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Operational Definition of Active and Healthy Aging (AHA): The European Innovation Partnership (EIP) on AHA Reference Site Questionnaire: Montpellier October 20–21, 2014, Lisbon July 2, 2015

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A B S T R A C T

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A core operational definition of active and healthy aging (AHA) is needed to conduct comparisons. A conceptual AHA framework proposed by the European Innovation Partnership on Active and Healthy Ageing Reference Site Network includes several items such as functioning (individual capability and underlying body systems), well-being, activities and participation, and diseases (including non-communicable diseases, frailty, mental and oral health disorders). The instruments proposed to assess the conceptual framework of AHA have common applicability and availability attributes. The approach includes core and optional domains/instruments depending on the needs and the questions. A major common domain is function, as measured by the World Health Organization Disability Assessment Schedule 2.0 (WHODAS 2.0). WHODAS 2.0 can be used across all diseases and healthy individuals. It covers many of the AHA dimensions proposed by the Reference Site network. However, WHODAS 2.0 does not include all dimensions proposed for AHA assessment. The second common domain is health-related quality of life (HRQoL). A report of the AHA questionnaire in the form of a spider net has been proposed to facilitate usual comparisons across individuals and groups of interest.

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For a list of all coauthors of this study, see the [Appendix](#).

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Health is a multidimensional concept, capturing how people feel and how they function. Social, environmental and biomedical factors from early life, and across generations, have long-term impact on health and aging.¹ The broad concept of active and healthy aging (AHA) was proposed by the World Health Organization (WHO) as the process of optimizing opportunities for health to enhance quality of life as people age. AHA is a major societal challenge, common to all populations.² The interrelationships between healthy biological aging and well-being with sex/gender, ethnicity, socioeconomic factors, and other lifetime determinants^{3,4} need to be better understood. AHA applies to both individuals and population groups throughout the life course.

A universal AHA definition is not available. Moreover, any definition must necessarily differ depending on the purpose and/or the questions

to be addressed. The European Innovation Partnership on Active and Healthy Ageing (EIP on AHA) has had a major impact,⁵ but a core operational definition of AHA is needed to be able to conduct comparisons. To this end, a meeting was organized in Montpellier, October 20–21, 2014, as the annual conference of the EIP on AHA Reference Site MACVIA-LR (Contre les Maladies Chroniques pour un Vieillessement Actif en Languedoc-Roussillon).⁶ The goal of the meeting was to propose an operational AHA definition and to identify instruments that may be used for such an operational definition. Following this meeting, 3 articles were developed describing current knowledge,⁷ the emerging conceptual framework,⁸ and instruments that can be used to assess AHA. The current article is the third of this series.

Conceptual Framework

The conceptual AHA framework, based on earlier work by Kuh et al.,⁹ has been recently accepted for publication.⁸ It includes several items, such as functioning (individual capability and underlying body systems), well-being, activities and participation, and diseases (including noncommunicable diseases (NCDs), frailty, and mental and oral health disorders) (Table 1). It also needs to encompass the idea of resilience, the ability to adapt physiologically, psychologically, and socially at different times of the life course.

Instruments Proposed

The instruments proposed to assess the conceptual framework of AHA should have common applicability and availability attributes (Table 2). The approach proposed includes core and optional domains/instruments depending on the needs and the questions (Table 3). A major common domain is function as measured by the World Health Organization Disability Assessment Schedule 2.0 (WHODAS 2.0).¹⁰ The second common domain is health-related quality of life (HRQoL). A discussion of measuring instruments is presented in the following section. The third common domain is education. These instruments or derived instruments should be available across the life course, as AHA promotion begins during development.¹¹

Functioning, Disability, and Health

The International Classification of Functioning, Disability, and Health (ICF) categories to characterize the functioning properties of any health condition have been selected from 3 main generic health profile instruments: The WHODAS 2.0,¹⁰ the World Health Survey (WHS) Questionnaire, and a list of candidate categories of the generic ICF core set.^{12,13}

WHODAS 2.0 is a generic assessment tool for health and disability addressing cognition, mobility, self-care, interactions with other people, life activities, and participation. It is applicable to all cultures, in all adult populations, and directly linked with the ICF (Figure 1). The 36-item version provides reasonable details and is available as interviewer-, self-, and proxy-administered forms. It has excellent

Table 1
Conceptual Framework for AHA (From Bousquet et al.⁸ and Modified From Kuh et al.⁹)

Key domains of healthy and active aging
1 Physical and cognitive capability across the life course
2 Psychological and social well-being, mental health, and quality of life across the life course
3 Functioning of underlying physiological systems across the life course, preventing or delaying onset of chronic diseases, frailty, and disability
Key factors influencing healthy and active aging
4 Education, lifelong learning, working, and caring
5 Lifetime lifestyles
6 Lifetime social, economic, and physical environment (including “geographical” environment: rural, urban)

