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| Supplementary Table 2. Characteristics of Included Studies (n=60) | | | | | | | | | |
| # | Reference | Country (language) | Design | Sample composition | Age Statistics | Instrument | Results for age and health literacy | Covariates adjusted for | p-value for difference |
| STUDIES WITH A LOWER RISK OF BIAS | | | | | | | | | |
| a) TOFHLA and S-TOFHLA | | | | | | | | | |
| 1 | Armistead-Jehle et al., 2010 | United States  (English) | Cross-sectional | 44 male patients referred to a movement disorders clinic in a Veteran’s Affairs Medical Centre with no gross dementia (MMSE) | Mean: 69.7  SD: 8.4  Range: 55-88 | TOFHLA | Mean TOFHLA score: 81.6  Correlation coefficient between TOFHLA score and age: 0.48  Age was negatively associated with TOFHLA score: β=-0.24 (B=-0.74; SEB=0.29) | Education, MMSE score (cognitive function), UPDRS (Unified Parkinson Disease Rating Scale) score, years with movement disorder, comorbidities | p<0.01 for correlation coefficient  p<0.05 for β coefficient from multiple linear regression |
| 2 | Backes et al., 2012 | United States  (English) | Cross-sectional | 79 adults from outpatient pharmacies | Inclusion: ≥18  Mean: 54  SD: 15 | S-TOFHLA | Mean (SD) age by S-TOFHLA score:  Inadequate (n=27): 58 (13)  Adequate (n=52): 52 (16)  Effect estimate frCaeom multiple logistic regression not given; older age was associated with inadequate HL | Education, sex, race | 0.09 for inadequate vs. adequate HL groups  <0.005 from logistic regression |
| 3 | Carthery-Goulart et al., 2009 | Brazil (Portuguese) | Cross-sectional | 312 healthy volunteers using hospital services with no cognitive or visual impairments, no untreated chronic conditions | Inclusion: ≥18  Mean: 47.3  SD: 16.8  Range: 19-81 | S-TOFHLA (Brazilian) | Correlation coefficient for age and score: r=-0.259  Age did not predict S-TOFHLA score in multiple linear regression: B=-0.035, β=-0.22 | Years of schooling | p<0.01 for bivariate correlation;  p=0.584 for regression coefficient |
| 4 | Chew et al., 2004 | United States (English) | Prospective cohort | 332 patients with adequate vision and no severe dementia from a Veteran’s Affairs preoperative clinic | Inclusion: >18  Mean: 58.2  SD: 13.1 | S-TOFHLA | N % with limited; adequate S-TOFHLA score by age:  Ages <65(n=221): 12 (5%); 209 (95%)  Ages ≥65 (n=111): 28 (25%); 83 (75%)  Older age (≥65 years) associated with limited vs. adequate HL: OR=3.7 (95% CI: 1.7-8.1)  Reference group: <65 years | Cognitive impairment, education less than high school, employment status | <0.001 for the proportions with limited HL by age  (chi-square test)  Not given for OR in logistic regression |
| 5 | Connor et al., 2013 | Switzerland (German, Italian, and French) | Cross-sectional | 659 Swiss residents recruited in random public places | German:  Mean: 36  SD: 16.3  Italian:  Mean: 47  SD: 20.1  French:  Mean: 37  SD: 16.3 | S-TOFHLA (German, Italian, and French) | Mean (SD) score by age (German; Italian; French):  Ages 18-45: 32 (3.2); 29 (6.2); 30 (6.1)  Ages 45-65: 30 (5.4); 24 (8.5); 27 (9.8)  Ages >65: 26 (9.7); 17 (8.9); 26 (7.1)  Older age associated with lower HL: standardized betas were -0.288 (German), -0.459 (Italian), and -0.326 (French) | Education, chronic condition, gender | p-values for mean HL by age group: p<0.001 for German and Italian; p=0.042 for French (ANOVA);  p<0.001 for linear regression betas |
