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우리나라의 근감소증 유병률 현황

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초 록

본 연구는 국민건강영양조사 자료를 이용하여 우리나라의 65세 이상 악력저하율 및 근감소증 유병률 현황을 파악하였다. 분석대상은 2022년 국민건강영양조사 악력 및 체성분검사에 참여한 65세 이상이며, 악력 및 임피던스체지방측정기(bioelectrical impedance analysis)를 이용한 근육량 측정 자료를 2019년 아시아 진단기준(Asian Working Group for Sarcopenia)에 따라 분류하여 악력저하율 및 근감소증 유병률을 산출하였다. 2022년 65세 이상 악력저하율은 남자 14.2%, 여자 18.8%이며, 근감소증 유병률은 남자 6.6%, 여자 9.2%였다. 근감소증 유병률은 고령일수록 높았고, 여자가 남자에 비해 높았으며, 소득수준이 낮은 군에서 높았다. 본 연구 결과, 고령과 소득수준이 낮은 경우 근감소증에 취약하므로 해당 대상자의 경우 근감소증의 조기 발견과 예방·관리 중재 프로그램의 중점적 실시가 필요함을 확인할 수 있었다.

주요 검색어: 근감소증; 악력; 국민건강영양조사

서 론

근감소증(sarcopenia)은 노화에 따른 근육량 감소와 더불어 근력이나 신체 기능이 감소한 상태로 정의하고 있다[1]. 근육량이 감소하면 낙상과 골절 위험 증가, 당뇨병, 고혈압, 심뇌혈관질환 등 만성질환의 발생이 증가하게 된다[1-3]. 노인실태조사에서 평가한 하지근력 수행률은 2014년 79.7%, 2017년 78.6%, 2020년 77.9%로 감소 경향이 보고되었고[4-6], 국내에서 2016-2017년 수행된 지역사회 거주 70세 이상 대상 연구에서는 근감소증 유병률이 남자 14.4%, 여자 6.4%였으나, 지속적인 추이가 보고된 바 없다[7]. 근감소증은 질병으로 인식되어 2016년 세계보건기구의 제10차 국제질병통계분류(ICD-10)에 병명코드(M62.84)가 등재되었고, 우리나라에서도 2021년 제8차 한국표준질병·사인분류(KCD-8) 진단코드(M62.5)에 포함되었다[1]. 국민건강영양조사에서는 2014년부터 악력을 측정하여 10세 이상의 악력 분포를 공표하고 있고, 아시아근감소증진단그룹(Asian Working Group for Sarcopenia, AWGS)의 지침(2019)에 따라 2019년부터 65세 이상의 악력저하율을 공표하고 있다[1]. 또한 2022년부터 임피던스체지방측정기(bioelectrical impedance analysis,

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핵심요약

① 이전에 알려진 내용은?

근감소증은 노화에 따라 근육량과 더불어 근력이나 신체수행능력이 감소한 상태로 이로 인해 낙상과 골절 위험 증가, 당뇨병, 고혈압, 심뇌혈관질환 등 만성질환의 발생이 증가하게 된다. 국내에서 수행된 기존 연구에서 70세 이상 근감소증 유병률(AWGS 2019 기준, DXA 및 악력 측정)은 약 10%로 보고되고 있다.

② 새로이 알게 된 내용은?

국민건강영양조사 근감소증 조사 결과, 유병률은 남자 6.6%, 여자 9.2%였다. 여자가 남자보다 유병률이 높고, 소득수준 낮은 군에서 더 높았다.

③ 시사점은?

본 연구 결과는 고령, 낮은 소득수준 등 취약계층 대상의 근감소증의 조기 발견과 예방·관리 중재 프로그램의 실시가 필요함을 시사한다.

BIA)를 도입하여 근육량을 측정하여 근감소증 유병률을 신규로 산출하였다. 이 글에서는 2022년 국민건강영양조사 악력 및 근육량 측정 자료를 토대로 우리나라의 근감소증 유병률 현황을 살펴보았다.