Table 2
Common Attributes of the AHA Questionnaire Instruments

- Applicable to health and disease (general and clinical populations)
- Applicable across diseases
- Short, simple, and easy to administer
- Self-, interviewer-, and proxy-administration
- Validated in many languages, older age groups, and across cultures
- Versions available across the life course (childhood, adulthood, old age)
- Applicable at all ages (65 to 100+)

psychometric properties. Test-retest studies of the 36-item scale in countries across the world found it to be highly reliable. All items were selected on the basis of an item-response theory. It is easy to use, can be self-administered in approximately 5 minutes, and is administered through a 20-minute interview. It measures similar constructs as in other measures, such as the Short Health Survey. But it also measures day-to-day functioning across a range of activity domains. Although other generic instruments for assessing health status can also be mapped to ICF, these do not clearly distinguish between measurement of symptoms, disability, and subjective appraisal. A version for children and adolescents is not yet available.

WHODAS 2.0 can be used across all diseases and healthy individuals. WHODAS 2.0 covers many of the AHA dimensions proposed during the meeting in Montpellier (Table 3). However, WHODAS 2.0 does not include all dimensions proposed for AHA assessment. Other questionnaires exist and are compared in Table 4. In epidemiologic studies, where a large questionnaire is used for other purposes, the 12-item version may be used.

For physical activity, there are general questionnaires and those aimed at specific populations: the young, midlife, adults or older people, such as the Short QuesTionnaire to ASsess Health enhancing physical activity (SQUASH), Physical Activity Questionnaire for Children (PAQ-C),¹⁴ International Physical Activity Questionnaire (IPAQ),¹⁵ or Physical Activity Scale for the Elderly (PASE)¹⁶ (Table 4).

The assessment of physical activity has often been carried out through self-reported questionnaire measures. However, a more recent introduction of accelerometry, as an “objective” measure, has gained wide acceptance. Sound studies also point to unsolved problems, such as defining appropriate cutoffs for different levels of physical activity throughout the life course and even within a given age range. For the purpose of AHA, e-questionnaires appear to be the appropriate tool. However, explorative studies for the reliability of physical activity assessed by advanced techniques, such as cell phones, may be addressed by the reference sites and later translated

Table 3
Instruments Proposed to Assess AHA Dimensions

AHA Dimensions	WHODAS 2.0 (Categories)	Added Core Questionnaire	Optional Questionnaires
Physical activities	Mobility (2)		
Psychological and social well-being	Cognition (1) Self-care (3) Getting along (4) Life activities (5) Participation (6)		
QOL		QOL	
Functioning of underlying physiological systems			Chronic diseases Treatment Pain
Education, working, and caring	Life activities (5) Education in demographics		Level of education Work
Lifestyles			Lifestyle
Social, economic, and physical environment	Self-care (3) Getting along (4) Life activities (5) Participation (6)		

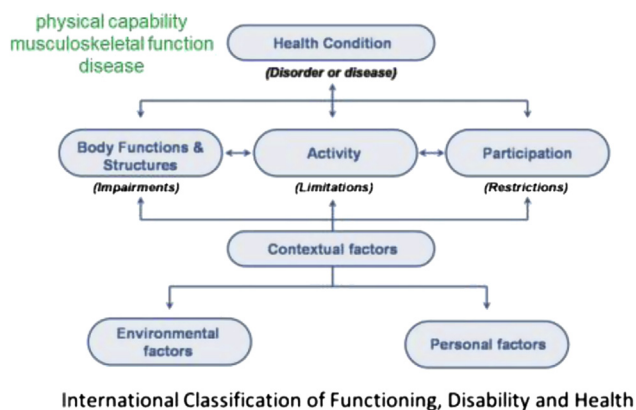


Fig. 1. The ICF framework. Adapted from <http://www.rehab-scales.org/international-classification-of-functioning-disability-and-health.html> (accessed March 30, 2015).

to AHA. This has the added advantage that GPs can be used to examine where individuals go to and how this relates to work and leisure activities.

Well-Being and Quality of Life, Psychological and Social Well-Being

For HRQoL, widely consolidated and comparable instruments include, among others, the EuroQoL 5 domains (EQ-5D),¹⁷ the SF-12,¹⁸ and the SF-6D derived from SF-36.¹⁹ Although all of these questionnaires measure the same concept, they use a different model of health, a different method of deriving preferences, and a different scoring formula. For mental well-being, the WEMWBS (Warwick-Edinburg Well-Being Scale)²⁰ has been tested in several EU countries, with cross-cultural validity in different and sociodemographic groups. In older people, the CASP-19 scale can be used.^{21,22} Candidate

