

Mapping gaps and exploring impairment and disability prevalence in South Asian (SAARC) countries: a scoping review

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ABSTRACT

Despite the considerable health and economic burden of disability in the South Asian (SA) region, there is limited evidence of impairments and disabilities prevalence and the need for Assistive Technologies (ATs). This scoping review aims to synthesise the evidence of the impairments and disabilities in SA countries. This review followed Arksey and O'Malley's methodological framework. EBSCOhost, EMBASE, PubMed, and Web of Science databases were searched for original research articles from SA countries. In this study, impairment and disability refer to functional limitations restricting individuals from performing activities, including visual, hearing, speaking, cognitive, mobility, and self-care difficulties. The review included full-text, English-language articles addressing any impairment and disability, without restrictions on publication date. This review identified 105 articles distributed over the six impairment and disability domains: visual, hearing, mobility, self-care, speaking, and cognitive. Most evidence originated from India (50.5%) and focused on visual impairments (53.3%). The review identified that heterogeneity in methodologies, case identification definitions, and study settings contributed to variations in prevalence estimation and restricted the comparability within and across countries. Besides, the uneven distribution of studies across countries suggests varying inclinations of countries toward specific impairment and disability domains. The review identified variations in prevalence due to differences in methodologies, definitions, and contexts. The review also identified the uneven distribution of studies, limited evidence on ATs, reliance on self-reported data, and lack of nationally representative research. Future research should use standardised case identification and evidence-based approaches to enhance comparability and minimise response biases.

> IMPLICATIONS FOR REHABILITATION

- More than half (53%) of the existing research publications on impairments and disabilities solely focus on visual impairment. This research gap highlights a deficiency in attention towards other forms of impairments, as well as assistive and rehabilitation services for those conditions.
- While the South Asian region (SA) is struggling with various challenges, including health and economic issues, information related to the availability and utilisation of Assistive Technologies (ATs) is limited due to the lack of empirical evidence.
- Owing to the absence of a standardised methodology and case identification definition, the prevalence of impairments notably varies across studies within countries.
- Analysing the factors contributing to the higher usage rates of ATs in the SA region for visual impairment could potentially improve AT adoption rates for other impairment types.

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Introduction

South Asian countries, comprising a diverse region with a rich cultural heritage, are a unique geopolitical region that hosts a quarter of the world's population and is the home of the second-highest number and proportion of the world's extreme poor [1]. This region also faces significant socioeconomic inequities and inadequate coverage of basic health interventions [2]. The 2022 World Health Organization (WHO) reported that as of 2021, an estimated 1.3 billion people, or 16% of the global population experience significant disability, where 80% of them live in low- and middle-income countries. This number

is growing due to the rising tide of chronic disease and greater recovery rate from injury and ill health [3].

Disability in South Asia presents a multifaceted challenge shaped by a complex interplay of socioeconomic, cultural, and healthcare factors. This region consists of Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka and hosts a significant portion of the world's population with disabilities [4]. Moreover, health disparities, limited access to healthcare services, inadequate rehabilitation facilities, cultural perceptions, and stigmatisation continue to affect the lives of individuals with disabilities in that region

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[2]. Although several international, regional, and national legal frameworks and policies are aimed at protecting the rights and promoting the well-being of people with disabilities, the effective implementation of these policies varies across countries. For instance, the United Nations Convention on the Rights of Persons with Disabilities (CRPD) recognises access to appropriate and affordable Assistive Technology (ATs) as a human right [5], however, access to ATs remains a significant challenge for most persons with disabilities. The WHO and UNICEF identified significant inequity in access to assistive technology, with only 3% of people in some low-income countries having access to the assistive products they need, compared to 90% in some high-income countries, and only 5–15% of the population who needs ATs have access to it [6].

Disability can be caused by a variety of factors, including congenital disabilities, accidents, injuries, and chronic diseases. The prevalence of disability in South Asia is estimated to be between 10% and 15% of the population [4]. This number has increased substantially during the past decade due to demographic and epidemiological changes. Besides, South Asia struggles with the data on prevalence; it is widely believed that the region under-reports disability, and in many cases, prevalence also varies across studies [7]. For instance, the prevalence of disability in Bangladesh is estimated between 0.93% to 5.71% in Sample Vital Statistics 2020 and Household Income and Expenditure Survey (HIES) 2022, respectively [8,9]. The reason behind these wide variations was identified in a government report conducted by the Bangladesh Bureau of Statistics (BBS) [10]. They mentioned that several factors like differing definitions of disability, different methodologies adopted during data collection, questionnaire design, and variation in the quality of study design may affect the prevalence estimation. In the South Asian setting, specific studies, and detailed data on the prevalence, risk factors, impact, and intersection with socio-cultural contexts of impairments and disabilities are still lacking despite their importance and ubiquity. A

comprehensive knowledge of the scope of these difficulties has been hampered by a lack of awareness, underreporting, and insufficient data collection methods. Considering these limitations, a scoping review is necessary to comprehensively examine the body of knowledge on impairments and disabilities in South Asian nations.

Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka are the densely populated countries in South Asia and are home to over 1.8 billion people. These nations collectively represent approximately 21% of the global population, occupy 3% of the world's landmass, and contribute to 3.8% of the global economy (Figure 1) [11]. Socioeconomic conditions, economic growth, disease patterns, social structure, and population composition show similar patterns in those countries. Consequently, an association known as the South Asian Association for Regional Cooperation (SAARC) was established in 1985, primarily aiming to expedite economic and social development processes, enhance their populations' quality of life, and foster increased intra-regional collaboration [12]. Therefore, we intend to conduct the scoping review including studies from all eight countries in this region. This scoping review aims to investigate the prevalence of various types of impairments and disabilities, assessing different estimating methods and their impact on prevalence estimation in South Asian countries.

Materials and methods

This review was conducted based on Arksey and O'Malley's methodological framework [13]. The Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist were used for guidance [14]. A scoping review was chosen because such a design allows research to be examined from different fields, as well as identifying possible research gaps without assessing the quality of included studies [13].