방 법

1. 연구대상

국민건강영양조사는 우리나라 국민의 건강수준, 건강행태, 식품 및 영양섭취 실태를 파악하기 위해 국민건강증진법 제16조에 근거하여 시행하는 전국 규모의 건강 및 영양조사이다[8]. 조사 표본은 2단계 층화집락표본추출방법을 적용하여 조사구 및 가구를 1, 2차로 추출하였다. 조사대상은 연간 약 192개 조사구, 조사구당 25개 표본가구 내 1세 이상의 모든 가구원이었다. 본 연구는 2022년 국민건강영양조사 중 65세 이상 악력(1,462명) 및 체성분검사(1,276명) 참여자를 대상으로 분석하였다.

2. 연구방법

국민건강영양조사의 검진조사는 이동검진차량에서 질병관리청 소속의 조사원에 의해 수행되었다. 악력검사는 디지털 악력계(TKK 5401; Takei)를 이용하여 양손 또는 한 손의 악력을 2회 측정하였으며, 최대값을 악력 측정치로 사용하였다. 악력검사 제외자 선별을 위해 시진 및 설문조사를 실시하였다. 시진 항목인 팔/손/엄지손가락의 결손, 손의 마비, 손/손목의 깁스 또는 붕대를 한 경우와 설문조사 항목인 주관적 조사참여 불가능한 경우, 최근 7일 이내 손의 통증/쑤심/뻣뻣함이 악화된 경우 검사를 실시하지 않았다.

체성분검사는 BIA (InBody970; InBody Co., Ltd.)를 이용하여 제지방량, 근육량(골무기질 제외), 체지방, 체수분, 전신위상각을 측정하였다. 인공심장박동기, 이식형심장충격기 장착 등 일부 대상자는 제외하였다. 근육량(골무기질 제외)은 부위별로 측정하였고, 사지근육량(오른팔, 왼팔, 오른다리, 왼다리)의 합을 산출하였다.

3. 분석방법

본 연구는 우리나라 국민의 특성을 대표할 수 있도록 가중치를 적용한 복합표본설계분석방법으로 SAS (version 9.4; SAS Institute Inc.)를 이용하여 산출하였다. 악력저하율 및 근감소증 유병률은 국민건강영양조사에 참여한 65세 이상 대상자 중 지표산출에 필요한 항목에 결측이 없는 대상자만을 통계분석에 이용하여 산출하였다. 거주지역은 시 또는 구의 하위 행정 구역인 동(도시지역), 군의 하위 행정 구역인 읍면(농어촌지역)으로 분류하였고, 가구소득수준은 월가구균등화소득(월가구소득/√가구원수)을 성별·연령별(5세 단위) 오분위로 분류하였다.

4. 지표정의

악력저하율은 AWGS (2019) 기준인 양손 또는 한 손의 악력을 2회 측정한 값 중 최대값이 남자 28 kg 미만, 여자 18 kg 미만인 분율로 산출하였다[1]. 근감소증 유병률 또한 AWGS (2019) 기준에 따라 악력저하에 해당하면서 BIA 결과 '사지근육량(골무기질 제외)의 합/신장^2'이 남자 7.0 kg/m^2 미만, 여자 5.7 kg/m^2 미만인 분율로 산출하였다[1].

결 과

1. 악력저하율 유병률 현황

65세 이상의 악력저하율은 2022년 기준 16.7% (남자 14.2%, 여자 18.8%)이며, 연령이 증가함에 따라 증가하여 80세 이상은 40.1%이다(표 1). 75세 미만에서는 성별에 따른 차이가 크지 않았으나, 75-79세부터 여자가 남자에 비해 높았다. 거주지역에 따라 남자에서는 차이를 보이지 않으나, 여자에서는 동지역 거주자(17.0%)에 비해 읍면 거주자(25.4%)가 악력저하율이 높았다. 소득수준별로 남녀 모두 소득수준이 낮은 군의 악력저하율이 더 높은 경향이었으며, 여자에서 더 뚜렷하였다.

2. 근감소증 유병률 현황

65세 이상의 근감소증 유병률은 2022년 기준 7.9%이며, 연령이 증가할수록 증가하여 70-74세 7.1%, 75-79세 9.9%, 80세 이상 20.0%였다(표 2). 남자(6.6%)에 비해 여자(9.2%)가 높았는데 75-79세는 여자가 남자에 비해 약 2배 높았고, 80세 이상에서는 남녀 비슷한 수준이었다. 남자는 거주지역별 차이가 없었으나 여자에서 읍면 거주자(14.8%)가 동지역 거주자(7.7%)보다 약 2배 높았다. 남녀 모두 소득수준 하위 40%인 '하' 또는 '중하' 군의 근감소증 유병률이 더 높은 경향이었다.

