Prevalence of Disability among the Chinese Older Population: A Systematic Review and Meta-Analysis

Pian-Pian Zheng 1, Zi-Le Guo 1, Xiao-Jing Du 2, Han-Mo Yang 3 and Zhen-Jie Wang 1, *

1 Institute of Population Research, Peking University, Beijing 100871, China; pian714@pku.edu.cn (P.-P.Z.);
guozile@stu.pku.edu.cn (Z.-L.G.)
2 School of Humanities and Social Sciences, Xi’an Jiaotong University, Xi’an 710049, China;
xiaojingdu@stu.xjtu.edu.cn
3 National School of Development, Peking University, Beijing 100871, China; hanmo.yang@pku.edu.cn
* Correspondence: zhenjie.wang@pku.edu.cn

Abstract: Background: Disability is an important problem in aging societies globally. However, the research findings of the prevalence of disability have been inconsistent. This study aims to estimate the prevalence of disability and its influencing factors among the Chinese older population from 1979 to 31 July 2021. Methods: A systematic review and meta-analysis were conducted using both international (PubMed, Web of Science, CBMdisc, PsycINFO, the Cochrane Library, and EMBASE) and Chinese (CNKI, CQVIP, and WanFang) databases. Meta-analysis was performed using a random-effects model to account for heterogeneity. Subgroup analyses were also done. Results: The pooled prevalence of disability across all 97 studies was 26.2% (95% CI: 23.7–28.6%). The estimates varied according to the types of activities of daily living (ADL), gender, age, and region. Studies based on the identification of cases by using the complete ADL scale showed a higher prevalence than those using the basic ADL scale. The prevalence was slightly higher among female older individuals than among male older individuals. The highest rates were seen in older individuals aged 80 years or older. Elders in central China, southwest China, and northwest China were more likely to be BADL-disabled. Conclusion: Prevalence of disability among the Chinese older population is high, around 26%. Using standardized diagnostic systems to correctly estimate the prevalence of disability would be helpful for public health professionals in China.

Keywords: prevalence; disability; activities of daily living; older population; Chinese; meta-analysis

1. Introduction

With the continuous extension of average life expectancy, the proportion of older individuals is increasing dramatically. In 2017, there were an estimated 962 million people aged 60 years or above, accounting for 13% of the global population [1]. The older population in China has reached a prevalence of 18.7%, according to China’s seventh census [2]. With the rapid aging that is occurring in all regions of the world, the prevalence of older individuals in the whole world, except Africa, will reach 25% by 2050. Therefore, the problems associated with an aging society are becoming more severe, and one of the associated problems is a high rate of disability. Figuring out the rate of disability and the number of disabled elders is vital for a country to make improvements and promotion strategies for the old, disabled population’s quality of life. Relevant agencies can also make better plans for financial support, nursing services, and medical services.

According to the World Health Organization (WHO) report on disability, the estimated prevalence of disability was 10.2% in people aged 60 years or above in 194 countries and regions around the world [3]. However, in China, the second national sample survey on disability pointed out that the disabled elders accounted for 24.43% of all older individuals [4]. This difference in the prevalence of disability was more apparent in individual studies. We found that the prevalence of disability among the Chinese older population...
varies greatly, ranging from 1.85% to 71.28% [5,6], after combining the results of different studies. The pooled prevalence rates given by three relevant meta-analyses were 20.1% (95% CI: 14.7–25.6%), 28.5% (95% CI: 25.9–31.2%), and 34% (95% CI: 14–53%), which also seem to be quite different [7–9].

One of the reasons for this discrepancy is the different understanding and measurements. Disability can be defined in various ways, including impairment, limitations in mobility, physical function decline, and activities of daily living (ADLs). World Health Organization (WHO)’s International Classification of Functioning, Disability, and Health (ICF) uses disability as an umbrella term for impairments, activity limitations, or participation restrictions [10]. Additionally, it points out that disability represents the negative aspects of the interaction between the health condition and life situations (personal factors and environmental factors). Thus, the ADL is considered a suitable measurement of disability and also has good robustness and comparability [11,12].

Although several studies calculated the prevalence of ADL disability among the older population, a synthesis of these studies to derive a general risk estimate has not been well conducted. Hence, we have carried out a systematic review and meta-analysis to comprehensively analyze the related studies and extract a more accurate and general prevalence of disability by avoiding differences in individual studies caused by biased samples and moderating factors.

2. Materials and Methods

2.1. Literature Search

This research protocol was registered with the International Prospective Register of Systematic Reviews (PROSPERO: CRD42021269367). The literature search was conducted using the Chinese National Knowledge Infrastructure (CNKI), VIP Database (CQVIP), China Biology Medicine disc (CBMdisc), Wanfang, PubMed, Web of Science, Embase, and the Cochrane Library. All databases were searched from 1979 (the earliest year available on the CNKI database) to 31 July 2021. The search terms were keywords related to the older population (elderly OR elder OR old population OR old adults), ADL (activities of daily living OR disable OR disabled OR ADL OR BADL OR IADL), and China (China OR Chinese).

The screening procedure is shown below: (a) the titles were reviewed to determine potential articles related to the topic, (b) the abstracts were reviewed to narrow down the list of articles, and (c) the full text of the articles was read to make a final decision.

2.2. Inclusion and Exclusion Criteria

The complete type of ADL includes basic activities of daily living (BADL) and instrumental activities of daily living (IADL). The most commonly used scales for assessing BADL are the Katz independence index and the Barthel independence index, which have 6 or 10 items, consisting of relatively simple self-care tasks such as dressing, eating, and bathing [13,14]. Moreover, the frequently used tool for assessing IADL was designed by Lawton and Brody and has 8 items, such as shopping, cooking, financial management, and other more complex activities [15]. Those standard scales provide good support for us to merge the rates and compare. Some researchers used a self-made scale or increased or decreased the ADL items, and we did not include these studies.

Studies were included only if they met the following criteria: (a) the study was published between 1979 and 31 July 2021; (b) the study was conducted using a questionnaire survey, and the measurement tool was the Barthel independence index, the Katz independence index or the scale designed by Lawton and Brody; (c) the study reported the prevalence of disability with accurate and clear data; and (d) all older respondents were aged 60 years or above and came from Mainland China.