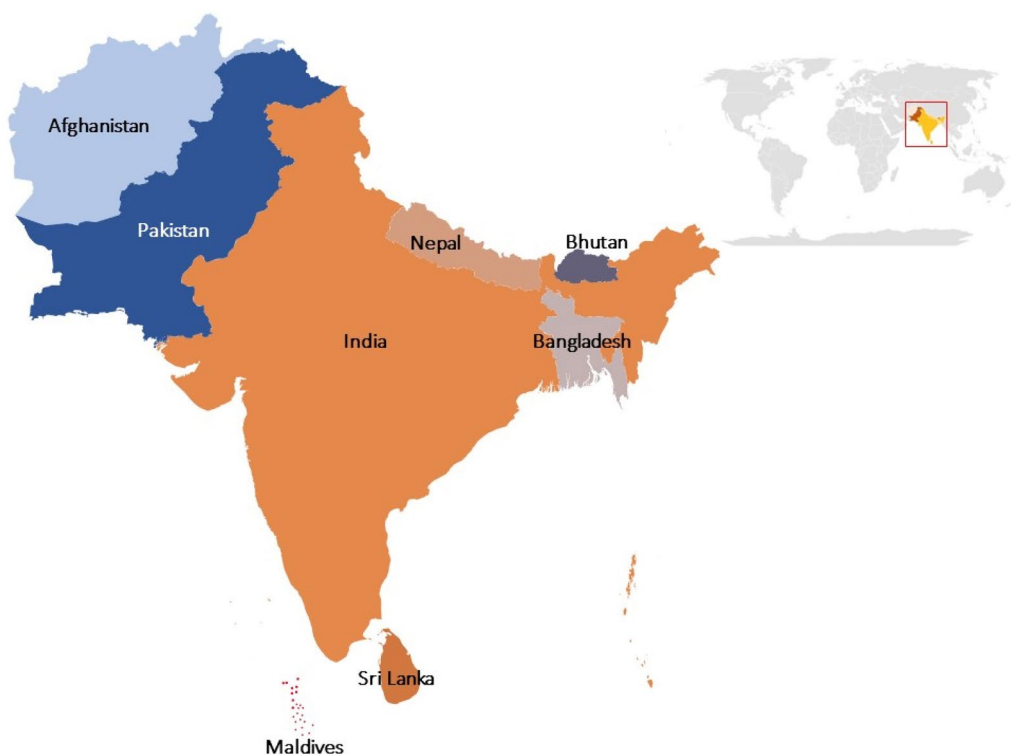


Figure 1. Map of the SAARC region highlighting member countries.

Definition of impairments and disabilities

According to the WHO's International Classification of Impairments, Disabilities, and Handicaps manual, impairment is any loss or abnormality of psychological, physiological, or anatomical structure or function. On the other hand, disability is defined as any restriction or lack (resulting from an impairment) of the ability to perform an activity in the manner or within the range considered normal for a human being [15]. In this study, we used the term "impairment and disability" to encompass any functional limitations restricting individuals from performing activities, including blindness, visual, hearing, speaking, cognitive, mobility, and self-care difficulties.

Systematic search strategy

The systematic literature search was conducted in March 2023, using EBSCOhost, EMBASE, PubMed, and Web of Science databases to retrieve journal articles published at any time (Figure 2). Keywords were developed based on the Washington Group's disability statistics, which enumerates specific difficulties a person may encounter in performing basic functional activities (i.e., visual, hearing, mobility, cognition, self-care, and communication) [16]. These keywords were then used to search each database. In addition to database searches, article titles in the reference lists of selected studies were reviewed to identify additional relevant literature. Given that the terms "disability" and "impairment" are

occasionally used interchangeably, we included both terms in our search strategy to broaden the search, enhance the review's comprehensiveness, and minimise the risk of excluding relevant studies. Search terms were developed using Medical Subject Headings (MeSH) or equivalent and from other reviews on similar topics. Boolean, truncation, and proximity operators were used to construct and combine searches for the key concepts as required for individual databases. If study protocols were identified, a manual search was conducted to determine whether the results of the study were published. Searches were limited to articles in English. Results from all four databases were combined, duplicates removed, and the eligibility of the articles was assessed using the study's inclusion criteria. The lead author (RA) performed a thorough review for all included articles and reviews. Coding and consensus were utilised in a review of the reference section of all included articles to determine inclusion in the review based on the title of the article. The full text of each identified article was then reviewed using the same process, and inclusion decisions were reached by consensus from two research team members (MS, RA).

Inclusion criteria

Studies were considered eligible if they met the following criteria: (1) quantitative research that included people with impairments and disabilities; (2) results reported the prevalence of disability by assessing any type of physical impairments; (3) research was