| 6 | Gazmararian et al., 1999 | United States (English and Spanish) | Cross-sectional | 3,260 new Medicare enrollees from four Prudential HealthCare plans who had no visual or cognitive impairments and did not live in nursing homes | Inclusion: ≥65 | S-TOFHLA | N (%) with inadequate; marginal; adequate HL by age:  Ages 65-69 (n=1205): 188 (16%); 104 (9%); 913 (76%)  Ages 70-74 (n=889): 199 (22%); 96 (11%); 594 (67%)  Ages 75-79 (n=668): 170 (27%); 88 (14%); 370 (59%)  Ages 80-84 (n=362): 141 (39%); 56 (15%); 165 (46%)  Ages ≥85 (n=176): 102 (58%); 22 (12%); 52 (30%)  Older age associated with inadequate/marginal (vs. adequate) HL:  OR (70-74) = 1.83 (95% CI: 1.43-2.33)  OR (75-79) = 2.91 (95% CI: 2.23-3.81)  OR (80-84) = 5.33 (95% CI: 3.89-7.31)  OR (≥85) = 8.62 (95% CI: 5.55-13.38)  Reference group: 65-69 years | Study location, race/language, sex, education completed, occupation, cognitive impairment (MMSE score) | p<0.001 for proportions with inadequate or marginal HL by age (chi-square test)  Not given for OR from logistic regression but statistically significant |
| 7 | Ginde et al., 2008 | United States (English and Spanish) | Cross-sectional | 300 patients from 3 Boston emergency departments who spoke English or Spanish, had no altered mentation, no sexual assault, and no corrected visual acuity | Inclusion: ≥18  Mean: 42 | S-TOFHLA | N (%) with limited; adequate HL by age:  Ages 18-44 (n=148): 24 (16%); 124 (84%)  Ages 45-64 (n=97): 32 (33%); 65 (67%)  Ages ≥65 (n=53): 18 (34%); 35 (66%)  Older age associated with limited (vs. adequate) HL:  OR (45-64 years) = 4.3 (95% CI: 2.0-9.2)  OR (≥65 years) = 3.4 (95% CI:1.4-8.51.4)  Reference group: 18-44 years | Gender, ethnicity, race, first language, preferred language, education, income | p=0.003 for proportions with limited HL by age (chi-square test)  Not given for OR from logistic regression but statistically significant |
| 8 | Jackson et al., 2007 | United States (English) | Cross-sectional | 99 adults from university-based health research panel | Mean: 71.0  SD: 5.9  Range: 59-85 | S-TOFHLA | Mean (SD) age by S-TOFHLA score:  Inadequate (n=2): 80.0 (7.1)  Marginal: (n=10): 74.2 (4.3)  Adequate (n=86): 70.4 (5.8)  Total score decreased with age in multiple linear regression (effect estimate not given) | Gender, ethnicity | p<0.01 for coefficient from multiple linear regression |
| 9 | Jovic-Vranes et al., 2009 | Serbia  (Serbian) | Cross-sectional | 120 patients from an urban and a rural primary health care center | Inclusion: ≥18  Mean: 52.79  SD: 14.68  Range: 21-84 | TOFHLA  (Serbian) | Mean (SD) TOFHLA score by age:  Ages ≤44 (n=26): 87.19 (9.60)  Ages 45-54 (n=22): 75.59 (18.78)  Ages 55-64 (n=35): 70.60 (15.93)  Ages ≥65 (n=22): 59.82 (16.53)  Older age (per year) associated with marginal or adequate HL: OR=4.86 (95% CI: 2.41-9.80) | Education, having a chronic condition | p=0.000 for chi-square test (HL categories by age groups)  p=0.000 for OR from logistic regression |
| 10 | Jovic-Vranes et al., 2011 | Serbia (Serbian) | Cross-sectional | 1,361 primary care patients | Inclusion: ≥18  Mean: 52.25  SD: 16.63  Range: 18-99 | S-TOFHLA (Serbian) | N (%) with inadequate; marginal; adequate HL by age:  Ages ≤44 (n=426): 59 (14%); 40 (9%); 327 (77%)  Ages 45-64 (n=552): 158 (29%); 98 (18%); 296 (54%)  Ages ≥65 (n=349): 196 (56%); 51 (15%); 102 (29%)  Younger age associated with adequate (vs. limited) HL:  OR (≤44): 5.40 (95% CI: 3.10-9.58)  OR (45-64): 2.32 (95% CI: 1.49-3.60)  Reference group: ≥65 years | Gender, marital status, employment status, educational attainment, socioeconomic status, self-perceived health, number of chronic conditions | p=0.000 for distribution of HL score by age (chi square test)  Not given for logistic regression |
| 11 | Jovic-Vranes et al., 2012 | Serbia (Serbian) | Cross-sectional | 824 female primary health care patients | Inclusion: ≥18  Mean: 51.64 SD: 16.42 | S-TOFHLA (Serbian) | Mean (SD) S-TOFHLA score by age:  Ages ≤44 (n=263): 26.41 (8.1)  Ages 45-64 (n=354): (9.0)  Ages ≥65 (n=192): 16.29 (9.7)  Younger age (≤44) associated with adequate (vs. limited) HL: OR = 2.42 (95% CI: 1.45-4.04)  Reference group: >44 | Employment status, education, material status, self-perceived health, chronic conditions | p-value for distribution of mean HL score across age groups not given but significant; p=0.001 for OR in logistic regression |