Studies were excluded if they met the following criteria: (a) for literature published with the same data, only the latest data were included; (b) reviews, conferences, lectures, or unpublished essays; (b) an unscientific research design, such as convenience sampling,
2.3. Data Extraction

The data in the studies, including the authors, publication year, survey year, sampling locations, diagnostic tools, participants, and disability cases, were collected. Additionally, the prevalence of disability among older individuals of different diagnostic tools, genders, ages, and regions was collected.

All studies were reviewed and coded by two authors to determine the consistency of the inclusion and exclusion criteria. In addition, each study included in the meta-analysis was coded by two authors to extract major outcomes. The discrepancies were resolved through discussions.

2.4. Quality of Assessment

The quality of included studies was assessed by the 11-item checklist recommended by the Agency for Healthcare Research and Quality (AHRQ). The item would be scored 1 for the answer of “Yes” and would get a score of 0 if the answer was “No” or “Unclear” (opposite for the 5th item). A total score of 0–3 = low quality, 4–7 = moderate quality, and 8–11 = high quality [16].

2.5. Statistical Analysis

The meta-analysis was carried out by using STATA 16.0. Combined effect sizes with corresponding confidence intervals (95%) were calculated, and these indicated the magnitude of the effect across all studies. The Q test and $I^2$ statistics were used to assess heterogeneity among the included studies. $p > 0.05$ and $I^2 < 50\%$ indicated no statistical heterogeneity between the studies. If no heterogeneity was observed, the fixed-effects model was employed; otherwise, the random-effects model was used [17]. The homogeneity test showed that $Q = 81,405.53$ ($p < 0.001$) and $I^2 = 99.9\%$. Therefore, we adopted the random-effects model for all meta-analyses.

Subgroup analyses and meta-regression analyses were conducted to eliminate heterogeneity and identify potential influencing factors. Sensitivity analyses were conducted by removing one study at a time and then recalculating the prevalence of the remaining studies to test the robustness of the primary results. Publication bias was diagnosed through Begg’s test. The significance level was set at 0.05 (two-sided) in all analyses.

3. Results

3.1. Search Strategy and Selection Criteria

Figure 1 shows a flow diagram of the systematic search of the literature. A total of 6444 articles were identified in 8 electronic databases. Among them, 1666 duplicates were eliminated, the titles and abstracts studies were screened, and the full text of 484 studies was evaluated. In the end, 97 studies passed the evaluation and were included in the meta-analysis.

3.2. Quality Assessment

The results of the quality assessment are shown in Table 1. Based on the AHRQ checklist, 97 studies reached moderate quality and above.

3.3. Study Characteristics

Table A1 in Appendix A summarizes the characteristics and findings of the included studies. A total of 97 eligible studies reported the prevalence of disability in Chinese older individuals, with a total of 110 results. Eight studies reported multiple results because they used several cross-sectional data sets or used several types of ADL.
Most of the included studies were cross-sectional, and two were longitudinal. For the longitudinal study, we included only the results from the cross-sectional analysis of the baseline data. In addition, 18 studies used national data, while the remaining studies obtained samples from regions within China; 86 studies were conducted with the general older population (≥60 or ≥65 years), but 11 studies only included the oldest elders (≥80 years) or centenarians. The sample size ranged from 182 to 32,281. The time of data collection spanned nearly three decades.

![Flow chart of the study selection process.](image)

Table 1. Risk of bias using quality assessment forms.

| Item                                                                                           | Yes | No  | Unclear |
|------------------------------------------------------------------------------------------------|-----|-----|---------|
| (1) Define the source of information (survey, record review)                                   | 97  | 0   | 0       |
| (2) List inclusion and exclusion criteria for exposed and unexposed subjects (cases and controls) or refer to previous publications | 97  | 0   | 0       |
| (3) Indicate time period used for identifying patients                                          | 78  | 19  | 0       |
| (4) Indicate whether or not subjects were consecutive if not population-based                  | 97  | 0   | 0       |
| (5) Indicate if evaluators of subjective components of the study were masked to other aspects of the status of the participants | 0   | 97  | 0       |
| (6) Describe any assessments undertaken for quality assurance purposes (e.g., test/retest of primary outcome measurements) | 60  | 36  | 1       |
| (7) Explain any patient exclusions from the analysis                                            | 89  | 7   | 1       |
| (8) Describe how confounding was assessed and/or controlled.                                    | 65  | 32  | 0       |
| (9) If applicable, explain how missing data were handled in the analysis                        | 13  | 82  | 2       |
| (10) Summarize patient response rates and completeness of data collection                     | 86  | 11  | 0       |
| (11) Clarify what follow-up, if any, was expected and the percentage of patients for which incomplete data or follow-up was obtained | 0   | 97  | 0       |

3.4. Pooled Prevalence of Disability

In total, 97 studies met the inclusion criteria, with 110 results. The whole sample included 561,800 subjects, of whom 116,813 had disabilities. Table 2 shows that the pooled
prevalence of disability among the Chinese older population was 26.2% (95% CI: 23.7–28.6%).

Table 2. Pooled prevalence of disability and subgroup analyses.