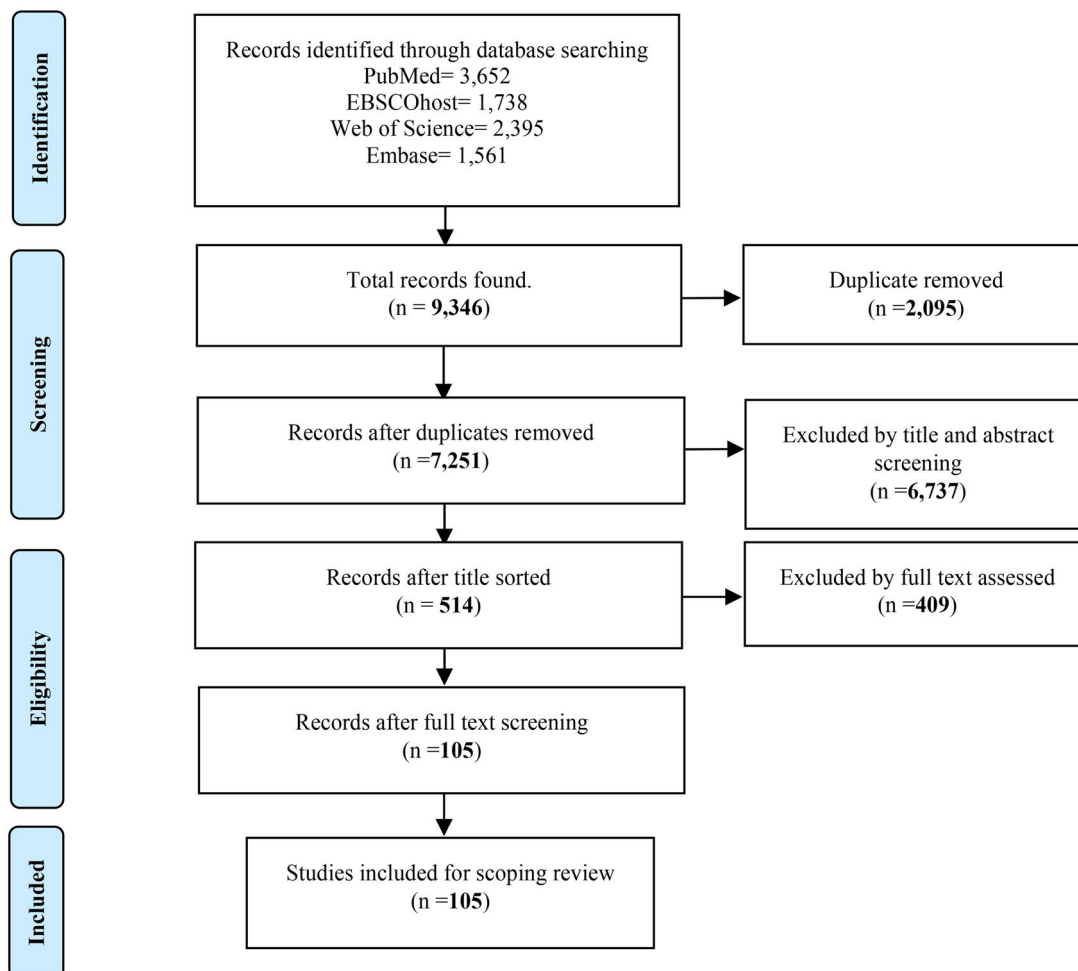


Figure 2. PRISMA flowchart showing the selection process of studies included in the review.

undertaken in SAARC member countries and written in the English language. Studies were excluded if the full text was unavailable after exhausting all possible sources. Additionally, articles were excluded that did not focus on health-related impairments. Commentaries were excluded from this review, however, related systematic reviews were assessed for this review to ensure that articles included in previous searches were assessed for inclusion.

Data extraction and synthesis

Data extraction includes the authors, publication year, country of origin, sample size, impairment types, methods used for assessment, prevalence of impairment, use rate of ATs, and need and unmet need of ATs. Due to the heterogeneity of studies, descriptive qualitative synthesis was undertaken that summarised different populations, outcomes, and types/forms of disabilities. While reporting, we classified all types of impairments and disabilities into four categories such as (a) visual (blindness and vision impairment), (b) communication (hearing, speaking, and language impairments), (c) cognitive and intellectual, and (d) activity of daily living (ADL) (mobility and self-care difficulties). Studies that assessed the presence of multiple or any impairments or disabilities were categorised in a different category titled "multiple or any type of impairments and disability". Table 1 presents the data items and extraction description for this scoping review.

Results

A total of 9,346 studies were identified through database searches. After removing duplicates, the remaining 7,251 articles underwent title and abstract screening. Subsequently, 514 articles were subjected to full-text screening for eligibility, and finally, 105 articles were included in this review.

Study characteristics

As illustrated in Figure 2, 105 journal articles met the eligibility criteria for inclusion and were included in the review. These studies were published between 1990 and 2023. More than half of the studies (53 or 50.48%) were conducted in various regions/states of India. Nepal has the second highest number of studies (18 or 17.14%), while 11 (10.48%) studies originated in Bangladesh. Among the 105 studies of this comprehensive review, we analysed a total of 56 (50.47%) studies on visual impairment, 10 (9.52%)

studies on communication impairment (hearing, speaking, speech & language), 7 (6.67%) studies on functional impairment, and 5 (4.76%) studies on cognitive or intellectual impairment. Apart from these, 27 (25.71%) studies were identified that reported the presence of multiple or any type of impairments rather than targeted for any specific type. The uneven distribution of studies across countries suggests varying inclinations of countries toward specific domains of impairments. Out of the studies we reviewed, 25 studies utilised a nationally representative sample, with India leading in this category with the highest number ($n=7$). The distribution of reviewed studies by their participants and country of origin is presented in Table 2.

Prevalence of impairments and disabilities

The scoping review identified variations in impairment prevalence rates across studies conducted in different countries. Among the studies we reviewed, Nepal exhibited the highest prevalence of visual-related impairments, with a noteworthy rate of 17.4% for blindness and 66% for other forms of visual impairment. It is worth noting that unoperated cataracts were the primary cause of up to 93% of blindness among the elderly aged 50 years and above in India, while uncorrected refractive errors were responsible for 94.4% of moderate or early visual impairment in Bhutan. India exhibited the highest prevalence rates for communication impairments, standing at 6.07%, as well as ADL impairments (53.6%). Conversely, Bangladesh demonstrated the highest prevalence of cognitive impairments at 27.9%, while Bhutan presented the highest prevalence of multiple impairments at 34.2%.

Nepal also exhibited the highest prevalence of hearing impairment (16.6%) as found in a study conducted in two geographic regions involving 15,845 study participants aged five years and above. Chronic Otitis and Speech and Language disorders, as forms of communication impairment, were assessed only in Indian studies and the prevalence was 4.79% among children aged 5–12 years, and 1.04% among children 6 to 16 years respectively. The prevalence of ADL disability was found the lowest at 8.9% in Bangladesh (among study participants aged 18 years and above) and the highest at 53.6% in India (among study participants aged 60 years and above). The review also indicated that cognitive impairment (CI) was most prevalent in Bangladesh among individuals aged 60 years and above, with an overall prevalence of 27.9%, comprising 21.6% with mild to moderate CI and 6.3% with severe CI. Specific learning difficulties were measured only in India, and it was 15.17% (8–11 years). Additionally, the highest

Table 1. Data extraction description and procedure.

