

Table 1. Synthesis of reviews (2004, 2011) and new literature search (2011-2016) on health literacy and outcome among patients with long term conditions

Outcome variable	Source; long term condition	Literacy relationship: Pos/Neg/No	Quality of studies; Design, N, measure	Number of studies with a significant association of health literacy with outcome variable
<b><i>Patient outcomes</i></b>				
<b><i>Clinical indicators</i></b>				13/31
CD4 count, viral load	(Kalichman & Rompa, 2000); HIV	No	Fair; cross sectional, n=339, TOFHLA	1/4
CD4 count	(Mayben et al., 2007); HIV	No	Fair; cross sectional, n=119, TOFHLA	
HIV - Viral load	(Paasche-Orlow et al., 2006); HIV	No	Fair; retrospective cohort, n=235, REALM	
	(Pellowski, Kalichman, & Grebler, 2016); HIV	Positive	Good; prospective, n=188, TOFHLA	
HIV symptoms severity	(Nokes et al., 2007); HIV	Positive	Fair; cross sectional, n=489, REALM	1/1
Glycemic control	(Schillinger et al., 2002); diabetes	Positive	Good; cross sectional, n=408, s-TOFHLA	4/8
	(Powell, Hill, & Clancy, 2007); diabetes	Positive	Fair; cross sectional, n=68, REALM	

	(Schillinger, Barton, Karter, Wang, & Adler, 2006); diabetes	Positive	Good; cross sectional, n=395, s-TOFHLA
	(Osborn, Bains, & Egede, 2010); diabetes	No	Fair; cross-sectional, n=125, REALM
	(Mancuso, 2010); diabetes	No	Good; cross sectional, n=102, TOFHLA
	(Brega et al., 2012); Diabetes	No	Fair; retrospective, n=594, 3 self-reported items
	(Ishikawa & Yano, 2011); diabetes	Positive	Good; prospective cohort, n=143, 5 self-reported items
	(Lai, Ishikawa, Kiuchi, Mooppil, & Griva, 2013); diabetes	No	Fair; cross sectional, n=63, 5 self-reported items
Glycemic control, blood pressure, BMI	(Al Sayah et al., 2015); diabetes	No	Fair; cross sectional, n=343, 3 self-reported items 1/4
Glycemic control, blood pressure, lipids	(Sayah, Majumdar, & Johnson, 2015); diabetes	No	Good; prospective, n=154, 3 self-reported items
Glycemic control, blood pressure, lipids, complications	(Morris, MacLean, & Littenberg, 2006); diabetes	No	Good; cross sectional, n=1002, s-TOFHLA
Glycemic control & less complications	(Tang, Pang, Chan, Yeung, & Yeung, 2008); diabetes	Positive	Fair; cross sectional, n=149, s-TOFHLA

Anti-coagulation control	(Estrada, Martin-Hryniewicz, Peek, Collins, & Byrd, 2004); coagulation	Positive	Fair; prospective cohort, n=143, REALM	2/3
	(Fang, Machtinger, Wang, & Schillinger, 2006); coagulation	No	Fair; cross sectional, n=179, s-TOFHLA	
	(Oramasionwu et al., 2014); coagulation	Positive	Fair; cross sectional, n=198	
Cancer stage	(C. L. Bennett et al., 1998); cancer	No	Good; cross sectional, n=212, REALM	0/2
	(Halverson et al., 2013); cancer	No	Good; cross sectional, n=1841, 4 self-reported items	
Blood pressure and b-p control	(Pellowski et al., 2016); HIV	Positive	Good; prospective, n=188, TOFHLA	2/4
	(Pandit et al., 2009); hypertension	Positive	Fair; cross sectional, n=330, s-TOFHLA	
	(Al Sayah et al., 2015); diabetes	No	Fair; cross sectional, n=343, 3 self-reported items	
	(Halladay et al., 2016); hypertension	No	Good; prospective cohort, n=525, s-TOFHLA	
Infections	(Jain, Sheth, Green, Bender, & Weisbord,	No	Fair; cross sectional, n=32, REALM	1/2