| Variables     | Classification | Number of Studies | Number of Results | Event Rate (%) | 95% CI (%) | Heterogeneity | p-Value |
|---------------|----------------|-------------------|-------------------|----------------|------------|---------------|---------|
| Pooled prevalence |               | 97                | 110               | 26.2           | 23.7–28.6 | 99.9          | 81,405.53 |
| Type of ADL   | BADL           | 56                | 62                | 20.5           | 17.7–23.3 | 99.9          | 26.55   |
|              | IADL           | 7                 | 7                 | 31.8           | 21.2–42.4 | 99.9          | <0.001  |
|              | BADL + IADL    | 41                | 41                | 33.8           | 29.4–38.3 | 99.6          |         |
| Gender        | Male           | 53                | 60                | 22.7           | 20.0–25.5 | 99.7          | 5.35   |
|              | Female         | 53                | 60                | 28.5           | 24.5–32.5 | 99.8          |         |
| Age group     | 60–69          | 23                | 26                | 12.8           | 10.1–15.5 | 99.6          | 104.92  |
|              | 70–79          | 23                | 26                | 22.4           | 16.5–28.3 | 99.7          |         |
|              | ≥80            | 36                | 44                | 36.8           | 33.1–40.5 | 99.6          |         |
| Region        | Eastern China  | 32                | 33                | 27.0           | 22.5–31.7 | 99.8          | 2.44   |
|              | Northern China | 18                | 20                | 26.0           | 19.9–32.1 | 99.7          |         |
|              | Southern China | 6                 | 6                 | 24.2           | 8.0–40.3  | 99.7          |         |
|              | Central China  | 7                 | 7                 | 26.9           | 17.9–35.8 | 99.4          |         |
|              | Southwest China| 10                | 13                | 30.9           | 22.3–39.4 | 99.7          |         |
|              | Northwest China| 4                 | 4                 | 21.3           | 12.3–30.3 | 97.8          |         |
| Hukou         | Urban          | 17                | 22                | 22.4           | 16.9–27.9 | 99.9          | 2.13   |
|              | Rural          | 26                | 31                | 28.0           | 22.9–33.0 | 99.9          | 0.143  |
|              | 1999 and before| 5                 | 6                 | 21.4           | 10.4–32.4 | 99.8          | 2.16   |
|              | 2000–2004      | 6                 | 7                 | 23.7           | 13.0–34.3 | 99.8          | 0.706  |
|              | 2005–2009      | 10                | 12                | 29.1           | 21.6–36.7 | 99.7          |         |
|              | 2010–2014      | 41                | 43                | 27.7           | 23.6–31.8 | 99.8          |         |
|              | 2015–2019      | 36                | 38                | 25.3           | 20.9–29.7 | 99.9          |         |

3.5. Subgroup Analyses

The prevalence varied greatly according to the types of ADL. The prevalence of disability detected by BADL was 20.5% (95% CI: 17.7–23.3%), which was significantly lower than that detected by complete ADL (33.8%, 95% CI: 29.4–38.3%) (p < 0.001).

The prevalence in women (28.5%, 95% CI: 24.5–32.5%) was slightly higher than that in men (22.7%, 95% CI: 20.0–25.5%). A significant difference was found among different age groups (p < 0.001). The prevalence of disability in the oldest age group (≥80 years) was 36.8% (95% CI: 33.1–40.5%), which was higher than that in the 60–69 years age group (12.8%, 95% CI: 10.1–15.5%) and the 70–80 years age group (22.4%, 95% CI: 16.5–28.3%).

3.6. Assessment of Disability by Using a Specific Type of ADL

3.6.1. BADL

As Table 3 shown, 56 studies provided information about the BADL. The random-effects analysis showed that the pooled prevalence of BADL disability was 20.5% (95% CI: 17.7–23.3%). Furthermore, older individuals aged 80 years or over (30.0%, 95% CI: 26.2–33.9%, p < 0.001) had a significantly higher BADL disability rate than younger elders. To avoid the limitation of insufficient studies, we merged some regional subgroups and found that other parts of China had an obviously higher BADL prevalence (24.4%, 95% CI: 26.2–33.9%, p < 0.001) than northern China.

3.6.2. Complete ADL

As Table 4 shown, 41 studies combined the basic and instrumental activities of daily living as a complete measurement tool, which consisted of 14 items. The pooled prevalence of disability according to complete ADL was 33.8% (95% CI: 29.4–38.3%). The oldest elders (≥80 years) also had an evidently higher prevalence (61.9%, 95% CI: 51.9–71.9%, p < 0.001).
### Table 3. Pooled prevalence of BADL disabilities and subgroup analyses.

| Variables          | Classification | Number of Studies | Number of Results | Event Rate (%) | 95% CI (%) | Heterogeneity I² (%) | Q-Value | p-Value |
|--------------------|----------------|-------------------|-------------------|----------------|------------|----------------------|---------|---------|
| Pooled prevalence  |                | 56                | 62                | 20.5           | 17.7–23.3  | 99.9                 | 45,852.9 | 0.047   |
| Gender             | Male           | 37                | 41                | 19.4           | 16.4–22.4  | 99.7                 | 3.95    | <0.001  |
|                    | Female         | 37                | 41                | 25.1           | 20.3–29.9  | 99.8                 |         |         |
| Age group          | 70–79          | 17                | 17                | 7.3            | 5.7–8.9    | 98.6                 | 111.60  | <0.001  |
|                    | ≥80            | 29                | 33                | 30.0           | 26.2–33.9  | 99.6                 |         |         |
| Region             | Eastern China  | 15                | 15                | 16.8           | 13.5–20.1  | 99.3                 | 10.45   | 0.005   |
|                    | Northern China | 6                 | 8                 | 12.9           | 9.7–16.1   | 99.2                 |         |         |
|                    | Other regions *| 16                | 16                | 24.4           | 18.0–30.7  | 99.5                 |         |         |
| Hukou              | Urban          | 14                | 18                | 22.6           | 16.1–29.2  | 99.9                 | 0.00    | 0.944   |
|                    | Rural          | 16                | 20                | 22.4           | 17.4–27.3  | 99.9                 |         |         |
| Survey year        | 2009 and before*| 8                | 14                | 21.7           | 14.2–29.1  | 99.9                 | 0.78    | 0.678   |
|                    | 2010–2014      | 25                | 25                | 21.3           | 17.6–25.1  | 99.7                 |         |         |
|                    | 2015–2019      | 20                | 20                | 18.9           | 14.3–23.4  | 99.8                 |         |         |

* To avoid the limitation of insufficient studies, we merged Central China, Southwest China, and Northwest China into a group called "Other regions". In addition, the studies published in 2009 and before were merged into one group.