Table 5 Comparison of Candidate Questionnaires for HRQoL

	EQ-5D (5 Levels)	SF-6D	SF-12/RAND-12
Items	5 + 1 (VAS)	6	12
Time	3 min	3 min	5 min
Recall period	Today	Last 4 weeks	Last 4 weeks
Overall QoL	NA	NA	NA
General health	VAS (0–100)	General health	General health
Physical	Mobility, self-care, andusual activities	Physical function	Physical function
Emotional	Anxiety/Depression	Role-emotional mental health	Role-emotional mental health
Pain	Pain	Pain	Pain
Social	NA	Social	Social
Environment	NA	NA	NA
Spirituality	NA	NA	NA
Sleep	NA	NA	NA
Metric robustness	Very good	Very good	Excellent
Cost/Payment	Paper: free	Free	1 EUR/free
EU languages	All	All	All
Reference/Norms	Yes, many	Yes, many	Yes, many
Children forms	Yes	No	No
Other issues	Utility	Utility	Worldwide use

NA, not available; VAS, visual analogue scale.

questionnaires for Perceived Health Status/Health-Related Quality of Life are listed in Table 5.

Social, Societal, and Economic Environment/Engagement

Active engagement in life is emerging as a critical factor for what is judged to be successful aging, and is strongly associated with health and well-being in late life.²³ Furthermore, individual socioeconomic conditions and neighbourhood conditions^{24,25} are also linked to health and well-being. These individual and contextual factors should be considered, if possible, during the long lifetime period, as it can be hypothesized that their pattern of association with health could vary

Table 4 Comparison of WHODAS 2.0 and Other Questionnaires

Instrument	WHODAS 2.0	SF-36	NHATS
Concept/ constructs	Disability 6 domains of functions, activities, and participation: Cognition (understanding and communicating); Mobility (moving and getting around); Self-care (hygiene, dressing, eating, and staying alone); Getting along (interacting with other people); Life activities (domestic responsibilities, leisure, work, and school); Participation (joining in with community activities)	Multipurpose, short-form health survey, including physical functioning (PF)	Health and aging trends, including a physical capacity module (and many more constructs agreeing with the ICF framework)
Items	12, 36, and 12 + 24 item versions	10 questions in PF domain: Vigorous activities; Moderate activities; Lifting/carrying groceries; Climbing several flights of stairs/one flight of stairs; Bending, kneeling, stooping; Walking >1 km/half a km/100 m; Bathing/dressing oneself (shorter versions exist: SF-12 and SF-8)	12 questions: were you able to: walk 6 blocks (about 1 km)/3 blocks? Walk up 20 stairs (approximately 2 flights)/10 stairs? Lift and carry 10 kg (or 2 full bags of groceries)/a 5-kg object? Get down on your knees and get back up/bend over without holding on to anyone or anything? Reach up over your head without holding on to anyone or anything? Open a sealed jar using just your hands? Use your fingers to grasp or handle small objects?
Recall period	Last month	Last month	Last month
Method	Interview and self-administered versions	Interview and self-administered versions	Interview, carer report, self-administered versions
Scaling	5-point scale "how much difficulty did you have in... (no difficulty-mild-moderate-severe-extreme or cannot do)	3-point response scale from 1 (yes, limited a lot) to 3 (no, not limited at all), totals 21 for the PF domain	Yes/no/refused/don't know
Languages Validated	Several European languages	Numerous European languages	(US) English
Costs	Free online	Licensing and registration needed	Free online
Web site	WHO Disability Assessment Schedule http://www.who.int/classifications/icf/whodasii/en/	http://www.sf-36.org/tools/sf36.shtml#VERS2	http://www.nhats.org/scripts/instruments/015_PC%20Round3.pdf

according to the period of life considered (ie, middle age, retirement period, oldest old).²⁶ The assessment of social participation is included in tools like WHODAS 2.0. Other existing tools for the assessment of social participation will be reviewed for their validity, usability, and applicability at various ages. A questionnaire on habitual physical activities²⁷ for this age group (activity score) includes household, sporting, and leisure activities (physically active or not).

Optional Instruments

Chronic diseases

For noncommunicable diseases and musculoskeletal disorders, we propose a simple question: “Did your doctor diagnose ...?” with a list of diseases and disorders with highest prevalence and/or chronic disease burden adapted to local needs. This also permits the derivation of comorbidity indexes such as the Charlson Index, which predicts the 10-year mortality from a list of 22 comorbid conditions.²⁸ Other comorbidity indexes include the Cumulative Illness Rating Scale (CIRS) that takes into account disease severity,²⁹ the Index of Coexisting Disease (ICED),³⁰ or the Kaplan-Feinstein Classification.³¹ The Charlson Index has excellent reliability and the others acceptable reliability.³¹

For mental health diseases, ESEMeD (European Study of Epidemiology of Mental Disorders),³² Euro-D scale,³³ or the major mental health measures (CIDI [Composite International Diagnostic Instrument]³⁴ and the SCID [Structured Clinical Interview Diagnosis]) are too long and cumbersome to be used efficiently. There are effective alternatives of self-reported measures such as the Patient Reported Outcomes Measurement Information System Emotional Item Short Forms (Depression, Anxiety, and Rage),³⁵ the PHQ-9, for Depression (9 items), the GAD-7 for Anxiety (7 items),³⁶ as well as the K-10 and K-6³⁷ for general psychopathology. All these instruments have been translated, evaluated, and calibrated in numerous European countries, and have shown satisfactory properties both in the general population and patients.