| 12 | Laramee et al., 2007 | United States (English) | Cross-sectional | 172 adults with diabetes in primary care, originally from the Vermont Diabetes Information System Field Survey study | Mean: 65  Range: 22-93 | S-TOFHLA | Older age (≥65 years) associated with limited (vs. adequate) S-TOFHLA score:  OR = 3.51 (95% CI: 2.18-5.63)  Reference group: <65 years | Sex, race, marital status, insurance, income, education, heart failure | p<0.001 for OR from logistic regression |
| 13 | Levinthal et al., 2008 | United States (English) | Cross-sectional | 492 community dwelling adults diagnosed with hypertension, primarily female (78%) and African American (68%) | Mean: 56.6  SD: 10.8  Range: 21-92 | Reading component of S-TOFHLA | Correlation coefficient for age and HL score: r=-0.28  Older age (per year) associated with lower score:  β=-0.20 with adjustment for demographics (model 1); β=-0.16 with adjustment for education (model 2);  β=-0.05 with adjustment for sensory and cognitive function (model 3)  Age explained 6% of variation in HL score; education explained 18%; cognitive variables explained 41% | Gender, race, comorbidities, systolic blood pressure (model 1); additionally education (model 2); additionally cognitive and sensory function (model 3) | p<0.05 for bivariate correlation;  p<0.001 for the β for age in models 1&2; p<0.10 for age in model 3 |
| 14 | Morris et al., 2011 | United States (English) | Cross-sectional | 103 hospitalized patients assessed at discharge | Inclusion: ≥18  Mean: 64  SD: 16  Range: 23-92 | S-TOFHLA | Mean (SD) age by S-TOFHLA score:  Inadequate: 70 (14)  Marginal: 68 (10)  Adequate: 56 (16)  Older age (per year) associated with being less likely to have adequate HL: OR=0.93 (95% CI: 0.89-0.97) | Gender, education, income | p<0.001 for both bivariate measure of association (Cuzick’s non parametric test for ordered categories) and for OR from logistic regression |
| 15 | Morrow et al., 2006 | United States (English) | Cross-sectional | 314 community-dwelling adults diagnosed with chronic heart failure from an urban hospital | Mean: 62.9  SD: 8.5  Range: 47-89 | S-TOFHLA | Correlation coefficient for age and S-TOFHLA score: r=-0.11  Age not associated with HL in multivariable modelling: β=0.09 | Gender, race, comorbidities, education, mental processing speed, speech comprehension, listening span, visual and auditory function | p<0.05 for bivariate correlation;  Not given for β from regression, but not significant |
| 16 | Olives et al., 2011 | United States (English and Spanish) | Cross-sectional | 960 adults presenting to a suburban emergency department with no altered mental status, high acuity complaint, not in police custody, and not deemed to be ‘vulnerable’ | Inclusion: >18  Mean: 36.7  SD: 13.7 | S-TOFHLA | Increasing age (per year) associated with higher odds of inadequate:  OR = 1.08 (95% CI: 1.05-1.10)  and marginal:  OR = 1.03 (95% CI: 1.00-1.05)  vs. adequate | Sex, primary language, ethnicity, access to a primary care provider, years of education in the U.S., self-reported health, employment, housing, insurance, and chronic disease status | p<0.001 for inadequate HL and p=0.031 for marginal HL (from logistic regression) |
| 17 | Robinson et al., 2011 | United States (English) | Randomized controlled trial | 612 rural-dwelling adults with stable heart failure and no serious comorbidity affecting cognition | Inclusion: ≥18  Mean: 66.0 SD: 13.0 | S-TOFHLA (7 min time limit and no time limit) | Age (continuous) was a negative predictor of S-TOFHLA score (continuous); the association was stronger with the 7 min test time limit (β=-0.740) than with no time limit (β=-0.317) | Gender, education, income | p<0.001 for both β coefficients |