### Table 4. Pooled prevalence of complete ADL and subgroup analyses.

| Variables          | Classification | Number of Studies | Number of Results | Event Rate (%) | 95% CI (%) | Heterogeneity I² (%) | Q-Value   | p-Value |
|--------------------|----------------|-------------------|-------------------|----------------|------------|----------------------|-----------|---------|
| Pooled prevalence  |                | 41                | 41                | 33.8           | 29.4–38.3  | 99.6                 | 10,997.47 | 0.472   |
| Gender             | Male           | 16                | 16                | 32.2           | 23.1–41.4  | 99.5                 | 0.52      |         |
|                    | Female         | 16                | 16                | 36.7           | 28.7–44.7  | 99.4                 |           |         |
| Age group          | 70–79          | 6                 | 6                 | 40.5           | 24.9–56.1  | 99.6                 | 22.45     | <0.001  |
|                    | ≥80            | 7                 | 7                 | 61.9           | 51.9–71.9  | 97.3                 |           |         |
| Region             | Eastern China  | 16                | 16                | 36.4           | 27.8–44.9  | 99.8                 | 1.10      | 0.578   |
|                    | Northern China | 12                | 12                | 34.7           | 26.9–42.4  | 99.6                 |           |         |
|                    | Other regions *| 12                | 12                | 31.2           | 25.1–37.2  | 99.6                 | 0.38      | 0.827   |
| Survey year        | 2010–2014      | 15                | 15                | 35.9           | 27.4–44.3  | 99.7                 |           |         |
|                    | 2015–2019      | 16                | 16                | 32.5           | 24.9–40.1  | 99.7                 |           |         |

* To avoid the limitation of insufficient studies, we merged Central China, Southwest China, and Northwest China into a group called “Other regions”. In addition, the studies published in 2009 and prior to 2009 were merged into one group.

#### 3.7. Meta-Regression

In this study, score, mean age, the proportion of females, the proportion of rural hukou, publication year, and survey year can be taken as a continuous variable. Additionally, meta-regression was performed to assess the relationship between those variables and the pooled prevalence. The results showed that only mean age had a significant linear relationship with the prevalence of disability (β = 0.0094, p < 0.001). Thus, the prevalence of ADL disability in Chinese older adults showed an ascending trend with age.

#### 3.8. Publication Bias and Sensitivity Analyses

Begg's test showed that there was no obvious publication bias (z = 1.65, p = 0.099). The results of sensitivity analysis were between 25.7% (95% CI: 23.3–28.2%) and 26.4% (95% CI: 23.9–28.9%), indicating that the primary result had good robustness.

### 4. Discussion

To the best of our knowledge, this is the first meta-analysis to examine the prevalence of disability among older adults in mainland China over such an extensive period based on both international and Chinese databases. The total number of older persons in this analysis was large enough to be conclusive on several issues. The meta-analysis of 97 studies revealed that the prevalence was 26.2% (95% CI: 23.7–28.6%), which means there are nearly
69 million older people suffering from disabilities in China. Additionally, the prevalence of disability presented differences in terms of types of ADL, gender, age, and region.

We divided ADL into three types when collating and analyzing the data and found that we obtained a higher pooled prevalence for complete ADL, especially compared with BADL. These findings might be related to the characteristics of BADL and IADL. BADL and IADL represent different positions along the spectrum of the disablement process. BADL reflects the elders’ basic self-care independence, whereas IADL reflects the ability of older people to live independently. The IADL disability is more likely to happen earlier with age. Hence, the more items that are included, the more sensitive the tool will be.

Several studies had shown that the ADL ability of older individuals was negatively correlated with age [18,19]. Therefore, it is not surprising that the pooled prevalence of disability among the oldest people (age 80 years or above) was significantly higher than that of younger individuals. Meanwhile, the regression results suggest that the increase in the prevalence of disability is about a 0.09 percent point for each 1-year increase in the mean age of the population. With increasing age, the physiological functions of older adults continue to decline, the risk of chronic disease and accidental injury increases, and the disability trend could further increase [20].

The prevalence of disability differs significantly by gender, and the prevalence in females was significantly higher than that in males. This finding is consistent with the results of numerous studies, showing that females are more likely to experience disabilities [21]. Especially in BADL disability, that females’ disability rate was 1.29 times that of males. This difference was mainly attributed to two aspects. Compared with females, males have usually had better social status, income, and degree of education since ancient times. They have a stronger awareness of health care and more social resources to obtain health care [22]. In addition, the average life expectancy of females is longer than that of males [23], leading to a higher risk of disability.

Compared with northern China, elders in other regions (including central China, southwest China, and northwest China) were more likely to be BADL-disabled. Although the economic conditions have been greatly improved recently in most areas of China, many older adults living in remote areas are still unable to obtain timely and high-quality medical services.

This analysis provides useful information for the public health professionals of China. Over a quarter of all Chinese older individuals may have different levels of disability. This result indicates that we should strengthen community-based intervention and provide more health services, such as disability assessments and functional exercises. Once an individual has a severe functional impairment, medical assistance and financial subsidies should be provided promptly. This is especially true for older individuals aged over 80 years and female older individuals.

5. Limitations

There are some limitations of our study. First, this study included only published studies, and there may have been publication bias even though no such bias was indicated by statistical tests. Second, the included studies suffered from high heterogeneity, although the measurement tools were controlled and subgroup analyses were performed to address this shortcoming. High heterogeneity may reflect differences in the design and conduct of the studies (methodological heterogeneity) or in the participants and outcomes measured (clinical heterogeneity) [24,25]. In this meta-analysis, we collected many studies published over nearly three decades. It was inevitable that we did not fully identify the studies with low-quality research design. Additionally, we may have ignored some important confounding factors, such as disease and social-economic status. Moreover, the large sample size included in the study may also make the I² value increase [26]. In addition, when using dependency measures, much information about the severity of the disability was lost, which is worthy of further study.
6. Conclusions

The meta-analysis of 97 studies on the prevalence of disability among the Chinese elderly population from 1979 to 2021 found that (1) the pooled prevalence reached 26.2% (95% CI: 23.7–28.6%) and (2) differences in prevalence exist in terms of types of ADL, gender and age. Considering the negative impact of disability on personal well-being and financial expenditure, regular and appropriate interventions are needed for this vulnerable group.