논 의

우리나라 65세 이상 악력저하율은 16.7% (남자 14.2%, 여자 18.8%)이고, 근감소증 유병률은 7.9% (남자 6.6%, 여자

표 1. 악력저하율(2022년)[a]

구분	전체		남자		여자	
	대상자 수(명)	분율(표준오차)	대상자 수(명)	분율(표준오차)	대상자 수(명)	분율(표준오차)
≥65세	1,462	16.7 (1.2)	681	14.2 (1.5)	781	18.8 (1.7)
연령(세)						
65-69	498	6.7 (1.4)	233	6.8 (2.2)[c]	265	6.5 (1.7)[c]
70-74	390	12.9 (2.0)	182	12.6 (2.9)	208	13.2 (2.6)
75-79	341	19.9 (2.3)	161	15.5 (3.0)	180	22.9 (3.4)
≥80	233	40.1 (3.9)	105	35.2 (5.8)	128	43.3 (5.2)
거주지역						
동	1,020	15.6 (1.4)	475	13.8 (1.8)	545	17.0 (1.9)
읍면	442	21.1 (2.5)	206	15.6 (2.7)	236	25.4 (3.7)
소득수준[b]						
하	276	21.8 (3.0)	129	16.0 (3.3)	147	26.5 (4.7)
중하	289	20.4 (3.1)	135	17.6 (3.9)	154	22.9 (4.5)
중	290	12.8 (2.3)	137	11.7 (3.1)[c]	153	14.0 (2.9)
중상	302	15.1 (2.8)	142	11.6 (2.6)	160	18.1 (4.5)
상	302	14.9 (2.6)	138	14.9 (3.9)[c]	164	15.0 (3.3)

[a]2022 국민건강통계 인용[8]. [b]소득수준: 월가구균등화소득(월가구소득/√가구원수)을 성별·연령별(5세 단위) 오분위로 분류. [c]변동계수: 25-50%.

표 2. 근감소증 유병률(2022년)[a]

구 분	전체		남자		여자	
	대상자 수(명)	분율(표준오차)	대상자 수(명)	분율(표준오차)	대상자 수(명)	분율(표준오차)
≥65세	1,276	7.9 (0.8)	605	6.6 (1.0)	671	9.2 (1.2)
연령(세)						
65–69	461	2.7 (0.8)[c]	220	2.2 (1.0)[c]	241	3.3 (1.2)[c]
70–74	343	7.1 (1.4)	163	5.9 (1.9)[c]	180	8.1 (2.1)[c]
75–79	287	9.9 (1.7)	133	6.6 (2.0)[c]	154	12.8 (2.8)
≥80	185	20.0 (3.3)	89	18.8 (4.5)	96	21.2 (5.0)
거주지역						
동	910	7.3 (1.0)	428	6.8 (1.1)	482	7.7 (1.4)
읍면	366	10.4 (1.7)	177	5.9 (2.1)[c]	189	14.8 (2.5)
소득수준[b]						
하	235	9.8 (2.0)	110	8.2 (2.5)[c]	125	11.1 (2.7)
중하	254	13.8 (2.4)	123	10.0 (3.0)[c]	131	17.9 (3.8)
중	252	4.6 (1.2)[c]	121	4.2 (1.8)[c]	131	5.1 (1.8)[c]
중상	271	5.6 (1.3)	129	4.9 (1.7)[c]	142	6.2 (2.0)[c]
상	262	6.9 (1.9)[c]	122	6.5 (2.2)[c]	140	7.2 (2.5)[c]

[a]2022 국민건강통계 인용[8]. [b]소득수준: 월가구균등화소득(월가구소득/√가구원수)을 성별·연령별(5세 단위) 오분위로 분류. [c]변동계수: 25–50%.

9.2%)였다. 근감소증 유병률은 여자가 남자에 비해 높았고, 소득수준이 낮은 군에서 높은 경향이었다.

