill, dependent elderly and the shifting of responsibilities from the elders to the younger family members.[23] This shift of responsibilities can add to the burden of unhealthy aging, increasing the longevity without promoting independent living; thereby decreasing the overall quality of life among the elderly. Studies indicate that promotion of social participation and physical activity have multiple benefits for the elderly, and also reduce the dependence in different countries.[24,25,19,26]

IADLs impairment showed a gender predilection, being more common among the females than males. Males were significantly less dependent than females. This is almost a universal finding, as reported by the supporting literature.[27,20,21] This could probably be explained on grounds of female dependency in general among all age

groups in terms of financing and transportation. A perception of weight loss in the prior 3 months was found to be associated with increased dependency among the elderly, supported by the existing literature.[28] Another study including elderly Korean adults found a positive relationship between transition of weight change with increased rate of mortality compared with no change in weight.[29] This finding might hint at a relationship between decrease in physical activity and increased mental psychological and physical dependence upon other family members in view of perceived weight loss.

Our study found a higher likelihood of presence of psychological distress among those elderly who were found dependent in IADLs.[30] This seems plausible because dependence upon others for basic living activities may give rise to discontent and feeling of helplessness, resulting into a stronger likelihood of development of psychological distress among the elderly.

To summarize, our study found an association of advancing age, gender predisposition perceived weight loss and psychological distress with impairment in instrumental activities of daily living.

The limitations of study are several. Firstly, it was conducted in a hospital setting, therefore a probability of co-morbidities and their impact could have affected the results. Secondly, it was a cross-sectional study, and therefore cannot provide a causal relationship, which is a property of this particular study design.

Strengths of the study include the novelty of topic. There has been very little research among the factors affecting the quality of life among and elderly.

CONCLUSION

This study shows a definite need to address the level of dependency and its associated factors among the elderly population. There is also a need to conduct further studies aimed at finding out the impact of malnourishment upon the development of dependence among the elderly.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Maaha Usmani	Data collection, Drafting.	
2	Rabeeya Saeed	Methodology, Proof reading, Revisions.	
3	Faridah Amin	Study Protocol, Critical Revisions.	
4	Noureen Durrani	Data analysis, Data interpretation.	
5	Muhammad Kashan Zaheer	Literature Review.	
6	Areeba Mateen	Data collection.	
7	Fatima Shakeel	Data collection.	
8	Sateesh Kumar	Literature review.	