Lifestyle

Lifestyle includes diet, physical activity, and personal risk factors (smoking, alcohol, intoxicants). Physical environment includes indoor (home) environment (mold/dampness, pets, exposure to tobacco smoke [ETS]), outdoor environment (air pollution, noise, access to green spaces, smoking, alcohol, and working environment).

For smoking, the European Community Respiratory Health Survey (ECRHS) questionnaire³⁸ may be used. For other lifestyle parameters, age-dependent questionnaires can be derived from the Mechanisms of the Development of Allergy (MeDALL) core questionnaire (children)³⁹ and ECRHS (adults).³⁸ For alcohol, no current validated questionnaire exists, but a newly developed questionnaire is currently being tested from the European Social Survey (ESS) and the Survey of Health, Ageing and Retirement in Europe (SHARE) study.

As a modifiable factor, nutrition and diet are of major concern in the context of health preservation in aging. Several methods are available to collect dietary data, including dietary recalls, dietary records, and semiquantitative food frequency questionnaires.⁴⁰ For logistic and time frame purposes, a comprehensive evaluation of the overall dietary intakes using country-specific questionnaires is not possible, as the use of different questionnaires accounting for cultural specificities and different composition tables across countries requires new validation and calibration studies. The Global Allergy and Asthma European Network (GA²LEN)⁴⁰ or the SHARE questionnaires (questions BR026 and others, www.share-project.org) may be used. In old age adults, the Mini Nutritional Assessment is of interest.^{41,42}

Working environment

Work exposures can be categorized into 3 main domains: psychosocial factors, biomechanical factors, and chemicals. Here, we

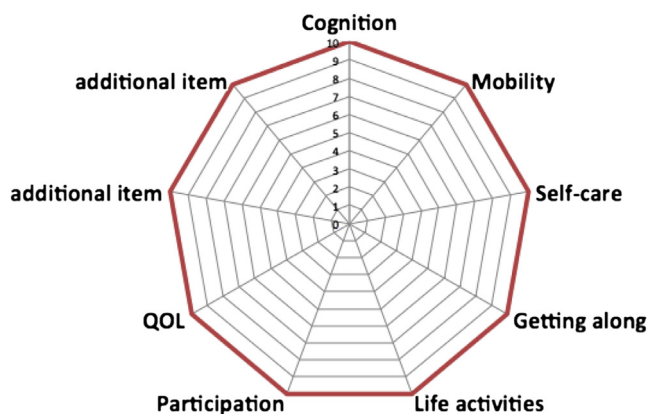


Fig. 2. Reporting of the AHA questionnaire.

propose simple tools for broadly assessing exposure to these factors as an additional list of questions.

Psychosocial factors at work: Job strain: The 2 prominent models in the domain of stressful working conditions are the job strain model⁴³ and the effort–reward imbalance (ERI) model.⁴⁴ We propose to use the short version of the ERI questionnaire (16 items), which was validated in different European cohorts.⁴⁵

Biomechanical factors: Exposure to occupational biomechanical factors is a major source of musculoskeletal disorders and of physical impairment while aging. Questions were validated in the Gazel cohort, where a single-item measure asking individuals about perceived physical strain at work was an acceptable proxy for physical load as compared with measures of 38 occupational biomechanical constraints.⁴⁶ The question is: “Do you find that your work is physically strenuous?” on a visual scale (0 to 8). Questions on low back pain are also important.

Chemicals: Exposure to chemicals in the workplace is very common among blue-collar workers. It shows long-term effects for various chronic diseases (cancer, cognitive functioning and other neurotoxic effects, respiratory diseases). The accurate assessment of chemical exposure requires efforts far beyond those possible in most places.

Optional Questions

Optional questions can be added depending on specific local research interests and needs or target population. Additional items in psychosocial, work, and social precariousness^{47,48} are not in the field of the WHODAS but may often be needed.

Reporting of the AHA Questionnaire

A report of the AHA questionnaire is proposed in the form of a spider net (Figure 2) to facilitate usual comparisons across individuals and groups of interest. The questionnaire should be considered as a screening for AHA. Depending on the impairment in the different items, a more extensive assessment is requested using specific instruments developed for the different items.

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