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Appendix A

Table A1. Characteristics of the 97 studies included in the meta-analysis.

| NO. | Study | Publication Year | Language | Survey Year | Sampling Province | Age (Mean) | Type of ADL | Sample Size | Female (N, %) | Rural (N, %) | Cases of Disability | Rate | Score of Quality |
|-----|-------|------------------|----------|-------------|------------------|------------|-------------|-------------|--------------|-------------|-------------------|-------|-----------------|
| 1.  | Huang et al. [27] | 1993 | CH | 1991 * | Sichuan | ≥60 (68.8) | PADL + IADL ** | 1242 | 657 (52.9) | NR | 422 | 33.98 | 6 |
| 2.  | Meng et al. [28] | 1996 | CH | 1992 | Beijing | ≥60 | PADL + IADL | 3257 | 1415 (43.44) | NR | 778 | 23.90 | 7 |
| 3.  | Tang et al. [29] | 1999 | EN | 1990 | Beijing | ≥60 (71.0) | PADL ** | 3440 | 1733 (50.38) | NR | 629 | 18.28 | 9 |
| 4.  | Lv et al. [30] | 2001 | CH | 2000 | Anhui | ≥60 | PADL + IADL | 1424 | NR | NR | 274 | 19.24 | 5 |
| 5a. | Meng et al. [31] | 2002 | CH | 1992 | Beijing | ≥60 (72.3) | PADL | 2783 | NR | NR | 262 | 9.41 | 8 |
| 5b. | Meng et al. [31] | 2002 | CH | 1997 | Beijing | ≥60 (72.0) | PADL | 2786 | NR | NR | 171 | 6.14 | 8 |
| 5c. | Meng et al. [31] | 2002 | CH | 2000 | Beijing | ≥60 (72.9) | PADL | 2667 | NR | NR | 214 | 8.02 | 8 |
| 6.  | Wang et al. [32] | 2002 | CH | 2000 | Guangzhou | ≥60 | PADL ** | 1161 | 631 (54.35) | NR | 94 | 8.10 | 7 |
| 7.  | Lin et al. [33] | 2002 | CH | 2000 | Beijing | ≥60 | PADL | 895 | NR | NR | 174 | 19.44 | 7 |
| 8.  | Ji et al. [34] | 2007 | CH | 2005 * | Jiangsu | ≥60 | PADL + IADL | 337 | NR | NR | 103 | 30.56 | 6 |
| 9.  | Yin and Lu [35] | 2007 | EN | 2002 | National | ≥60 | PADL | 8844 | 4938 (55.83) | 4627 (52.3) | 3153 | 35.65 | 10 |
| 10a. | Huang et al. [36] | 2008 | CH | 2006 * | Guizhou | ≥60 (70.2) | PADL | 3221 | 1995 (61.94) | NR | 171 | 5.31 | 7 |
| 10b. | Huang et al. [36] | 2008 | CH | 2006 * | Guizhou | ≥60 (70.2) | IADL | 3221 | 1995 (61.94) | NR | 382 | 11.86 | 7 |
| 11.  | Tang et al. [37] | 2009 | CH | 2008 | Hunan | ≥60 | PADL + IADL | 203 | 124 (61.08) | NR | 102 | 50.25 | 7 |
| 12.  | Xu et al. [38] | 2011 | CH | 2010 | Zhejiang | ≥60 (84.8) | PADL ** | 454 | 268 (59.03) | NR | 138 | 30.40 | 9 |
| 13.  | Chen et al. [39] | 2011 | CH | 2010 | Beijing | ≥60 | PADL + IADL | 1882 | 990 (53.65) | NR | 917 | 43.41 | 5 |
| 14.  | Li et al. [40] | 2011 | EN | 2002 | Shanghai | ≥60 (83.1) | PADL + IADL | 1027 | 534 (52.60) | NR | 674 | 65.63 | 9 |
| 15.  | Xue et al. [41] | 2011 | CH | 2010 | Shanghai | ≥60 (93.3) | PADL + IADL | 1027 | 534 (52.60) | NR | 674 | 65.63 | 9 |
| 16.  | Li et al. [42] | 2012 | CH | 2011 | Beijing | ≥60 | PADL + IADL | 11,338 | 6043 (53.30) | NR | 2013 | 17.75 | 8 |
| 17.  | Shi et al. [43] | 2012 | CH | 2011 | Shandong | ≥60 | PADL | 504 | 234 (46.43) | NR | 96 | 19.05 | 8 |
| 18.  | Li et al. [44] | 2012 | CH | 2010 * | Ningxia | ≥60 | PADL + IADL ** | 904 | 459 (50.77) | NR | 251 | 28.87 | 7 |
| 19.  | Zhang et al. [45] | 2012 | CH | 2010 * | Hebei | ≥60 | PADL + IADL ** | 2161 | NR | NR | 796 | 36.83 | 7 |
| 20.  | Yu et al. [46] | 2012 | CH | 2011 | Shanghai | ≥60 | PADL + IADL | 1500 | 842 (56.13) | NR | 589 | 39.27 | 8 |
| 21.  | Huang et al. [47] | 2012 | CH | 2008 | Anhui | ≥60 (70.2) | PADL + IADL ** | 1117 | 764 (68.40) | 1117(100.00) | 764 | 68.40 | 8 |
| 22.  | Yin et al. [48] | 2012 | CH | 2012 | Zhejiang | ≥60 | PADL + IADL ** | 2184 | 1218 (55.77) | 2184(100.00) | 566 | 25.92 | 8 |
| 23.  | Zhang and Wei [49] | 2014 | CH | 2013 | Beijing | ≥60 | PADL | 2031 | NR | NR | 200 | 9.85 | 9 |
| 24.  | Zhong et al. [50] | 2014 | CH | 2008 | Zhejiang, Gansu | ≥60 | PADL | 1157 | 547 (47.28) | NR | 214 | 18.50 | 9 |
| 25.  | Yin et al. [51] | 2014 | EN | 2011 | National | ≥60 (92.3) | PADL | 5405 | 3192 (59.09) | NR | 1856 | 33.98 | 7 |
| 26.  | Chen et al. [52] | 2015 | CH | 2013 * | Fujian | ≥60 (71.5) | PADL | 14,292 | 7404 (51.81) | NR | 610 | 4.27 | 8 |
| 27.  | Li et al. [53] | 2015 | CH | 2013 * | Ningxia | ≥60 (70.0) | PADL + IADL ** | 817 | 457 (55.94) | NR | 84 | 10.28 | 7 |
| 28.  | Li and Yuan [54] | 2015 | CH | 2013 | Shandong | ≥60 | PADL | 416 | 276 (66.19) | 172 (41.25) | 76 | 16.11 | 7 |
| 29.  | Zhang et al. [55] | 2016 | CH | 2011 | Chongqing | ≥60 | PADL ** | 227 | 131 (57.71) | NR | 84 | 37.00 | 9 |
| 30.  | Zhang et al. [56] | 2016 | EN | 2013 | Shanghai | ≥60 (72.1) | IADL | 8237 | 4473 (53.26) | NR | 1360 | 16.51 | 7 |
| 31.  | Gong [57] | 2016 | CH | 2014 | Shanghai | ≥60 | PADL | 1233 | NR | NR | 226 | 18.33 | 6 |
| 32.  | Zhong [58] | 2016 | CH | 2012-2014 | Guangdong | ≥60 | PADL | 1706 | NR | NR | 331 | 19.40 | 7 |
| 33.  | Liu et al. [59] | 2016 | EN | 2013 | Beijing | ≥60 (71.4) | PADL | 1036 | 522 (50.40) | NR | 219 | 21.10 | 7 |