Data items	Description
Setting & Sample Characteristics	Each article was coded to determine the country of origin, sampling method and sample size, age range of individuals in the study, and whether the study used primary data or secondary data for the analysis.
Methodology	A brief of the methodology used for the assessment of health-related impairment was extracted from each of the studies. Also, the data collection method i.e., how the data were collected (either questionnaire-based self-reported or on-spot screening) was captured and presented on the data extraction table. The study design and sampling technique were also elicited and reported in the table.
Impairments and Disabilities Type	The type of impairments and disabilities were captured for each article. For reporting, all types of impairments and disabilities were classified into four categories such as a) visual (blindness and vision impairment), b) communication (hearing, speaking, and language impairments), c) cognitive and intellectual, and d) activity of daily living (ADL) (mobility and self-care difficulties). Studies that assessed the presence of multiple or any impairments or disabilities were categorised in a different category titled "multiple or any type of impairments and disability".
Major findings include prevalence of impairment and disability and the severity scale	Major findings of the reviewed articles were quoted verbatim. The prevalence of impairments and disabilities, age-specific prevalence, reference threshold used to report the prevalence and severity scale for the impairment were identified and reported.
Statistical method used	Preferred statistical methods like bi-variate or multivariate logistic regression, descriptive statistics or any other method were elicited and reported in the present review.

Table 2. Characteristics of the included studies.

Description	Types of impairments and disabilities					Overall n = 105
	Visual (n = 56)	Communication (hearing, speaking, speech & language) (n = 10)	Cognitive and intellectual (n = 5)	Activity of Daily Living (ADL) (mobility, self-care) (n = 7)	All six or any type (n = 27)	
Country						
Afghanistan	2	–	–	–	1	3
Bangladesh	5	–	1	1	4	11
Bhutan	3	–	–	–	1	4
India	26	7	4	5	11	53
Maldives	1	–	–	–	2	3
Nepal	12	3	–	–	3	18
Pakistan	5	–	–	–	2	7
Sri Lanka	1	–	–	1	–	2
Multiple countries	1	–	–	–	3	4
Age of participants recruited in the reviewed studies						
Less than 18 years	11	4	2	–	3	20
02 years and above	–	1	–	–	2	3
15 years and above	–	–	–	–	1	1
18 years and above	1	–	–	–	4	5
30 and above	5	–	–	1	–	6
35 years and above	1	–	–	–	–	1
40 years and above	11	–	–	–	–	11
45 years and above	2	–	–	–	–	2
50 years and above	20	–	–	–	1	21
60 years and above	3	–	1	–	10	20
All age group	–	4	2	5	5	3
Other (Partial age group)	2	1	–	1	1	1

n: number of studies

prevalence of multiple impairments was found in Bhutan (34.2%) and the presence of any impairment was found in an Indian study (93.3%) involving 6,560 elderly people aged 50 years and above. Details of the study findings of the reviewed studies are presented in the following Tables 3–7.

Diverse methodologies for impairment assessment

The review identified diverse methods and case identification definitions used for the assessment of the impairments. For visual impairment assessment, the commonly used methods were the LogMAR E chart, Snellen's E chart, and the Early Treatment Diabetic Retinopathy Study (ETDRS) chart. The definition of case identification was also diverse- some studies define blindness if visual acuity (VA) is less than 3/60, while some studies define blindness if VA <6/60. Diverse methodologies were also found for communication, ADL, and cognitive impairments.

Three studies assessed communication-related impairment in terms of difficulties in speech and language and they employed the Speech-language Screening and the Receptive Expressive Emergent Language (REEL) technique. Furthermore, the Pure-Tone Average (PTA) and the High-risk Register (HRR) were the common techniques that assessed hearing impairment to report communication impairment. On the other hand, most of the studies relied on self-reported responses for assessing ADL impairments. The Barthel index scale for ADLs was the most utilised tool for scoring participants' ability to perform daily activities and defining impairments whereas, for cognitive and intellectual impairments assessment, the common tools were the Mini-Mental State Examination (MMSE) scale, the Specific Learning Difficulty (SpLD) test, the Specific Learning Disability-Screening Questionnaire (SLD-SQ), and the sociodemographic index (SDI). For the assessment of multiple impairments or any impairments among the participants, the Washington Group questionnaire, and the WHO Disability Assessment Schedule version 2.0 (WHODAS 2.0) are the most frequently employed tools as found in our review.

Impact of diverse methods and issues of comparability

This review identified the divergence of impairment prevalence rates within countries due to the adoption of diverse methods and operational definitions. These discrepancies were observed for visual, communication, ADL, and cognitive impairments (Figure 3). Two similar studies from Nepal recruited 4,771 and 4,717 participants aged 50 and above and reported blindness prevalence of 1.2% and 17.4%, respectively. The two studies used distinct definitions of blindness (blindness if VA < 3/60 vs. <6/60). In the Indian context, two studies among individuals aged 60 years and above (495 and 616 participants) revealed varying prevalence rates for ADL impairment at 16.6% and 53.3%. Although the age of participants and sample size were identical, however, one study used Activities of Daily Living (ADL) (0 to 10 scale) while the other employed Barthel's Index of ADL (0 to 100 scale) for assessing ADL impairment. Moreover, two Indian studies found significant disparities in intellectual disability (ID) prevalence across all age groups. The first study reported ID prevalence of 179 per 100,000 individuals utilising the 76th round of the National Sample Survey, India (NSS-76) definition, while the second found the prevalence at 1,050 per 100,000 that employed International Classification of Disease (ICD-10) based diagnostic criteria for ID. Regarding communication impairment assessment in Nepal, the prevalence ranges from 3.4% to 6.1%. Both studies focused on elder participants aged 50 years and above and utilised the REEL and PTA techniques for assessment. It's important to note that there was a difference in sample size between the two studies, with one having 30,307 participants and the other 15,441 respectively. This divergence of methods, case identification definitions, and research settings limits the comparability of prevalence within and across countries.

Access, need, and unmet need for ATs

The reviewed articles also provided information on the access, need, and unmet need for ATs, along with the impairments and

Table 3. Summary of findings of the visual impairment and disability.