| 18 | von Wagner et al., 2007 | United Kingdom (English) | Cross-sectional | 719 population-representative adults with no visual impairments identified through random location sampling | Inclusion: ≥18  Mean: 47.6  SD: 18.3  Range: 18-90 | UK-TOFHLA | Mean (SD) age by UK-TOFHLA score:  Inadequate (n=41): 63.9 (19.5)  Marginal (n=41): 60.2 (20.9)  Adequate (n=637): 45.2 (17.2)  Older age associated with limited (vs. adequate) HL:  OR (per year)=1.04 (95% CI: 1.02-1.06) | Gender, ethnic background, first language, educational attainment, annual personal income | p<0.0001 for logistic regression OR |
| b) NVS | | | | | | | | | |
| 19 | Adams et al., 2009 | Australia (English) | Cross-sectional | 2824 adults in the South Australian Health Omnibus Survey | Not given | NVS | Proportions with limited NVS score by age:  15-24 years: 13%  25-44 years: 11%  45-64 years: 18%  ≥65 years: 50%  OR for limited vs. adequate score (vs. ages 15-24): OR=1.6 (95% CI: 0.9-2.8) for 25-44; OR=2.8 (95% CI: 1.6-4.9) for 45-64; OR=12.4 (6.6-23.2) for ≥65 | Sex, residence area, education, income, cohabitation, birth region, general health status, private health insurance | ORs from multiple logistic regression statistically significant for ages 45-64 and ≥65 |
| 20 | Shah et al., 2010 | United States (English) | Cross-sectional | 808 adults from 4 primary care centers | Mean: 44.9  SD: 15.0  Range: 18-91 | NVS | Mean (SD) age by NVS score:  Limited: 53.3 (15.2)  Possible limited: 45.9 (15.4)  Adequate: 40.0 (12.5)  OR=0.95 (0.94-0.97) for adequate HL per year increase in age | Gender, race, education, BMI, having taken a health class | p<0.0005 for age by health literacy (ANOVA)  OR from multiple logistic regression statistically significant |
| c) REALM and its short forms | | | | | | | | | |
| 21 | Rowlands et al., 2013 | United Kingdom (English) | Prospective cohort | 659 coronary heart disease patients from 16 general practices in South London | Inclusion: ≥18 | REALM | Mean age (SD) by REALM score:  <9th grade: 68.92 (11.84)  ≥9th grade: 71.14 (10.14)  OR=1.00 per year increase for <9th vs. ≥9th grade score | Gender, ethnicity, index of multiple deprivation, education, employment, alcohol intake, BMI, depression and anxiety | p=0.049 for bivariate association; p=0.873 for OR from logistic regression |
| 22 | Sudore et al., 2006 | United States (English) | Prospective cohort | 2,512 community-dwelling, Medicare-eligible men and women with good physical functioning | Mean: 75.6  SD: 2.8  Range: 71-82 | REALM | Mean (SD) age by REALM score:  0-6th grade (n=212): 75.8 (2.9)  7-8th grade (n=383): 75.7 (2.9)  ≥9th grade (n=1,917): 75.6 (2.8)  Older age not associated with limited HL:  OR (≥77 years): 1.05 (95% CI: 0.84-1.31)  Reference group: <77 years | Race, sex, income, study site | p=0.36 for differences in mean age by HL score  Not given for logistic regression |
| d) Multiple tests | | | | | | | | | |
| 23 | Haun et al., 2012 | United States (English) | Cross-sectional | 378 veterans attending 8 rural and non-rural ambulatory Veteran’s Affairs clinics | Inclusion: ≥18  Mean: 61.5 SD: 11.9  Range: 23-89 | REALM  S-TOFHLA | N (%) with limited HL by age (REALM; S-TOFHLA):  Ages ≤59 (n=157): 53 (33.8%); 12 (7.6%)  Ages 60-69 (n=123): 46 (37.4%); 16 (13.0%)  Ages 70-79 (n=70): 27 (38.6%); 25 (35.7%)  Ages ≥80 (n=25): 14 (56.0%); 10 (40.0%)  ORs for limited HL (per 10 year increase in age):  REALM: OR=1.01 (95% CI: 0.99-1.04)  S-TOFHLA: OR=1.12 (95% CI: 1.07-1.16) | Gender, ethnic minority status, education, self-reported reading level, retirement status, disability status, diabetes, high blood pressure, stroke | p-values for bivariate statistic (chi-square test) and logistic regression <0.05 for the S-TOFHLA; not significant for the REALM |