근감소증 유병률은 근육량 측정방법, 근감소증 유병률을 산출하는 기준 등에 따라 차이가 있다(유병률 범위: 10–27%)[9]. 동일한 AWGS 기준을 적용 시에도 이중에너지 방사선 흡수계측법(dual energy X-ray absorptiometry, DXA) 측정 연구에서는 18%, BIA 측정 연구에서는 14%로 측정방법에 따라 차이가 있었고[9], 동일한 대상자에서 AWGS 외 여러 근감소증 유병률을 산출하는 기준에 따라 유병률이 차이가 있었다[7,10].

본 연구의 근감소증 유병률은 7.9%로, 아시아인 대상의 메타분석 결과인 근감소증 유병률(15.0%)에 비해 낮은 수준이었다[9]. BIA를 이용한 기존 연구 결과에서는 아시아인(남자 10%, 여자 11%)의 유병 수준이 비아시아인(유럽, 미국 등) (남자 19%, 여자 20%)에 비해 낮았고[11], 우리나라의 근감소증 유병률은 이에 비해 더 낮은 수준(남자 6.6%, 여자 9.2%)이었다. 인종에 따른 차이에 대해서는 아시아인의 근감소증 유병률 산출기준 절단값이 서양인에 비해 낮고, 아시아인이 서양인에 비해 더 건강한 식품섭취 및 신체활동을 하여 근감소증이 예방되었을 가능성이 제안되고 있다[11].

근감소증을 성별로 구분하여 비교 시 여자의 근감소증 유병률이 남자보다 높았는데, 우리나라 노쇠코호트 결과로 보고된 70세 이상 근감소증 유병률(AWGS 2019 기준, DXA 및 악력 측정) 결과에서는 남자(14.4%)가 여자(6.4%)보다 높았고[7], AWGS 기준 메타분석 연구에서는 남녀 근감소증 유병률이 각각 14.0%로 차이가 없어 성별에 따른 다른 방향의 연구 결과에 관해 후속 연구가 필요할 것이다[9]. 또한, 연령별로 비교 시 75–79세의 근감소증 유병률이 여자가 남자에 비해 높았지만 80세 이상에서는 큰 차이를 보이지 않았다. 여러 요인 중 여자는 폐경 이후 에스트로겐과 안드로젠 등 성호르몬 분비가 감소하여 근육량 소실을 유도하여 60–70대에 근감소증 유병률이 증가하지만, 남자는 여자보다 늦은 나이에 성호르몬(테스토스테론) 분비가 감소하여 80세 이후 근감소증 유병률이 급증한다고 보고되고 있다[11].

본 연구의 근감소증 유병률은 소득수준에 따라 차이가 있었는데, 중국 65세 이상 대상의 조사 결과에 따르면 가구소

득이 낮을수록 근감소증 유병률(AWGS 2019 기준, 근육량[BIA] 및 악력[3회] 또는 보행속도)이 높아 본 연구와 유사한 결과를 보였다[12]. 소득수준이 낮을수록 근감소증 유병률이 높은 요인에 대해 중국 농촌 거주 60-89세 대상 연구에서는 소득수준이 낮을수록 건강관리를 위한 영양지식 수준이 낮음으로 인한 영향의 가능성을 제안한 바 있고[13], 중국 중장년층 대상 연구에 따르면 근감소증 환자의 경우 소득수준이 낮은 군에서 의료비 지출에 대한 부담이 증가하여 근감소증 진단 및 관리가 어려울 수 있다고 설명하였다[14]. 또한 본 결과에서 동지역 거주자에서는 근감소증 유병률의 성별 차이가 크지 않았으나, 읍면지역 거주자에서 차이가 뚜렷하였는데(남자 5.9%, 여자 14.8%), 중국 농촌지역에 거주하는 60-89세 대상 조사 결과(AWGS 2019 기준, 근육량[BIA] 및 악력[2회 이상])에서도 여자(21.7%)가 남자(12.9%)보다 더 높아 본 조사 결과와 유사하였다[15].