Country	Region	No. of studies	Sample size	Prevalence variations	Severity measured, Y/N (n)	Major causes of BL and VI	Spectacles use rate	Reference(s)
Afghanistan	Sub-national	2	<i>n</i> = 1,281 to 3,751	BL: 2.4% to 8.7% Mild VI: 8.7% Mod. VI: 6.9% Sev. VI: 2.2% Any VI: 22.6%	Y = 1 N = 1	BL: Cat: 36.8%. VI: Cat: 46.1% to 52.8%; URE: 20.3% 26.9%.	NR	[17,18]
Bangladesh	Sub-national	2	<i>n</i> = 3,629 to 21,596	BL: 2.14% to 2.2% Mild VI: 14.7% Mod. VI: 9.68% Sev. VI: 2.35%	Y = 2 N = 0	BL: Cat: 75.0% to 75.8%. SVI: Cat: 73.6% to 75.8%. MVI/EVI: URI: 63.6% to 90.9%	4.80%	[19,20]
	National	3	<i>n</i> = 204 to 11,624	BL: 1.0% to 1.9%. LV: 13.8% Mod. VI: 5.4% to 12.4% Sev. VI: 1.5% to 1.9% BL: 1.5%	Y = 2 N = 1	LV: Cat 61% to 74.2%; URE: 18.7% to 28%.	NR	[21–23]
Bhutan	Sub-national	1	<i>n</i> = 4,046	BL: 1.0% UVI: 14.5%; PVI: 12.8%; BCVI: 0.34%.	Y = 0 N = 1	BL: Cat: 67.1%. SVI: Cat: 74.1%. VI: URE: 34.1%.	NR	[24]
	National	2	<i>n</i> = 4,985 to 5,050	BL: 1.0% UVI: 14.5%; PVI: 12.8%; BCVI: 0.34%.	Y = 2 N = 0	BL: Cat: 53.8%. SVI: Cat: 57.1%. MVI/EVI: URE: 46.7% to 94.4%.	19.9%	[25,26]
India	Sub-national	25 + 1 (joint study)	<i>n</i> = 236 to 40,447	BL: 0.09% to 6.9% Mod. VI: 6.2% to 17.6% Sev. VI: 1.0% to 9.7% Any VI: 1.85% to 59.1% PVI: 29.3%; BCVI: 13.5% LV: 2.9%; LRC: 42.9%, GA: 28.6%; RD: 14.3% RE: 47.4%	Y = 14 N = 12	BL: Cat: 28.7% to 93.0%. SVI: Cat: 70% to 92.7%. MVI/EVI: URE: 32.9% to 83.5%; Cat: 5.5% to 78.6%.	17.2% to 46.9%	[27–52]
	National	1	<i>n</i> = 85,135	BL: 1.99%	Y = 1 N = 0	BL: Cat: 66.2% CO: 8.2%. VI: Cat: 48.01%; URE: 41.53%.	NR	[53]
Nepal	Sub-national	10	<i>n</i> = 1,860 to 72,900	BL: 0.07% to 17.4% LV: 3.97% to 52.90% VI: <0.01% to 66.1% UCVI: 18.6% to 66.1% PVI: 9.1% BCVI: 0.86% OM: 3.7%	Y = 5 N = 5	BL: Cat: 53.3% to 82.1%; URE: 7.7%. VI: Cat: 29.9%; URE: 64.9% to 93.3%. LV: Cat: 60.8% to 68.07%; URE: 12%; Retinal disorders: 28.64%.	<10% to 61.9%	[54–63]
	National	2	<i>n</i> = 2,815 to 4,771	BL: 1.2% Mod. VI: 13.2% Sev. VI: 2.5% Any VI: 9.5% LV: 1.02%	Y = 2 N = 0	BL: Cat: 53.5% to 61.8%. Any VI: Cat: 27.5% to 78.5%; URE: 10.4% to 67.0%.	NR	[64,65]
Sri Lanka	National	1	<i>n</i> = 5,779	LV: 1.02%	Y = 0 N = 1	FLV: Cat: 42.4%.	NR	[66]
Maldives	National	1	<i>n</i> = 3,100	BL: 2.0%	Y = 1 N = 0	BL: Cat: 51.4%. VI: URE: 50.9%.	NR	[67]
Pakistan	Sub-national	1 + 1 (joint study)	<i>n</i> = 1,106 to 2,958	BL: 1.9%; LV: 8.0%; SVI: 2.4%; Any VI: 1.9% to 5.5%.	Y = 1 N = 1	BL and SVI: Cat: 66.7% to 93.0%. VI: URE: 53.5%.	NR	[50,68]
	National	4	<i>n</i> = 16,507 to 22,600	BL: 1.7% to 3.9%	Y = 3 N = 1	BL: Cat: 51.5%. VI: URE: 39%.	NR	[69–72]

Note: BCVI=Best Corrected Visual Impairment; BL=Blindness; Cat: Cataract; CO: Corneal Opacity; CSC: Cataract Surgical Coverage; FLV=Functional low vision; EVI: early Visual Impairment; GA=Globe Anomalies; LRC=Lens and Related Complications; LV: Low Vision; MVI/EVI: Moderate/Extreme Visual Impairment; NR: Not Reported; OM=Ocular morbidity; PVI=Presenting Visual Impairment; RD=Retinal Dystrophy; RE=Refractive error; SVI=Severe Visual Impairment; URE: Uncorrected Reflective Error; VA=Visual Acuity; VI=Visual impairment.

Table 4. Summary of findings of the communication-related impairment and disability (hearing, speech, and language).

Country	Region	No. of studies	Sample size	Prevalence variations	Severity measured, Y/N (n)	Need for AT, Y/N (n)	Reference(s)
India	Sub-national	7	<i>N</i> = 1,312 to 49,495	CD: 3.38% to 6.07% HI: 3.25% to 8.8%. Sp&L disorders: 0.79% to 1.04% COM: 4.79%	Y = 3 N = 4	Y = 0 N = 8	[73–79]
Nepal	Sub-national	2	<i>N</i> = 3,646 to 15,845	HI: 6.1% to 16.6%	Y = 2 N = 0	Y = 0 N = 2	[80,81]
	National	1	<i>N</i> = 79,340	HI: 5.73%	Y = 1 N = 0	Y = 0 N = 1	[82]

Note: AT: Assistive Technology; CD: Communication Disorder; COM: Chronic otitis media; HI: Hearing Impairment; Sp&L disorders: Speech and Language Disorder.