	2015); peritoneal dialysis (renal disease)			
Kidney function (eGFR)	(Devraj et al., 2015); renal disease	Positive, small and not stable.	Fair; cross sectional, n=150, NVS	
Graft failure	(Miller-Matero et al., 2016); transplantation	Negative	Fair; retrospective cohort, n=398, REALM	1/1
Complication (minor) following surgery	(Scarpato et al., 2016); cystectomy	Negative	Fair; cross sectional, n=368, 3 self-reported items	1/2
Complication (major) following surgery	(Scarpato et al., 2016); cystectomy	No	Fair; cross sectional, n=368, 3 self-reported items	
<i>Function and health status</i>				12/17
<i>SRH</i>	(Cho, Lee, Arozullah, & Crittenden, 2008); Elderly	Positive	Fair; cross sectional, n=489, s-TOFHLA	5/8
	(Kalichman & Rompa, 2000); HIV	No	Fair; cross sectional, n=339, TOFHLA	
	(Gordon, Hampson, Capell, & Madhok, 2002); Rheumatoid arthritis	No	Fair; cross sectional, n=123, REALM	
	(I. Bennett & Chen, 2009); Elderly	Positive	Good; cross sectional, n=2668, NAAL	
	(Howard, Sentell, & Gazmararian, 2006); Elderly	Positive	Fair; cohort, n=3260, TOFHLA	

	(S.-Y. D. Lee, Arozullah, Cho, Crittenden, & Vicencio, 2009); Elderly	Positive	Fair; cross sectional, n=489, s- TOFHLA	
	(Smith, Curtis, Wardle, von Wagner, & Wolf, 2013); Elderly	Positive	Fair; cross sectional, n=697, TOFHLA	
	(Hahn et al., 2015); diabetes	No	Fair; cross sectional, n=295, Health LiTT	
SRH and less limitations	(Kim, 2009); Elderly	Positive	Fair; cross sectional, n=103, TOFHLA	4/5
	(Mancuso & Rincon, 2006); Asthma	No	Fair; cross sectional, n=175, TOFHLA	
	(Wolf, Gazmararian, & Baker, 2005); Elderly	Positive	Fair; cross sectional, n=3260, s-TOFHLA	
	(Zhang, Li, Fong, & Thumboo, 2009); Rheumatoid arthritis	Positive	Fair; cross sectional, n=199, REALM	
	(Puente-Maestu et al., 2016); COPD	Positive	Good; prospective cohort, n=296, SAHLSA	
Function improvement	(Sperber et al., 2013), 2013; osteoarthritis	No	Fair; prospective RCT; n=515, REALM	0/1
Pain improvement	(Sperber et al., 2013); osteoarthritis	Negative	Fair; prospective RCT; n=515, REALM	1/1

Morbidity	(Johnston, Diab, Kim, & Kirshblum, 2005); spinal cord injury	Negative	Fair; cross sectional, n=107, TOFHLA	2/2
	(Puente-Maestu et al., 2016); COPD	Negative	Good; prospective cohort, n=296, SAHLSA	
<i>Quality of Life, emotional conditions</i>				7/17
Depression	(Kalichman et al., 2000); HIV	Negative	Fair; cross sectional, n=297, TOFHLA	4/7
	(J. Gazmararian, Baker, Parker, & Blazer, 2000); Elderly	No	Good; cross sectional, n=2923, s- TOFHLA	
	(Lincoln et al., 2006); Adults with addiction	Negative	Fair; prospective cohort, n=380, REALM	
	(Nokes et al., 2007); HIV	Positive	Fair; cross sectional, n=489, REALM	
	(Al Sayah et al., 2015); diabetes	Negative	Fair; cross sectional, n=343, 3 self-reported items	
	(Sayah et al., 2015); diabetes	No	Good; prospective, n=154, 3 self-reported items	
	(Smith et al., 2013); Elderly	Negative	Fair; cross sectional, n=697	
Anxiety, depression	(Gordon et al., 2002); Rheumatoid arthritis	Negative, only with anxiety	Fair; cross sectional, n=123, REALM	3/3