| 24 | McNaughton et al., 2011 | United States (English) | Cross-sectional | 207 adults presenting to an urban emergency department | Median: 46 IQR: 32-59 | REALM  S-TOFHLA | Age negatively predicted S-TOFHLA score: standardized regression weight = -0.26; but not REALM score: standardized regression weight = -0.08 | Education, gender, race, subjective literacy, subjective numeracy | p<0.05 for S-TOFHLA score; not significant for REALM score |
| STUDIES WITH A HIGHER RISK OF BIAS | | | | | | | | | |
| a) TOFHLA and S-TOFHLA | | | | | | | | | |
| 25 | Baker et al., 1998 | United States (English) | Prospective cohort | 979 patients with no visual impairments & non-urgent problems from a hospital emergency department serving an indigent African American community | Inclusion: >18  Median: 40 | TOFHLA | Mean (SD) age by TOFHLA score:  Inadequate (n=333): 53.1 (16.0)  Marginal (n=122): 43.7 (13.2)  Adequate (n=503): 36.2 (11.2) | N/A | <0.001 for mean age in adequate vs. inadequate HL groups |
| 26 | Calkins Aguirre et al., 2005 | United States (English and Spanish) | Cross-sectional | 2370 Medicaid and Medicare recipients stratified by ethnicity and language: 936 Non-Hispanic English-speaking; 328 Hispanic English-speaking; 1066 Hispanic Spanish-speaking | Mean: 44.9 for Non-Hispanic English; 31.7 for Hispanic English; 42.7 for Hispanic Spanish | S-TOFHLA | Mean (SD) S-TOFHLA score by age among non-Hispanic English speakers:  Ages ≤31: 30 (8.0)  Ages 31-45: 28 (8.7)  Ages ≥46: 23 (10.5).  Scores were similar among Hispanic English speakers, and lower among Hispanic Spanish speakers. | N/A | p<0.001 for mean HL score by age group, within each of the three ethnic/language categories |
| 27 | Colbert et al., 2013 | United States (English) | Cross-sectional | 302 adults taking antiretroviral medication for HIV/AIDS recruited from clinics | Inclusion: ≥18  Mean: 43.9  SD: 7.94 | S-TOFHLA | N (%) with limited S-TOFHLA score by age:  20-30 (n=28): 1 (4%); 27 (96%)  31-54 (n=261): 27 (10%); 234 (90%)  ≥55 (n=23): 2 (9%); 21 (91%) | N/A | p=0.79 for the proportions with limited HL by age (chi-square test) |
| 28 | Downey et al., 2008 | United States  (English and Spanish) | Cross-sectional | 398 patients with mental capacity to complete the study from 3 outpatient clinics and 1 emergency department | Inclusion: >18 | S-TOFHLA | Proportions with limited S-TOFHLA score by age:  Ages 43-53 (n=92): 21 (23%)  Ages >53 (n=69): 28 (41%) | N/A | 0.00 (chi-square test for proportion with limited HL by age) |
| 29 | Federman et al., 2009 | United States (English and Spanish) | Cross-sectional | 414 community-living adults recruited from community-based settings with no visual impairments | Inclusion: ≥60  Mean: 73.6  SD: 8.6 | S-TOFHLA | Age by S-TOFHLA score:  Inadequate (n=101): 60-64: 12.9%; ≥85: 12.9%  Marginal (n=38):; 60-64: 10.5%; ≥85: 13.2%  Adequate(n=275): 60-64: 21.1%; ≥85: 12.7%  Proportions across other 5-year age groups varied. | N/A | 0.09 for the distribution of HL scores across age categories |
| 30 | Geltman et al., 2013 | United States (English) | Cross-sectional | 439 Somali refugees living in Massachusetts with no visual or cognitive impairments or disabilities | Inclusion: ≥18  Range: 18-64 | S-TOFHLA | N (%) with limited; adequate S-TOFHLA score by age:  Ages 18-24: 77 (55%); 63 (45%)  Ages 25-44: 145 (78%); 41 (22%)  Ages ≥45: 104 (92%); 9 (8%) | N/A | p<0.001 for the proportions with limited HL by age (chi-square test) |