Table 5. Summary of findings of the ADL impairment and disability (mobility and self-care).

Country	Region	No. of studies	Sample size	Prevalence variations	Severity measured, Y/N (n)	Need for AT, Y/N (n)	Reference(s)
Bangladesh	Sub-national	1	<i>n</i> = 1,855	FD= 8.9% (95 % CI: 7.7, 10.3).	Y=0 N=1	Y=0 N=1	[83]
India	Sub-national	4	<i>n</i> = 430 to 836	FD: 16.16% to 53.6%.	Y=2 N=2	Y=0 N=4	[84–87]
	National	1	<i>n</i> = 31,477	At least one ADL: 23.8%. At least one IADL: 48.4%. At least one ADL/IADL: 52.0%.	Y=0 N=1	Y=0 N=1	[88]
Sri Lanka	Sub-national	1	<i>n</i> = 2,460	FD: 4.2%	Y=0 N=1	Y=0 N=1	[89]

Note: Assistive Technology; FD: Functional Disorder; ADL: Activity of Daily Living; IADL: Instrumental Activity of Daily Living.

Table 6. Summary of findings of the cognitive or intellectual impairment and disability (remembering and concentration).

Country	Region	No. of studies	Sample size	Prevalence variations	Severity measured, Y/N (n)	Need for AT, Y/N (n)	Reference(s)
Bangladesh	Sub-national	1	<i>N</i> = 111	CI: 27.9%. Mild/moderate CI: 21.6%, Severe CI: 6.3%. SpLD: 15.17%.	Y=1 N=0	Y=0 N=1	[90]
India	Sub-national	1	<i>N</i> = 1,101	ID: 1.79/1,000 to 10.5/1,000 LD: 3.08 %.	Y=0 N=1	Y=0 N=1	[91]
	National	3	<i>N</i> = 3,600 to 106,894		Y=0 N=3	Y=0 N=3	[92–94]

Note: AT: Assistive Technology; CI: Cognitive and Communication Impairment; SpLD: Specific Learning Disability; LD: Learning Disability.

Table 7. Summary of findings of all multiple or any impairment and disability.

Country	Region	No. of studies	Sample size	Prevalence variations	Severity measured, Y/N (n)	Need for AT, Y/N (n)	Reference(s)
Afghanistan	National	1	<i>N</i> = 14,520	MSD: 37.9% Mobility: 35.7% Self-care: 24.6% Daily activities: 41.2% Participation in society: 39.1% Body functions: 35.6%	Y=1	Y=0	[95]
Bangladesh	Sub-national	3	<i>N</i> = 2,576 to 37,030	Disability: Age-standardised 46.4 per 1000 to 7%. VI: 29.1%, HI: 16.5%, FI: 14.7, Any single disability: 28.6% Multiple disabilities: 14.7%.	Y=2 N=1	Y=0 N=3	[96–98]
	National	1	<i>N</i> = 4,176	FD: 42%; Severe/extreme FD: 5%; Self-care disability: 7%; Severe/extreme self-care disability: 3%	Y=1 N=0	Y=0 N=1	[99]
Bhutan	National	1	<i>N</i> = 536,443	Any disability: 2.8%; Multiple disabilities: 34.2%	Y=1 N=0	Y=0 N=1	[100]
India	Sub-national	11	<i>N</i> = 195 to 925,380 (census population)	Any Disability: 0.83% to 93.3%. Functional impairment: 4.7% Seeing: 2.1% to 49.5% Mobility: 12.8% to 92.7% Fine motor: 1.8% Hearing: 3.6% Cognition: 4.5% to 4.8% Self-care: 3.3% Communication: 1.8%	Y=8 N=5	Y=1 N=12	[101–111]
	National	2	<i>N</i> = 28,43,917 to 103,836,714 (census population)	Any disability: 5.178% to 4.52%	Y=0 N=2	Y=0 N=2	[112,113]
Nepal	Sub-national	5	<i>N</i> = 915 to 6,40,259	Any disability: 0.95% to 20.3%	Y=1 N=2	Y=0 N=3	[106,108,114,115]
Sri Lanka	Sub-national	1	<i>N</i> = 9,965	Any functional difficulty: 3.8% to 41.5%	Y=1 N=0	Y=0 N=1	[116]
Maldives	Sub-national	3	<i>N</i> = 449 to 5,362	Any disability: 1.86% to 29.4%	Y=3 N=0	Y=0 N=3	[106,108,117]
	National	1	<i>N</i> = 5363	Any disability: 7.5%	Y=1 N=0	Y=1 N=0	[118]
Pakistan	Sub-national	2	<i>N</i> = 1,200 to 176,364	Any disability: 0.55% Mobility impaired: 31.1% VL= 31% CI = 63.1% HL= 8%	Y=0 N=2	Y=0 N=2	[119,120]

Note: AT: Assistive Technology; CI: Cognitive Impairment; MSD: Moderate or Severe Disability; VI: Visual Impairment; VL: Visual Loss; HI: Hearing Impairment; HL: Hearing Loss; FI: Functional Impairment.