	(Walker et al., 2007); Rheumatoid arthritis	Negative	Fair; cross sectional, n=363, REALM	
	(Puente-Maestu et al., 2016); COPD	Negative	Good; prospective cohort, n=296, SAHLSA	
Quality of Life	(Lincoln et al., 2006); Adults with addiction	No	Fair; prospective cohort, n=380, REALM	0/7
	(C. A. Mancuso & Rincon, 2006); Asthma	No	Fair; cross sectional, n=175, TOFHLA	
	(Hahn et al., 2007); cancer	No	Good; cross sectional, n=415, Health LiTT	
	(Zhang et al., 2009); Rheumatoid arthritis	No	Fair; cross sectional, n=199, REALM	
	(E.-H. Lee, Lee, & Moon, 2016); diabetes	No	Fair; cross sectional, n=459, self-constructed health literacy scale in Japanese	
	(Al Sayah et al., 2015); diabetes	No	Good; prospective, n=154, 3 self-reported items	
Quality of Life, vision- related	(Muir et al., 2008); glaucoma	No	Fair; cross sectional, n=195, REALM	
<i>Mortality (Elderly)</i>	(Baker et al., 2007); Elderly	Negative	Good; prospective cohort, n=3260, s-TOFHLA	4/4
	(Baker, Wolf, Feinglass, & Thompson, 2008); Elderly	Negative	Good; prospective cohort, n=3260, s-TOFHLA	

	(Sudore, Yaffe, et al., 2006); Elderly	Negative	Good; prospective cohort, n=2512, REALM	
	(Puente-Maestu et al., 2016); COPD	Negative	Good; prospective cohort, n=296, SAHLSA	
<b><i>Process of Care</i></b>				
Medication adherence & management	(Kalichman & Rompa, 2000); HIV	No	Fair; cross sectional, n=339, TOFHLA	14/20
	(Kalichman, Ramachandran, & Catz, 1999); HIV	Positive	Good; cross sectional, n=182, adapted TOFHLA	
	(Cho et al., 2008); Elderly	Positive	Fair; cross sectional, n=489, s-TOFHLA	
	(Kripalani et al., 2006); CVD	Positive	Good; cross sectional, n=152, REALM	
	(Waldrop-Valverde et al., 2009); HIV	Positive	Fair; cross sectional, n=155, TOFHLA	
	(Raehl, Bond, Woods, Patry, & Sleeper, 2006); Elderly	Positive	Fair; cross sectional, n=57, REALM	
	(Kalichman et al., 2008); HIV	Positive	Fair; prospective, n=145, TOFHLA reading	
	(Paasche-Orlow et al., 2006); HIV	No	Fair; retrospective cohort, n=235, REALM	

(Wolf, Davis, et al., 2007); Positive HIV		Fair; cross sectional, n=204, REALM
(Gazmararian et al., 2006); No CVD		Fair; prospective cohort, n=1549, s-TOPHLA
(Osborn, Paasche-Orlow, Davis, & Wolf, 2007); HIV	Positive	Fair; cross sectional, n=204, REALM
(Waite, Paasche-Orlow, Rintamaki, Davis, & Wolf, 2008); HIV	Positive	Fair; cross sectional, n=204, REALM
(Gatti, Jacobson, K. L., Gazmararian, J. A., Schmotzer, & Kripalani, 2009); urban hospital	No	Fair; cross sectional, n=275, REALM
(Graham, Bennett, Holmes, & Gross, 2007); HIV	Positive	Fair; retrospective cohort, n=87, REALM
(Gerber, Cho, Arozullah, & Lee, 2010); Elderly	No	Fair; cross sectional, n=489, s-TOPHLA
(Osborn et al., 2010); diabetes	No	Fair; cross-sectional, n=125, REALM
(Bauer et al., 2013); diabetes	Positive	Good; prospective, n=1366, 3 self-reported items
(Kripalani, Gatti, & Jacobson, 2010); CVD	Positive	Fair; cross sectional, n=434, REALM