| 31 | Juzych et al., 2008 | United States (English) | Cross-sectional | 204 glaucoma patients from an eye clinic | Inclusion: >18  Mean: 65.8  SD: 12.8 | TOFHLA  (reading component) | Mean (SD) age by TOFHLA reading score:  Lower (n=102):67.1 (13.6)  Higher(n=102): 64.6 (12.2) | N/A | 0.16 for mean age between HL groups |
| 32 | Kalichman et al., 2000 | United States  (English) | Cross-sectional | 294 adults with HIV/AIDS from AIDS service organizations and HIV clinics | Mean: 39.7  SD: 7.4  Range: 24-67 | TOFHLA (reading component) | Mean (SD) age by TOFHLA reading score:  Lower (n=50): 39.1 (7.4)  Higher (n=244) was 39.9 (7.3) | N/A | Not given but non- significant |
| 33 | Kim, 2009 | South Korea  (Korean) | Cross-sectional | 103 adults from three community-based senior welfare centers | Inclusion: >60  Mean: 72  SD: 4.91 | Korean Functional Health Literacy test (adapted TOFHLA) | Mean (SD) age by KFHLT score:  High: 70.98 (4.28)  Low: 73.15 (5.14) | N/A | 0.022 for mean age between high and low HL groups (general linear model) |
| 34 | Mansuco et al., 2006 | United States (English and Spanish) | Prospective cohort | 175 patients requiring daily asthma medications from a primary care clinic | Mean: 42.0  SD: 10.0 | TOFHLA | Proportions with marginal/inadequate HL by age:  Ages ≤42: 7%  Ages >42: 30% | N/A | <0.0001 for the proportions with limited HL by age |
| 35 | Mbaezue et al., 2010 | United States (English) | Cross-sectional | 189 diabetic patients from a hospital-based clinic | Inclusion:  18-65  Mean: 51.2  SD: 10 | S-TOFHLA | Mean (SD) age by S-TOFHLA score:  Limited: 55.79 (8.97)  Adequate: 48.23 (9.55) | N/A | p<0.001 for mean age by HL category (t-test) |
| 36 | Roth et al., 2005 | United States (English) | Cross-sectional | 100 independently-living older adults in an Eldercare community program (85% female) | Mean: 77.5  SD: 8.7  Range: 61-97 | S-TOFHLA | Mean TOFHLA scores (not given) did not differ between those aged <75 and ≥75 | N/A | Not given but non- significant |
| 37 | Schillinger et al., 2002 | United States  (English and Spanish) | Cross-sectional | 408 patients with type II diabetes from two primary care clinics | Inclusion: >30  Mean: 58.1  SD: 11.4  No range | S-TOFHLA | Mean (SD) age by S-TOFHLA score:  Inadequate (n=156): 62.7 (10.9)  Marginal (n=54): 59.8 (9.8)  Adequate (n=198): 54.0 (10.7) | N/A | <0.001 for mean age between HL groups with ANOVA |
| 38 | Williams et al., 1998 | United States (English and Spanish) | Cross-sectional | 402 patients with hypertension from one hospital and 114 patients with diabetes from another with no visual impairments or overt psychiatric illness | Inclusion: >18  No mean or range given | TOFHLA | Mean (SD) age by TOFHLA score:  Hypertension patients:  Adequate (n=156): 53.4 (10.2)  Marginal (n=50): 57.7 (8.1)  Inadequate (n=196): 64.2 (11.3)  Diabetes patients:  Adequate (n=51): 49.8 (10.3)  Marginal (n=13): 53.2 (8.8)  Inadequate (n=50): 57.5 (9.3) | N/A | <0.001 for mean age for adequate vs. marginal/inadequate HL groups, among both patient populations |
| b) REALM and its short forms | | | | | | | | | |
| 39 | Bains et al., 2011 | United States  (English) | Cross-sectional | 351 patients from a primary care clinic | Inclusion: ≥18 | REALM-R | Proportions of REALM-R scores by age:  ≤6th grade (n=87): 16-34: 12.8%; 35-49: 20.9%; 50-64: 44.2%; ≥65: 22.1%  >6th grade (n=260): 16-34: 23.1%; 35-49: 21.6%; 50-64: 32.6%; ≥65: 22.8% | N/A | 0.12 for the distribution of HL scores across age categories |
| 40 | Cavanaugh et al., 2010 | United States  (English) | Prospective cohort | 480 incident chronic hemodialysis patients from dialysis clinics | Median: 62  IQR: 51-72 | REALM | Median (IQR) ageby REALM score:  <9th grade (n=154): 64.0 (50.2-72.0)  ≥9th grade (n=326):60.0 (51.2-71.8) | N/A | 0.95 for mean age between HL groups |