결론적으로 본 연구의 우리나라 65세 이상 근감소증 유병률은 7.9%로 국외에 비해 낮은 수준이지만[9], 연령이 증가할수록 근감소증이 증가하고, 특히 소득수준이 낮은 경우 근감소증에 취약할 수 있음을 시사한다. 제5차 국민건강증진종합계획에서는 만성질환 관리 위주로 추진하던 보건소 어르신 방문건강관리서비스를 허약·노쇠 등 보편적 건강관리서비스 체계로 개편하여 인공지능·사물인터넷(AI·IoT) 기반 어르신 건강관리사업 등 지역사회 지원 확대를 추진하고 있다[16]. 저소득층 등 취약계층을 우선적으로 근감소증 조기 발견과 영양관리 프로그램(경로당·복지관 등 노인 회합형 프로그램, 방문·배달 프로그램, 요리교실 등) 및 운동을 포함한 조기 개입이 중요할 것이다. 국민건강영양조사에서는 악력 측정과 함께 2024-2028년 이중에너지 방사선 DXA를 도입하여 더 정확한 근육량 측정을 실시하고 이를 기초로 근감소증 추이 및 관련요인을 모니터링할 계획이다.

Declarations

Ethics Statement: This study was approved by the Institutional Review Board of Korea Disease Control and Prevention Agency, and all subjects provided written informed consent (IRB no. 2018-01-03-4C-A).

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Prevalence of Sarcopenia in the Republic of Korea

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ABSTRACT

The prevalence of low handgrip strength and sarcopenia in people aged ≥65, in the Republic of Korea, was investigated using data from the Korea National Health and Nutrition Examination Survey (KNHANES). This study included participants in the 2022 KNHANES aged ≥65 years who had handgrip strength and muscle mass measured by bioelectrical impedance analysis, according to the Asian Working Group for Sarcopenia 2019 guidelines. In 2022, prevalence of low handgrip strength among those aged ≥65 was 14.2% for men and 18.8% for women, and the prevalence of sarcopenia was 6.6% for men and 9.2% for women. In this study, the prevalence of sarcopenia was higher in older age, women than in men, and low-income groups. In conclusion, older people and those with in low-income groups are vulnerable to sarcopenia; therefore, it is necessary to focus on early identification of sarcopenia and development of prevention and management intervention programs for these people.

Key words: Sarcopenia; Handgrip strength; Korea National Health and Nutrition Examination Survey

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Introduction

Sarcopenia is characterized by the loss of muscle mass associated with aging, as well as the decline in muscle strength or physical function [1]. The loss of muscle mass increases the risk of falls and fractures and the incidence of chronic diseases such as diabetes mellitus, high blood pressure, and cardiovascular disease [1-3]. The lower extremity muscle strength performance evaluated in the National Survey of Older Koreans was decreasing from 79.7% in 2014 to 78.6% in 2017 and 77.9% in 2020 [4-6]. Although a domestic study of community-dwelling people aged 70 years or older in 2016–2017 reported that the prevalence of sarcopenia was 14.4% in men and 6.4% in women, continuous trends in its prevalence have not been reported [7]. As sarcopenia is recognized as a disease, its disease code (M62.84) was registered in the World Health Organization's 10th International Statistical Classification of Diseases and Related Health Problems code (ICD-10) in 2016. In the Republic of Korea (ROK), sarcopenia was also included as a diagnosis code (M62.5) in the 8th Korean Standard Classification of Diseases and Causes of Death (KCD-8) in 2021 [1]. The Korea National Health and Nutrition Examination Survey (KNHANES) has included measuring handgrip strength and published the distribution of handgrip strength in individuals aged 10 years or older since 2014, along with the prevalence of low handgrip strength in people

Key messages

① What is known previously?

Sarcopenia is defined as the age-related loss of skeletal muscle mass, loss of muscle strength, and/or reduced physical performance, and it increases the risk of falls, fractures, and chronic diseases. In a previous study conducted in the Republic of Korea, the prevalence of sarcopenia was reported to be approximately 10%.

② What new information is presented?

The prevalence of sarcopenia was 6.6% in men and 9.2% in women and was higher in low-income groups.

③ What are implications?

Early identification of sarcopenia and development of prevention/management interventions for vulnerable groups, such as older people and individuals in low-income groups, are required.

aged 65 years or older according to the criteria of the Asian Working Group for Sarcopenia (AWGS 2019) since 2019 [1]. In 2022, the KNHANES introduced bioelectrical impedance analysis (BIA) to measure muscle mass and newly calculate the prevalence of sarcopenia. In this study, we investigated the prevalence of sarcopenia in the ROK based on the handgrip strength and muscle mass measurement data from the 2022 KNHANES.