| NO. | Study | Publication Year | Language | Survey Year | Sampling Province | Age (Mean) | Type of ADL | Sample Size | Female (N, %) | Rural (N, %) | Cases of Disability | Rate | Score of Quality |
|-----|-------|------------------|----------|-------------|-------------------|------------|-------------|-------------|--------------|-------------|-------------------|------|-----------------|
| 34. | Peng and Wu [60] | 2016 | CH | 2011 | National | ≥65 | PADL | 9097 | 4918 (54.06) | 4755 (52.27) | 1948 | 21.41 | 10 |
| 35. | Huang et al. [61] | 2016 | CH | 2013-2015 | Zhejiang | ≥60 (73.8) | PADL | 883 | 490 (55.49) | NR | 191 | 21.63 | 8 |
| 36a | Su et al. [62] | 2016 | EN | 2013 | Shanghai | ≥80 | IADL | 2058 | 1191 (57.87) | NR | 780 | 37.90 | 7 |
| 36b. | Su et al. [62] | 2016 | EN | 2013 | Shanghai | ≥65 | IADL | 5118 | 2861 (55.90) | NR | 1214 | 23.72 | 10 |
| 37. | Yue and Liu [63] | 2016 | CH | 2011 | National | ≥65 | PADL | 5183 | 2861 (55.90) | NR | 1214 | 23.72 | 10 |
| 38. | Chen et al. [64] | 2016 | CH | 2014 | Shanghai | ≥60 (74.2) | PADL + IADL | 3556 | 2114 (59.45) | NR | 879 | 24.72 | 8 |
| 39. | Yi et al. [65] | 2016 | CH | 2013 | Hubei | ≥65 (73.3) | PADL + IADL | 4002 | 2058 (51.42) | NR | 1375 | 34.36 | 8 |
| 40. | Zhang et al. [66] | 2016 | CH | 2014* | Hebei | ≥60 (68.7) | PADL + IADL | 2548 | 1322 (51.88) | 1350 (52.98) | 1076 | 42.23 | 7 |
| 41. | Zhai et al. [67] | 2016 | CH | 2011 | Shandong, Henan, Hubei, Hunan, Guangdong, Guangxi, Hainan, Jiangsu | ≥65 | PADL + IADL | 1355 | 706 (52.10) | 479 (53.80) | 921 | 67.97 | 10 |
| 42. | Luo et al. [68] | 2016 | CH | 2011 | Shandong, Henan, Hebei, Hunan, Guangdong, Guangxi, Hainan, Jiangsu | ≥65 | PADL + IADL | 2227 | 1227 (55.10) | NR | 553 | 24.83 | 10 |
| 43. | Dong et al. [5] | 2017 | EN | 2011 | Shanghai | ≥60 (71.6) | PADL | 1997 | 1153 (57.74) | NR | 37 | 1.85 | 6 |
| 44a. | Zhang et al. [69] | 2017 | EN | 2005–2014 | National | ≥65 (72.0) | PADL | 26,604 | 13,515 (50.80) | NR | 16,022 (60.22) | 1862 | 7.00 | 9 |
| 44b. | Zhang et al. [69] | 2017 | EN | 2005–2014 | National | ≥65 (72.0) | IADL | 26,604 | 13,515 (50.80) | NR | 8513 | 32.00 | 9 |
| 45. | Zhou and Ma [70] | 2017 | CH | 2013 | National | ≥65 (68.9) | PADL | 7629 | 3988 (52.27) | NR | 1038 | 14.92 | 9 |
| 46. | Ding and Wang [71] | 2017 | CH | 2014 | National | ≥60 (70.7) | PADL + IADL | 6959 | 3549 (50.99) | NR | 3976 | 21.34 | 9 |
| 47. | Jin [72] | 2017 | CH | 2011 | National | ≥60 | PADL ** | 9765 | NR | 2084 | 21.34 | 9 |
| 48. | Li et al. [73] | 2017 | CH | 2014 | Shanghai | ≥60 (72.3) | PADL + IADL ** | 1038 | 543 (50.14) | NR | 347 | 32.04 | 8 |
| 49. | Hao et al. [74] | 2017 | CH | 2016 | Beijing | ≥60 | PADL + IADL ** | 1196 | NR | 404 | 33.78 | 8 |
| 50. | Liu et al. [75] | 2017 | CH | 2016 | Shandong | ≥65 | PADL ** | 724 | 378 (52.20) | NR | 309 | 42.68 | 6 |
| 51. | Wang et al. [76] | 2017 | CH | 2015* | Hubei | ≥60 (75.5) | PADL + IADL ** | 724 | 378 (52.20) | NR | 309 | 42.68 | 6 |
| 52a. | Hu et al. [77] | 2017 | CH | 2014 | National | ≥65 (66.4) | PADL ** | 6168 | 2813 (45.61) | NR | 1517 | 24.59 | 8 |
| 52b. | Hu et al. [77] | 2017 | CH | 2014 | National | ≥65 (66.4) | IADL ** | 6168 | NR | 3864 | 62.65 | 8 |
| 53. | Wu et al. [78] | 2017 | CH | 2010 | Chongqing | ≥100 | PADL | 564 | 471 (83.51) | 564 (100.00) | 370 | 65.60 | 9 |
| 54. | Yang et al. [79] | 2018 | EN | 2015-2016 | Hubei | ≥65 (72.6) | PADL ** | 2096 | 1065 (50.81) | NR | 149 | 7.11 | 8 |
| 55. | Liu et al. [80] | 2018 | CH | 2013 | National | ≥60 | PADL ** | 8751 | NR | 842 | 9.62 | 8 |
| 56. | Ding and Yan [81] | 2018 | CH | 2011 | National | ≥60 | PADL | 7626 | 3801 (49.84) | NR | 5765 (75.60) | 845 | 11.08 | 8 |
| 57a. | Chen et al. [82] | 2018 | EN | 2016-2017 | Guangxi | ≥60 | PADL | 1200 | 1350 (58.70) | NR | 266 | 11.57 | 7 |
| 57b. | Chen et al. [82] | 2018 | EN | 2016-2017 | Guangxi | ≥60 | IADL | 1200 | 1350 (58.70) | NR | 976 | 42.43 | 7 |
| 57c. | Chen et al. [82] | 2018 | EN | 2016-2017 | Guangxi | ≥60 | PADL + IADL | 1200 | 1350 (58.70) | NR | 998 | 43.39 | 7 |
| 58. | Zhai et al. [83] | 2018 | CH | 2016* | Shanghai | ≥60 | PADL + IADL | 1000 | NR | 1187 | 41.82 | 7 |
| 59. | Liu et al. [84] | 2018 | CH | 2010-2014 | Beijing | ≥60 (70.3) | PADL | 4499 | 2684 (59.66) | NR | 544 | 12.10 | 8 |
| 60. | Xu et al. [85] | 2018 | CH | 2016 | Sichuan | ≥60 | PADL | 890 | 577 (64.83) | NR | 119 | 13.37 | 9 |
| NO. | Study                      | Publication Year | Language | Survey Year | Sampling Province | Age (Mean) | Type of ADL         | Sample Size | Female (N, %) | Rural (N, %) | Cases of Disability Rate Score of Quality |
|-----|----------------------------|------------------|----------|-------------|-------------------|------------|---------------------|-------------|---------------|-------------|------------------------------------------|
| 61. | Wu et al. [86]             | 2018             | CH       | 2016*       | Beijing           | ≥60        | PADL + IADL         | 1158        | 713 (61.57)   | NR          | 220          | 19.00 8                                  |