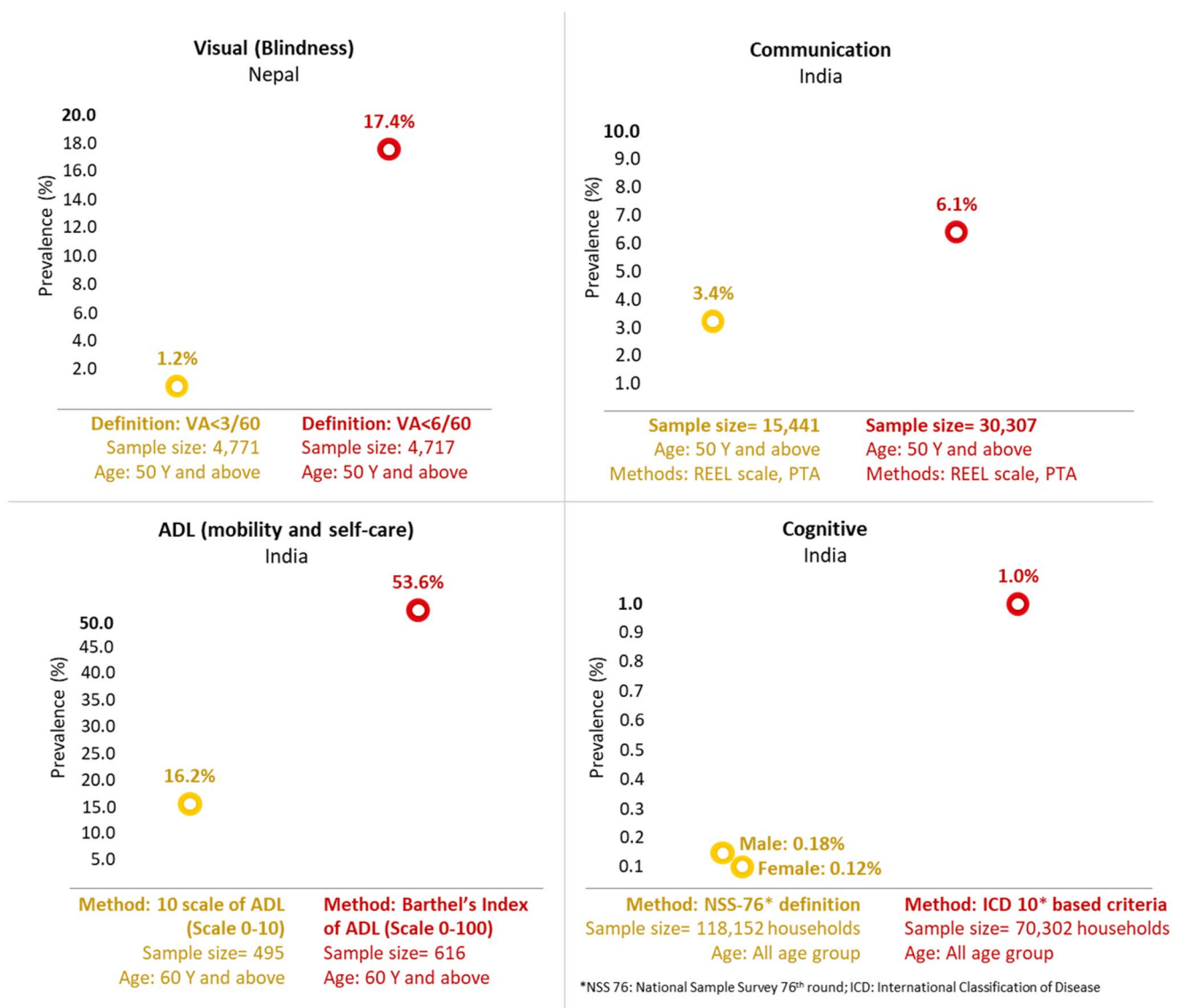


Figure 3. Impact of diverse methods on the prevalence of impairments and disabilities.

disability prevalence. A study from the Maldives reported unmet needs for ATs, revealing higher self-reported needs as the highest for physical (71%), followed by vision (67%), and communication (59%) but lower for hearing, mental health, and cognition (<50%) [118]. Despite these needs, actual usage rates were low: 53% for physical limitations, 40% for vision, 35% for mental health, 23% for communication, 20% for cognition, and 11% for hearing. The highest unmet needs were in communication (36%) and hearing (34%). AT coverage was 75% for physical limitations and lowest for hearing (25%) and communication (39%). Both reported and unmet needs increased with age and were more common among lower-income individuals. Additionally, an Indian study reported minimal AT use for most impairments except visual impairments [101]. Of the 10 studies on spectacle use, Nepal exhibited the highest rate of spectacle use (61.9%) among children aged 10–15 years.

Discussion

This scoping review presents a comprehensive overview of the prevailing evidence regarding the prevalence of impairments and disabilities within SAARC countries. This review covers a wide

range of impairments and disabilities, such as visual, hearing, mobility, self-care, speaking, and cognitive impairments, and shows varying prevalence rates across the different studies analysed. This information is essential for understanding the situation of disability and impairment in SAARC countries. This baseline information could help identify populations that may need ATs, guiding resource allocation and intervention planning even in the absence of specific AT studies. To our knowledge, this is the first initiative to synthesise evidence of impairment and disability assessment in the South Asian country context. The added value of this study is that it gives an overview of research interests pertaining to disability and assistive technology within a region experiencing a concerning rise in the prevalence and incidence of various impairments and disabilities.

Prevalence of different impairments

Our scoping review identified varying prevalence rates of distinct types of impairments both within and across countries. The highest prevalence of blindness ranged from 0.07% to 17.4%, while other forms of visual impairments, excluding blindness, exhibited a prevalence range of <0.01% to 66.1% in studies conducted in

Nepal. Comparable higher prevalence rates of visual impairments were also reported in India and Afghanistan. The WHO's World Report on Vision in 2019 highlighted that the prevalence of visual-related diseases and impairments is common in Asian regions compared to other global areas and is associated with age [121]. The higher prevalence of that region can be explained by the fact that people of this region face vitamin deficiencies and eye care and limited access to healthcare facilities among people living in those regions [122]. Our review also revealed that cataracts and reflective errors were the prominent causes of blindness and visual impairment, respectively. Similar findings were also reported in other previous studies conducted in the South Asian region, and the WHO report on the global situation [123–127]. However, this is not valid for all the regions of the world, specifically outside Asia. A study in the United States reported that the leading cause of blindness is age-related macular degeneration (AMD) in white people, whereas cataracts and glaucoma in black people [128]. Another previous study reported that vegetarian diets and less consumption of proteins are significant risk factors for cataracts among Asians [129].