| 41 | Cox et al., 2011 | United Kingdom  (English) | Cross-sectional | 127 women with stage I-III breast cancer from an outpatient clinic | Inclusion: ≥18  Median: 64  Range: 34-90 | REALM | HL score by age:  Ages <65: (n=67): 90% had ≥9th grade score  Ages ≥65 (n=60): 93% had ≥9th grade score | N/A | 0.45 for the proportion of women with adequate HL |
| 42 | Davis et al., 2006 | United States (English) | Cross-sectional | 395 patients from three outpatient primary care clinics in indigent community population | Inclusion: ≥18  Mean: 44.8  SD: 13.7  Range: 19-85 | REALM | Mean (SD) age by REALM score:  ≤6th grade (n=75): 50.8 (12.7)  7-8th grade (n=207): 42.6 (13.6)  ≥9th grade (n=113): 44.9 (13.5) | N/A | <0.001 for mean age between HL categories |
| 43 | Ferguson et al., 2011 | United States (English) | Cross-sectional | 150 patients with no visual, audial, or cognitive impairments from a YMCA wellness center and a general internal medicine practice | Inclusion: ≥18  Range: 18-88 | REALM | Age distribution by REALM score:  ≤6th grade: 18-39: 9.1%; 40-59: 18.2%; 60-88: 72.7%  7-8th grade: 18-39: 18.2%; 40-59: 20.0%; 60-88: 30.1%  ≥9th grade: 18-39: 27.7%; 40-59: 30.1%; 60-88: 42.2% | N/A | 0.007 for the proportions with inadequate and adequate HL by age group |
| 44 | Gordon et al., 2002 | United Kingdom  (English) | Cross-sectional | 123 adults with rheumatoid arthritis at a tertiary referral center for rheumatic diseases in a deprived area of Glasgow | Median: 56  Range: 19-77 | REALM | Median age (range) among <9th grade score (n=18):  54 (30-67)  Median age (range) among ≥9th grade score (n=105):  57 (19-77) | N/A | Not given but non- significant |
| 45 | Green et al., 2011 | United States (English) | Randomized controlled trial | 260 patients with chronic hemodialysis from outpatient dialysis clinics | Inclusion: ≥18  Median: 64  Range:56-73 | REALM | Median age among <9th grade score (n=41): 61  Median age among ≥9th grade score (n=219): 63 | N/A | 0.76 for median age between HL categories |
| 46 | Ibrahim et al., 2008 | United Kingdom (English) | Cross-sectional | 300 coronary heart disease hospital inpatients | Inclusion: ≥18  Mean: 64.0  SD: 12.7  Range: 21-91 | REALM | Correlation between age and REALM score (Spearman’s rho): 0.001 | N/A | 0.98 for Spearman’s rho |
| 47 | Lindau et al., 2002 | United States (English) | Prospective cohort | 529 women from ambulatory obstetrics, gynecology, and women’s HIV clinics | Inclusion: ≥18  Median: 27  Range:18-54 | REALM | Proportions with below adequate HL by age:  Ages 18-24: 39.5%  Ages 25-30: 36.1%  Ages 31-39: 37.7%  Ages 40-49: 46.5%  Ages ≥50: 31.6% | N/A | 0.61 for mean HL between age groups (Wilcoxon rank-sum test) |
| 48 | McDougall Jr. et al., 2012 | United States (English) | Cross-sectional pilot study | 45 adults with no dementia from community locations (previously recruited for a memory intervention study) | Inclusion: ≥65  No mean or range given | REALM | REALM scores:  <9th grade: n=3  ≥9th grade: n=42  Pearson corr. coefficient between age and HL: -0.15 | N/A | Not given but non- significant |
| 49 | Miller et al., 2007 | United States (English) | Cross-sectional | 50 patients at a university-affiliated internal medicine practice | Inclusion: ≥50  No mean or range given | REALM | Mean (SD) age by REALM score:  <9th grade (n=24): 62.9 (10.5)  ≥9th grade (n=26): 62.2 (9.2) | N/A | p=0.78 for mean age by HL category (t-test) |
| 50 | Mosher et al., 2012 | United States  (English) | Prospective cohort | 310 veterans taking ≥5 non-topical medications with no cognitive impairments from Veteran’s Affairs primary care clinics | Inclusion: >65  Mean: 73.9  SD: 5.3 | REALM | Mean (SD) age by REALM score:  ≤6th grade (n=27): 73.2 (5.4)  7-8th grade (n=94): 73.9 (5.5)  ≥9th grade (n=189): 74.0 (5.2) | N/A | 0.48 for low vs. marginal and adequate groups; 0.52 for adequate vs. low and marginal groups |