Methods

1. Participants

The KNHANES is a nationwide health and nutrition survey to assess health status, health behaviors, and food and nutritional intake status of Koreans based on Article 16 of the National Health Promotion Act [8]. The target sample of the KNHANES was extracted to select primary sampling units (PSUs) and household members in the primary and secondary stages using two-stage stratified, clustered sampling. The participants in the KNHANES comprise approximately 192 PSUs every year, and all household members aged 1 year or older in 25 sample households per PSU. This study analyzed 2022 KNHANES participants aged 65 years or older who underwent handgrip strength (n=1,462) and body composition (n=1,276) analyses.

2. Methods

The health examination of the KNHANES was conducted at mobile examination centers by survey staff members from the Korea Disease Control and Prevention Agency. For measuring handgrip strength, the handgrip strength of both hands or one hand was measured twice using a digital grip dynamometer (TKK 5401; Takei), and a maximum value was used as the handgrip strength measurement. A visual examination and survey were conducted to select those who should be excluded from handgrip strength testing. Handgrip strength testing was not performed in people with visual examination items, such as defects in the arm/hand/thumb, hand paralysis, cast or bandage on the hand/wrist, or survey items, such as subjective inability to participate in the survey or worsening of pain/tingling/stiffness in the hands within the past 7 days.

Body composition analysis was performed to evaluate lean body mass, muscle mass (excluding bone mineral), body fat mass, body water, and whole-body phase angle using an impedance body fat analyzer (Inbody 970; InBody Co., Ltd.). Some participants with artificial pacemakers and implantable cardioverter defibrillators were excluded. Muscle mass (excluding bone mineral) was measured for each body part, and the

sum of the limb muscle masses (right arm, left arm, right leg, left leg) was calculated.

3. Statistical Analysis

In this study, data were analyzed using a complex sample design analysis method that assigned sample weights to represent the Korean population using SAS (version 9.4; SAS Institute Inc.). The prevalence of low handgrip strength and sarcopenia were analyzed for only those aged 65 years or older who participated in the KNHANES and who had no missing data required for calculating the concerned indicators. The residential area was classified into dong (urban area), which is a lower administrative district of a city or district, and eup-myeon (rural area), which is a lower administrative district of a county. Household income levels were classified using the monthly equivalized household income (monthly household income/√ number of household members) into quintiles by sex and age (5-year units).

4. Definitions of Indicators

The prevalence of low handgrip strength was calculated as the percentile of those with a maximum grip strength value of <28 kg for men and <18 kg for women, among the values of handgrip strength, which were measured twice for both hands or one hand according to the criteria of the AWGS 2019 [1]. The prevalence of sarcopenia was also calculated as the percentage of those with correspondingly low handgrip strengths based on the criteria of the AWGS 2019, and the sum of all limbs muscle masses (excluding bone minerals)/height^2 <7.0 kg/m^2 for men and <5.7 kg/m^2 for women in the results of impedance body fat analysis [1].

Table 1. Prevalence of low handgrip strength (2022)[a]

Variables	Total		Men		Women	
	n	% (SE)	n	% (SE)	n	% (SE)
Total (≥65)	1,462	16.7 (1.2)	681	14.2 (1.5)	781	18.8 (1.7)
Age (yr)						
65–69	498	6.7 (1.4)	233	6.8 (2.2)[c]	265	6.5 (1.7)[c]
70–74	390	12.9 (2.0)	182	12.6 (2.9)	208	13.2 (2.6)
75–79	341	19.9 (2.3)	161	15.5 (3.0)	180	22.9 (3.4)
≥80	233	40.1 (3.9)	105	35.2 (5.8)	128	43.3 (5.2)
Residential area						
Urban areas	1,020	15.6 (1.4)	475	13.8 (1.8)	545	17.0 (1.9)
Rural areas	442	21.1 (2.5)	206	15.6 (2.7)	236	25.4 (3.7)
Household income[b]						
Low	276	21.8 (3.0)	129	16.0 (3.3)	147	26.5 (4.7)
Low-middle	289	20.4 (3.1)	135	17.6 (3.9)	154	22.9 (4.5)
Middle	290	12.8 (2.3)	137	11.7 (3.1)[c]	153	14.0 (2.9)
Middle-high	302	15.1 (2.8)	142	11.6 (2.6)	160	18.1 (4.5)
High	302	14.9 (2.6)	138	14.9 (3.9)[c]	164	15.0 (3.3)

SE=standard error. [a]Cited from Korea Health Statistics 2022 [8]. [b]The household income was calculated by dividing the household monthly income by the square root of the household size, and then categorized into quintile. [c]Coefficient of variation: 25–50%.