Prevalence of communication impairment was also found to be a common condition in Nepal and India, affecting both children and adults and this prevalence varies within countries. A communication disorder is a condition characterised by a developmental or acquired impairment that primarily affects the individual's language, speech, or hearing abilities [73]. In Nepal, the lowest prevalence was recorded as 5.73%, while the highest was 16.6% [80,82]. Disparities in the prevalence may be the cause of the selection of study participants, the surrounding environment of the examination site, and the diverse sample size affect the prevalence estimation, which is well documented in previous studies [130,131]. Another WHO report found a positive association of hearing impairment with the age of participants, which is also reflected in this review [132]. Additionally, it's important to mention that hearing impairment threshold values differ across age groups, as outlined in the WHO guidelines for hearing screening. This variability was evident in the studies we reviewed [133].

Impairments and disabilities related to ADLs were prominent among older people aged 60 years and above. The review revealed that functional disability is lower among the younger age group aged 18 to 59 years (prevalence 4.2%) in Sri Lanka and higher for the elder age group (prevalence 16.16% to 53.6%) in India. Both the review findings and those from other studies show evidence that the loss of capacity for physical activity is progressively relevant to the age of the participants [134]. Therefore, advanced age can be the most critical risk factor for the deterioration of the functional state, particularly in older adults. Therefore, it refers to a need for comprehensive geriatric assessment to identify patients at risk of functional disabilities. In the reviewed studies, cognitive impairment was higher at 27.9% in Bangladesh among the participants aged 60 years and above. Although the reported prevalence is higher, the reason behind this is unclear. Previous studies also reported positive associations between age and cognitive impairment [135–137].

Use and impact of diverse methods for impairment assessment

Our analysis revealed variations in the methods employed to identify, measure the severity of, and report the prevalence of different impairments and disabilities. According to the World Health Organisation's International Classification of Disease (ICD), visual impairment is categorised as blindness (VA <3/60), severe visual impairment (VA <6/60 to ≥3/60), moderate vision

impairment (VA <6/18 to ≥6/60), and mild vision impairment (VA <6/12 to ≥6/18) [121]. It's crucial to emphasise that the visual acuities of 3/60 and 6/60 signify the minimum distance at which a person can perceive objects compared to someone with standard vision who can see the same objects from 60 meters [121]. During our review, we observed that different studies employed different definitions for reporting visual impairment and disability. For instance, studies conducted in India and Nepal used distinct definitions of blindness (VA <6/60 in the better eye and VA <20/400) [27–30]. Apart from the WHO classification, some studies also used the term "low vision" to describe visual-related impairment. Such discrepancies were found in communication, ADL, and cognitive impairments due to the use of diverse methodologies, operational definitions, sample size, and representativeness of the sample. For example, when assessing ADL impairment, some studies used the Barthel index on a 0–100 scale for ADL, while others employed a 0–10 scale for ADL. In measuring cognitive impairment, some utilised the ICD-10-based National Sample Survey (NSS)-78 criteria, while others opted for the NSS-58 criteria within the same country. Each method of measuring impairments has unique features, contributing to diverse prevalence rates. Another substantial reason for the divergence of prevalence is the reliance on self-reported responses during data collection. It is evident that participants in these countries often attempt to conceal their impairments due to social stigma, and this is more feasible in question-answer-based interviews than instrumental assessments [2]. Consequently, these diverse prevalence estimations and methodological variations make it difficult to compare the prevalence rate within and across countries. These diverse prevalence patterns are supported by a previous study conducted in Asia and explained in a government report of Bangladesh [10,138]. They found variations of prevalence within the same country and summarised that this was responsible for different definitions, study population compositions, and sampling strategies. This is to acknowledge that, in addition to methodological variations, genuine and substantive differences in the phenomenon across various contexts such as geographical location, cultural factors, and socioeconomic conditions can lead to actual disparities in the outcomes.

Need and unmet need for ATs

The review study provides a wide array of information about impairments; however, there is a noticeable gap between the need for and unmet need for ATs. Two of the studies we reviewed assessed the need for ATs and reported that except for visual impairment, the use of ATs for all other impairments and disabilities was minimal (2.4% for hearing, 0.9% for walking) and prominent among older adults [101,118]. However, other studies from the same region reported a very low use rate of any ATs, which was positively associated with age [139–141]. As this review focuses primarily on the prevalence of various impairments and disabilities, it does not rigorously assess the needs or unmet needs related to ATs. Consequently, a subsequent review study is required to address these aspects.

Limitations

The review encompasses a diverse range of scholarly articles drawn from multiple academic disciplines. Nevertheless, several limitations must be acknowledged. Firstly, the review exclusively incorporated studies conducted in the English language,

potentially overlooking research published in other languages within the region. Secondly, this review primarily underscores the prevalence of impairments and disability and the corresponding need for ATs, potentially diverting attention from in-depth examinations of methodologies, screening techniques, aetiology, and risk factors, which calls for separate research. The absence of information on the need and unmet need for ATs in this current review is a limitation, creating a scope for further investigation and exploration in future research. Moreover, to maintain a manageable scope, the review included studies that explicitly identified disabilities, impairments, or functional limitations, potentially excluding relevant research on mental health, and specific medical conditions.

Conclusion

This scoping review synthesised data on various types of impairments and disabilities, identified variations in prevalence rates within and across SAARC countries, and highlighted research gaps in this topic. The study found that variations in prevalence rates are largely due to differences in methodologies, operational definitions, and study contexts, which hinder cross-country comparisons. Additionally, there is an uneven distribution of research efforts, with disproportionate research concentrated on certain impairments and disability types. The reliance on self-reported data and the lack of nationally representative studies further limit the robustness of the findings. Efforts should be made to diversify research across all impairment and disability types, integrating objective measures alongside self-reported data and conducting nationally representative studies to strengthen the robustness and applicability of the findings. Our review also found that the use and need for ATs were low. Future research should focus on the use and need for ATs and investigate other impairment and disability types to ensure a comprehensive understanding of the context.

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Data availability statement

All data generated or analysed during this study is included in this published article and its supplementary information file.

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