(Heinrich & Kuiper, 2012); No chronic patients in community		Fair; cross sectional, n=36, NVS
(Y.-M. Lee, Yu, You, & Son, 2015); Elderly	Positive	Fair; cross sectional, n=291, s-TOFHLA
(Pellowski et al., 2016); HIV	Positive	Good; prospective, n=188, TOFHLA

Preventive health behaviors (e.g., vaccinations, cancer screen, physical activity, self-care, appointment keeping)

10/15

(Scott, Gazmararian, Williams, & Baker, 2002); Elderly	Positive	Good; cross sectional, n=2722, s-TOFHLA
(Williams, Baker, Honig, Lee, & Nowlan, 1998); Asthma	Positive	Good; cross sectional, n=483, s-TOFHLA
Cho et al., 2008; Elderly	Positive	Fair; cross sectional, n=489, s-TOFHLA
(I. Bennett & Chen, 2009); Elderly	Positive in some behaviors; no in others	Good; cross sectional, n=2668, NAAL

(White, Chen, & Atchison, 2008); Elderly	Positive only among the elderly	Fair; cross sectional, n=18100, NAAL
(Sudore, Mehta, et al., 2006); Elderly	Positive	Fair, cross sectional, n=2512, REALM
(Lindau, Basu, & Leitsch, 2006); abnormal Pap	No	Fair, cohort; n=68, REALM
(Wolf, Gazmararian, & Baker, 2007); Elderly	No	Fair; cross sectional, n=2923, s-TOFHLA
(Osborn et al., 2010); diabetes	No	Fair; cross-sectional, n=125, REALM
(Brega et al., 2012); Diabetes	Mixed	Fair; retrospective, n=594, 3 self-reported items
(Cajita et al., 2016); heart transplantation	No (except for physical activity)	Fair; cross sectional, n=1362, 1 self-report item
(Eckman et al., 2012); CAD	No	Fair; cross sectional, n=187, REALM
(Hahn et al., 2015); diabetes	No	Fair; cross sectional, n=295, Health LiTT
(Lai et al., 2013); diabetes	Positive	Fair; cross sectional, n=63, 5 self-reported items
(Lee et al., 2016); diabetes	Positive	Fair; cross sectional, n=459, self-constructed health literacy scale in Japanese

	(Miller-Maturo et al., 2016); transplantation	Positive	Fair; retrospective cohort, n=398, REALM	
<b>Health care services outcomes</b>				
<i>Emergency Care and/or hospitalization</i>	(Baker et al., 2004); older adults	Negative	Good; cohort, n=3260, s-TOFHLA	8/11
	(Murray et al., 2009); CHD	Negative	Fair; prospective cohort, n=186, s-TOFHLA	
	(Paasche-Orlow et al., 2005); Asthma	Negative	Fair; prospective cohort, n=73, s-TOFHLA	
	(Tang et al., 2008); Diabetes	Negative	Fair; cross sectional, N=149, s-TOFHLA	
	(Gordon et al., 2002); Rheumatoid arthritis	Negative	Fair; cross sectional, n=123, REALM	
	(Baker et al., 1998); Elderly	Negative	Good; cross sectional, n=3260, s-TOFHLA	
	(Murphy et al., 2010); HIV	No	Fair; cross sectional, n=186, s-TOFHLA	
	(Hope, Wu, Tu, Young, & Murray, 2004); CVD	Negative	Fair; Cohort, n=61, medication-specific behavioral measure	
	(Jain et al., 2015); peritoneal dialysis (renal disease)	No	Fair; prospective cohort, n=32, REALM	

	(Puente-Maestu et al., 2016); COPD	Negative	Good; prospective cohort, n=296, SAHLSA	
	(Scarpato et al., 2016); cystectomy	No	Fair; cross sectional, n=368, 3 self-reported items	
<i>Referral to transplantation</i>	(Grubbs, Gregorich, Perez-Stable, & Hsu, 2009); kidney	Positive	Fair; retrospective cohort, n=62, s-TOFHLA	1/1