| 62. | Fu et al. [87]             | 2018             | EN       | 2014        | Hebei             | ≥65 (74.3) | PADL + IADL         | 1210        | 672 (55.54)   | NR          | 249          | 20.58 7                                  |
| 63. | Liu et al. [88]            | 2018             | EN       | 2016*       | Hebei             | ≥65        | PADL + IADL         | 622         | 358 (57.56)   | NR          | 179          | 28.78 6                                  |
| 64. | Gu and Feng [89]           | 2018             | EN       | 2000–2009   | National          | ≥65 (88.1) | PADL **             | 32,281      | NR            | 220          | 19.00 8                                  |
| 65a.| Hou et al. [90]            | 2018             | EN       | 1998        | National          | ≥80 (92.0) | PADL                | 1374        | 18,914        | 9361 220    | 29.00 9                                  |
| 65b.| Hou et al. [90]            | 2018             | EN       | 2000        | National          | ≥80 (91.1) | PADL                | 10,940      | 5240 (59.76)  | 5455 (62.21)| 3236 10       |
| 65c.| Hou et al. [90]            | 2018             | EN       | 2002        | National          | ≥80 (92.3) | PADL                | 10,905      | 6356 (58.10)  | 4181 (38.22)| 3805 10       |
| 65d.| Hou et al. [90]            | 2018             | EN       | 2005        | National          | ≥80 (92.5) | PADL                | 10,393      | 6260 (60.23)  | 5795 (53.05)| 4414 10       |
| 65e.| Hou et al. [90]            | 2018             | EN       | 2008        | National          | ≥80 (92.4) | PADL                | 11,658      | 7074 (60.68)  | 7016 (60.18)| 3318 10       |
| 66. | Bai et al. [91]            | 2018             | CH       | 2013        | Hebei             | ≥60        | PADL + IADL         | 23,803      | 13,234 (55.60)| 11,029      | 2.10 9                                  |
| 67. | Gong et al. [92]           | 2018             | EN       | 2016*       | Anhui             | ≥60 (70.7) | PADL + IADL         | 3182        | 1862 (58.52)  | 3182 (100.00)| 1942 66       |
| 68. | Dong et al. [93]           | 2018             | EN       | 2014        | Hebei             | ≥60        | PADL + IADL         | 945         | 580 (61.38)   | 945 (100.00)| 599 63.39     |
| 69a.| Zhang et al. [94]          | 2019             | CH       | 2015        | Fujian, Sichuan, | ≥60        | PADL                | 23,803      | 13,234 (55.60)| 11,029      | 2.10 9                                  |
| 69b.| Zhang et al. [94]          | 2019             | CH       | 2015        | Hebei, Sichuan,  | ≥60        | IADL                | 23,803      | 13,234 (55.60)| 11,029      | 4570 19.20    |
| 79. | Li et al. [95]             | 2019             | CH       | 2015        | Fujian, Sichuan, | ≥60        | PADL **             | 5174        | 2716 (52.49)  | NR          | 280 5.41 9                             |
| 71. | Liu et al. [96]            | 2019             | CH       | 2016-2017   | Hebei             | ≥60        | PADL + IADL         | 3125        | 1670 (53.44)  | NR          | 324 10.37 8                          |
| 72. | Fu et al. [97]             | 2019             | CH       | 2017 *      | Sichuan           | ≥60        | PADL **             | 1000        | 562 (56.20)   | NR          | 158 15.80 7                          |
| 73. | Chen et al. [98]           | 2019             | CH       | 2016        | Jiangsu           | ≥60        | PADL                | 2493        | 1314 (52.71)  | 1584 (63.54)| 402 16.13 7                          |
| 74. | Chen et al. [99]           | 2019             | CH       | 2016-2017   | Hebei             | ≥60        | PADL + IADL **      | 6171        | 3024 (49.00)  | NR          | 2489 40.33 9                          |
| 75. | Xu et al. [100]            | 2019             | CH       | 2017        | Hunan             | ≥60        | PADL + IADL **      | 6171        | 3024 (49.00)  | NR          | 2489 40.33 9                          |
| 76. | Bai et al. [101]           | 2019             | CH       | 2016-2017   | Hebei             | ≥60        | PADL + IADL **      | 6171        | 3024 (49.00)  | NR          | 2489 40.33 9                          |
| 77. | Ma et al. [102]            | 2019             | CH       | 2016-2017   | Hebei             | ≥60        | PADL + IADL **      | 6171        | 3024 (49.00)  | NR          | 2489 40.33 9                          |
| 78. | Zhao et al. [103]          | 2019             | CH       | 2017 *      | Fujian, Hebei     | ≥60        | PADL + IADL         | 23,803      | 13,234 (55.60)| 11,029      | 4570 19.20    |
| 79. | Yao et al. [6]             | 2019             | CH       | 2014-2016   | Hainan            | ≥100 (102.8)| PADL                | 940         | 765 (81.38)   | NR          | 670 71.28 9                           |