Results

1. Prevalence of Low Handgrip Strength

The prevalence of low handgrip strength among those aged 65 years or older was 16.7% (14.2% in men, 18.8% in women) as of 2022 and increased with age, reaching 40.1% in those aged 80 years or older (Table 1). For those under 75 years old, there was no remarkable sex difference, but for those aged 75–79 years or older, it was higher in women than in men. There was no difference in the prevalence of low handgrip strength in men with respect to residential area. However, the prevalence of low handgrip strength in women was higher in eup-myeon area residents (25.4%) than in dong area residents (17.0%). With respect to income levels, the prevalence of low handgrip strength was higher in low-income groups for both men and women, and it was more evident in women.

2. Prevalence of Sarcopenia

The prevalence of sarcopenia in those aged 65 years or older was 7.9% as of 2022 and increased with age, reaching 7.1% in those aged 70–74 years, 9.9% in those aged 75–79 years, and 20.0% in those aged 80 years or older (Table 2). Its prevalence was higher in women (9.2%) than in men (6.6%), its prevalence in women aged 75–79 years was about twice as high as in men aged 75–79 years and was similar between men and women aged 80 years or older. With respect to residential areas, the prevalence of sarcopenia showed no difference in men. However, its prevalence in women was about twice as high in eup-myeon area residents (14.8%) than in dong area residents (7.7%). With respect to income levels, the prevalence of sarcopenia in both men and women was higher in the low (or bottom 40% of income earners) or lower-middle income groups.

Table 2. Prevalence of sarcopenia (2022)[a]

Variable	Total		Men		Women	
	n	% (SE)	n	% (SE)	n	% (SE)
Total (≥65)	1,276	7.9 (0.8)	605	6.6 (1.0)	671	9.2 (1.2)
Age (yr)						
65–69	461	2.7 (0.8)[c]	220	2.2 (1.0)[c]	241	3.3 (1.2)[c]
70–74	343	7.1 (1.4)	163	5.9 (1.9)[c]	180	8.1 (2.1)[c]
75–79	287	9.9 (1.7)	133	6.6 (2.0)[c]	154	12.8 (2.8)
≥80	185	20.0 (3.3)	89	18.8 (4.5)	96	21.2 (5.0)
Residential area						
Urban areas	910	7.3 (1.0)	428	6.8 (1.1)	482	7.7 (1.4)
Rural areas	366	10.4 (1.7)	177	5.9 (2.1)[c]	189	14.8 (2.5)
Household income[b]						
Low	235	9.8 (2.0)	110	8.2 (2.5)[c]	125	11.1 (2.7)
Low-middle	254	13.8 (2.4)	123	10.0 (3.0)[c]	131	17.9 (3.8)
Middle	252	4.6 (1.2)[c]	121	4.2 (1.8)[c]	131	5.1 (1.8)[c]
Middle-high	271	5.6 (1.3)	129	4.9 (1.7)[c]	142	6.2 (2.0)[c]
High	262	6.9 (1.9)[c]	122	6.5 (2.2)[c]	140	7.2 (2.5)[c]

SE=standard error. [a]Cited from Korea Health Statistics 2022 [8]. [b]The household income was calculated by dividing the household monthly income by the square root of the household size, and then categorized into quintile. [c]Coefficient of variation: 25–50%.

Discussion

The prevalence of low handgrip strength among Koreans aged 65 or older was 16.7% (14.2% in men, 18.8% in women). The prevalence of sarcopenia was 7.9% (6.6% in men, 9.2% in women). The prevalence of sarcopenia was higher in women than in men and in those with low income.