| 51 | Nokes et al., 2007 | United States  (English) | Cross-sectional | 489 community-living HIV-seropositive adults from infectious disease clinics and community-based organizations in 5 cities | Mean: 42.6  SD: 8.77  Range: 20-74 | REALM | Correlation coefficient between age and REALM score: 0.02 | N/A | Not given but non- significant |
| 52 | Osborn et al., 2010 | United States (English) | Cross-sectional | 398 type 1 or 2 diabetes patients from two primary care clinics and two diabetes specialty clinics | Inclusion:  18-85  Mean: 54.4  SD: 13 | REALM | Mean (SD) age by REALM score:  <9th grade (n=120): 55.6 (10.7)  ≥9th grade (n=263): 53.8 (13.9) | N/A | 0.15 for mean age between HL groups |
| 53 | Peterson et al., 2007 | United States (English) | Cross-sectional | 99 primary care patients on Medicaid or Medicare | Inclusion: ≥50  Mean: 59.5  SD: 7.8 | REALM | Mean (SD) age by REALM score:  <9th grade: 60 (8.8)  ≥9th grade: 60 (7.5) | N/A | 0.99 for mean age between HL groups  (t-test) |
| 54 | Shea et al., 2004 | United States (English) | Prospective cohort | 1,610 patients from a Veteran’s Affairs medical center and three primary care clinics | Inclusion: ≥18  No mean or range given | REALM | Mean (SD) REALM score by age group:  Ages <45: 58.7 (10.4)  Ages 45-64: 57.9 (10.6)  Ages ≥65: 55.8 (12.9) | N/A | <0.0005 for mean HL score for ages <45 vs. ≥65 and 45-64 vs. ≥65 |
| 55 | Stewart et al., 2013 | United States (English) | Cross-sectional | 402 daily smokers recruited via media and community outreach | Inclusion: ≥18  Mean: 43.2  SD: 10.8  Range: 18-69 | REALM | Mean (SD) age by REALM score:  <9th grade: 43.21 (10.75)  ≤9th grade: 43.18 (10.82) | N/A | Not given but non-statistically significant |
| 56 | Swearingen et al., 2010 | United States  (English) | Cross-sectional | 194 patients with rheumatic diseases (79% female) | Mean: 56.5  Range: 22-86 | REALM | Mean (SD) age by REALM score:  <9th grade (n=35): 60.8 (12.0)  ≥9th grade (n=159): 55.6 (14.3) | N/A | p<0.05 from Student’s t test |
| 57 | Zhang et al., 2009 | Singapore  (English) | Cross-sectional | 199 patients with rheumatic diseases and no cognitive problems from a tertiary referral center | Inclusion: >18  Age statistics not given | REALM | Mean (SD) age by REALM score:  <9th grade (n=87): 43.7 (14.0)  ≥9th grade (n=112): 48.5 (14.7) | N/A | 0.04 for mean age between HL groups |
| c) Multiple tests | | | | | | | | | |
| 58 | Kirk et al., 2012 | United States  (English) | Cross-sectional | 563 community-based African American, American Indian, and white adults with diabetes | Inclusion: ≥60 | S-TOFHLA  REALM-SF  NVS | Mean (SD) S-TOFHLA; REALM-SF; NVS by age:  Ages 60-69: 51.2 (12.4); 5.9 (1.8); 3.5 (1.9)  Ages 70-79: 48.8 (13.8); 6.1 (1.7); 3.2 (2.0)  Ages ≥80: 42.6 (12.3); 6.0 (1.4); 3.3 (1.7) | N/A | <0.05 for S-TOFHLA scores between 60-69 and 80+ year olds.  No age differences in REALM-SF or NVS. |
| 59 | Ozdemir et al., 2010 | Turkey  (Turkish) | Cross-sectional | 456 patients with no cognitive impairments from a primary care clinic | Mean: 36.21  SD: 12.61  Range: 17-72 | REALM  NVS  (Turkish) | Mean (SD) REALM score; NVS score by age:  Ages 15-24: 62.2 (3.1); 3.8 (1.5)  Ages 25-34: 62.2 (4.4); 2.7 (1.2)  Ages 35-44: 59.2 (8.9); 2.0 (1.8)  Ages ≥45: 57.8 (7.4); 2.2 (1.7) | N/A | 0.000 for mean HL scores between age groups for both tests  (ANOVA) |
| 60 | Walker et al., 2010 | United States  (English) | Cross-sectional | 21 hospital inpatients and 34 outpatients who were able to see, answer questions appropriately, with stable medical status | Mean: 56.8  SD: 13.6 | REALM  TOFHLA | Pearson corr. coefficient between age and REALM score: 0.08; between age and TOFHLA score: -0.12. | N/A | Not given but non- significant |