| 80. | Chen et al. [104]          | 2020             | CH       | 2015        | National          | ≥60        | PADL                | 4485        | 2422 (54.00)  | NR          | 297 6.62 9                        |
| 81. | Ning et al. [105]          | 2020             | CH       | 2018        | Shandong          | ≥60 (69.9) | PADL                | 3349        | 1715 (51.21)  | NR          | 229 6.84 9                        |
| 82. | Xu et al. [106]            | 2020             | CH       | 2018 *      | Hainan            | ≥60        | PADL **             | 365         | 213 (58.36)   | 221 (60.55)| 29 7.95 8                      |
| 83. | Gu et al. [107]            | 2020             | CH       | 2018        | Jiangsu           | ≥60 (69.4) | PADL                | 3259        | 1644 (50.44)  | 1544 (47.38)| 344 10.56 9                          |
| 84. | Peng et al. [108]          | 2020             | CH       | 2018        | Guangdong         | ≥60 (71.6) | PADL                | 1321        | NR            | NR          | 160 12.11 8                        |
| 85. | Xu et al. [20]             | 2020             | EN       | 2018        | Ningxia           | ≥60 (70.5) | PADL                | 1040        | 513 (49.33)   | NR          | 179 17.21 8                        |
| NO. | Study                          | Publication Year | Language | Survey Year | Sampling Province | Age (Mean) | Type of ADL | Sample Size | Female (N, %) | Rural (N, %) | Cases of Disability | Rate | Score of Quality |
|-----|-------------------------------|-----------------|----------|-------------|------------------|------------|-------------|-------------|---------------|--------------|---------------------|-------|-------------------|
| 86. | Zhang et al. [109]            | 2020            | CH       | 2018*       | Henan            | ≥60 (70.9) | PADL        | 5570        | 2825 (50.72)  | 4074 (73.14) | 1139                | 20.45 | 6                 |
| 87. | Cai et al. [110]              | 2020            | CH       | 2015        | Yunnan           | ≥60 (70.9) | PADL + IADL | 3978        | 2213 (55.63)  | 2000 (50.28) | 1017                | 25.57 | 9                 |
| 88. | Song et al. [111]             | 2020            | CH       | 2014        | Shandong         | ≥65        | PADL **     | 559         | 254 (45.44)   | 312 (55.81)  | 143                 | 25.58 | 9                 |
| 89. | Liu et al. [112]              | 2020            | CH       | 2015–2018   | Guangdong       | ≥60 (74.3) | PADL + IADL | 221         | 104 (47.06)   | NR           | 58                  | 26.24 | 9                 |
| 90. | Du et al. [113]               | 2020            | CH       | 2016        | Anhui            | ≥60 (71.7) | PADL        | 983         | 527 (53.61)   | NR           | 312                 | 31.74 | 10                |
| 91. | Zhang et al. [114]            | 2020            | CH       | 2016        | Chongqing        | ≥65        | PADL + IADL | 1341        | 609 (45.41)   | NR           | 596                 | 44.44 | 8                 |
| 92. | Lin et al. [115]              | 2020            | CH       | 2018 *      | Yunnan, Guizhou, | ≥60 (76.7) | PADL        | 182         | 118 (64.84)   | NR           | 96                  | 52.75 | 8                 |
| 93. | Xiao et al. [116]             | 2021            | EN       | 2018        | Yunnan, Guizhou, Yunnan, Sichuan, Xinjiang | ≥60 (69.4) | PADL        | 3770        | NR            | NR           | 488                 | 12.94 | 8                 |
| 94. | Cheng and Yan [117]           | 2021            | EN       | 1998–2014   | National        | ≥80        | PADL        | 30,317      | 17,663 (58.26) | NR           | 4884                | 16.11 | 10                |
| 95. | Gao et al. [118]              | 2021            | CH       | 2017        | Shandong         | ≥60 (69.8) | DL + IADL   | 7070        | 4224 (59.75)  | NR           | 1603                | 22.67 | 9                 |
| 96. | Chen et al. [119]             | 2021            | CH       | 2014        | National        | ≥60 (70.5) | PADL        | 6182        | 3305 (53.46)  | 3337 (53.98) | 1517                | 24.54 | 9                 |
| 97. | Yan et al. [120]              | 2021            | CH       | 2018        | National        | ≥65 (85.6) | PADL        | 15,771      | 8902 (56.45)  | NR           | 4196                | 26.61 | 10                |

* Survey year is the year the data were collected; if the survey year was not reported, the data was computed by subtracting two from the year of publication; ** Some studies did not indicate the source of the scale. We determined by the items and calculation methods used; CH = Chinese; EN = English; NR = not reported.
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