The prevalence of sarcopenia varies from 10% to 27% depending on the methods to measure muscle mass and the criteria [9]. Although AWGS criteria are used, the calculated prevalence still vary with respect to measurement methods, for example, 18% in a study using dual-energy X-ray absorptiometry (DXA) and 14% in a study using BIA [9]. More so, the prevalence of sarcopenia also differs in the same participants with respect to the criteria other than the AWGS criteria [7,10].

The prevalence of sarcopenia in this study was 7.9%, which was lower than that reported in a meta-analysis study of Asians (15.0%) [9]. In another study that used BIA, the prevalence of sarcopenia in Asians (10% in men, 11% in women) was lower than that in non-Asians (Europeans, Americans, etc.) (19% in men, 20% in women) [11], and that in the ROK was even lower (6.6% in men, 9.2% in women). Regarding racial differences in the prevalence of sarcopenia, it has been suggested that the cutoff value for calculating the prevalence of sarcopenia in Asians is lower than that in Western societies and that sarcopenia was likely to be prevented in Asians by consuming healthier foods and engaging in more physical activity compared to people in Western societies [11].

By sex, the prevalence of sarcopenia in women was higher than that in men, and in those aged 70 years or older (AWGS 2019, DXA, and handgrip strength measurement) as reported in the results of the frailty cohort in the ROK, it was higher in men (14.4%) than in women (6.4%) [7]. However, a meta-analysis based on the AWGS criteria reported that the prevalence of sarcopenia in men and women was 14.0%, respectively, with no sex difference. Therefore, follow-up studies are needed to investigate study results in different directions according to sex [9].

By age, the prevalence of sarcopenia in women aged 75–79 years was higher than that of men of the same age group, but there was no significant difference in those aged 80 or older. In women, the secretion of sex hormones such as estrogen and androgen decreases after menopause, leading to loss of muscle mass, which increases the prevalence of sarcopenia in their 60s and 70s. Meanwhile, in men, the secretion of sex hormones (testosterone) decreases at a later age than women and its prevalence increases rapidly after the eighth decade of life [11].

The results of this study showed that the prevalence of sarcopenia differed according to income level. A study of people aged 65 or older in China reported that lower household income was associated with a higher prevalence of sarcopenia (based on AWGS 2019, muscle mass [BIA], and handgrip strength [3 measurements] or walking speed) [12], which was similar to the results of this study. A study of individuals aged 60–89 years living in rural areas in China suggested that the factors contributing to the higher prevalence of sarcopenia in those with lower income levels might be affected by the possibility that lower income levels might be associated with lower nutritional knowledge levels for health management [13]. A study involving middle-aged people in China stated that patients with sarcopenia in the low-income class might have increasing risk of catastrophic health expenditure, making it difficult for them to diagnose and manage sarcopenia [14].

Moreover, the results of this study showed that there was

no significant sex difference in the prevalence of sarcopenia in dong area residents, but there was a distinct difference in its prevalence among eup-myeon area residents (5.9% in men and 14.8% in women). In a previous study of people aged 60–89 years living in rural areas of China (based on AWGS 2019, muscle mass [BIA] and handgrip strength [more than 2 measurements]) were also higher in women (21.7%) than in men (12.9%), which was similar to the results of this survey [15].

In conclusion, the results of this study suggest that the prevalence of sarcopenia in those aged 65 or older in the ROK is 7.9%, which is lower than in other countries [9]. However, this study suggests that sarcopenia increases with age, and, in particular, those with low income levels may be particularly vulnerable to sarcopenia. In the 5th Health Plan, public health centers' home visiting health services for older adults, which were focused on managing chronic diseases, were reorganized into a universal healthcare service system for frailty and is promoting expansion of community support projects such as AI or IoT-based health service projects for older adults [16]. It is important to provide vulnerable groups such as low-income groups with priority early intervention such as early detection of sarcopenia, nutritional management programs (senior gathering programs at senior centers and welfare centers, home visit/delivery programs, cooking classes, etc.), and exercise programs. Along with handgrip strength measurement, the KNHANES plans to introduce DXA between 2024 and 2028 to measure muscle mass more accurately and monitor trends in sarcopenia and related factors accordingly.

Declarations

Ethics Statement: This study was approved by the Institutional Review Board of Korea Disease Control and Prevention Agency, and all subjects provided written informed consent (IRB no. 2018-01-03-4C-A).

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