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Diabetes Project



# Health Literacy & Health-related Quality of Life in Adults with Type 2 diabetes

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(For the ABCD Cohort Investigators)*

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ACHORD  
Alliance for Canadian Health  
Outcomes Research in Diabetes



SCHOOL OF  
**PUBLIC HEALTH**  
UNIVERSITY OF ALBERTA



# Background

## **Health Literacy (HL)**

Ability to read, process,  
understand and  
communicate about  
health-related  
information

## **Health-related Quality of Life (HRQL)**

Perceived quality of an  
individuals' emotional,  
social, and physical  
aspects of one's life,  
and how that might be  
affected by disease  
states





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# Background

## Annals of Internal Medicine

*Ann Intern Med.* 2011;155:97-107.

### Low Health Literacy and Health Outcomes: An Updated Systematic Review

Nancy D. Berkman, PhD; Stacey L. Sheridan, MD, MPH; Katrina E. Donahue, MD, MPH; David A. Asch, MD, MPH; Karen Crotty, PhD, MPH

Decrease in HRQL in elderly; Inconsistent & insufficient evidence in specific patient groups

## REVIEWS



### Health Literacy and Health Outcomes in Diabetes: A Systematic Review

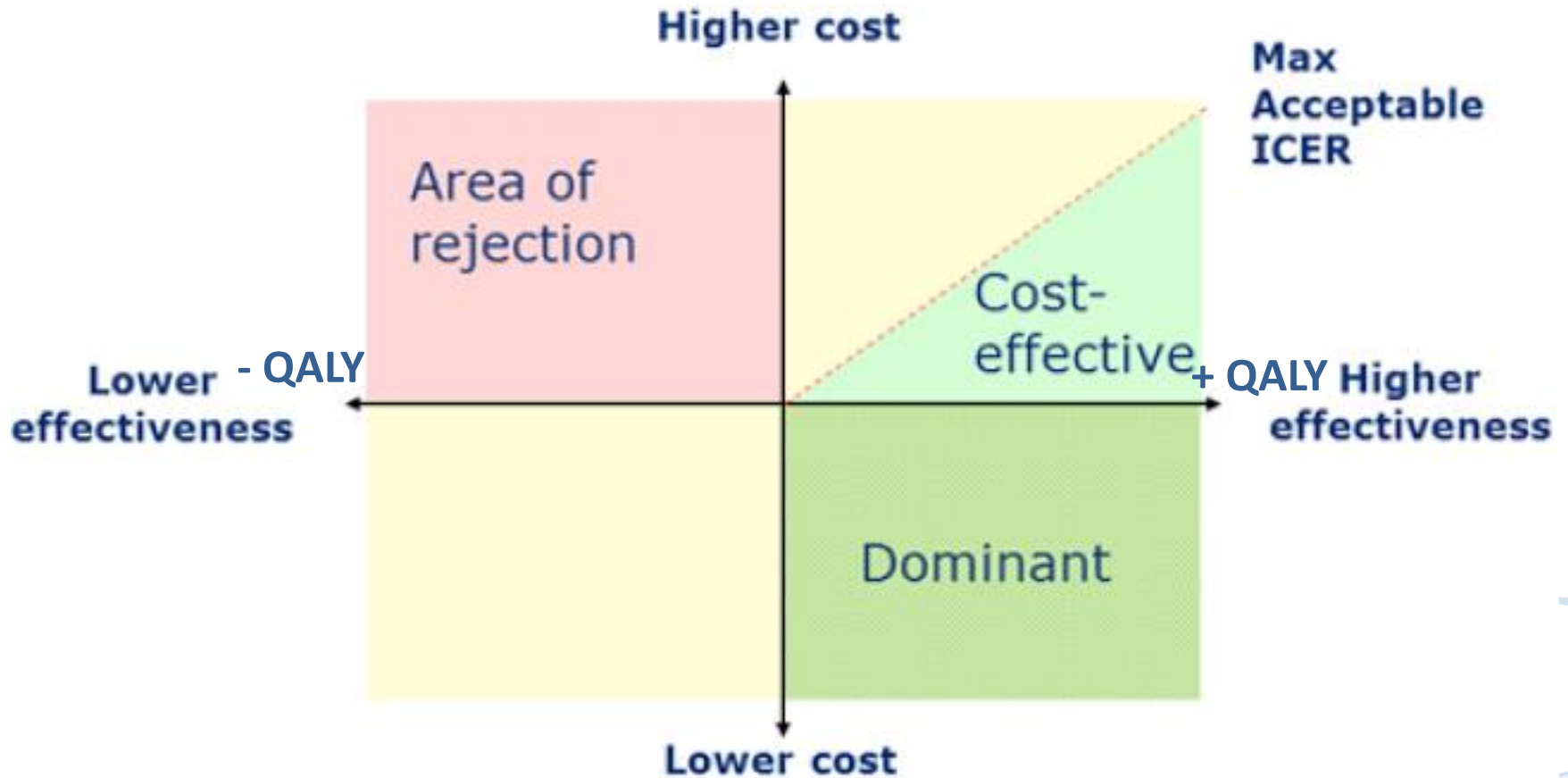
*J Gen Intern Med* 28(3):444-52

Fatima Al Sayah, PhD<sup>1,2,4</sup>, Sumit R. Majumdar, MD, MPH, FRCPC<sup>2,3</sup>, Beverly A. Broun, PhD<sup>1,2</sup>, Sandy Robertson, RN<sup>4</sup>, and Jeffrey A. Johnson, PhD<sup>1,2</sup>

Inconsistent & insufficient evidence in patients with type 2 diabetes



# Application of utility scores in Economic Evaluations





# Background

## Health Literacy (HL)

Ability to read, process,  
understand and  
communicate about  
health-related  
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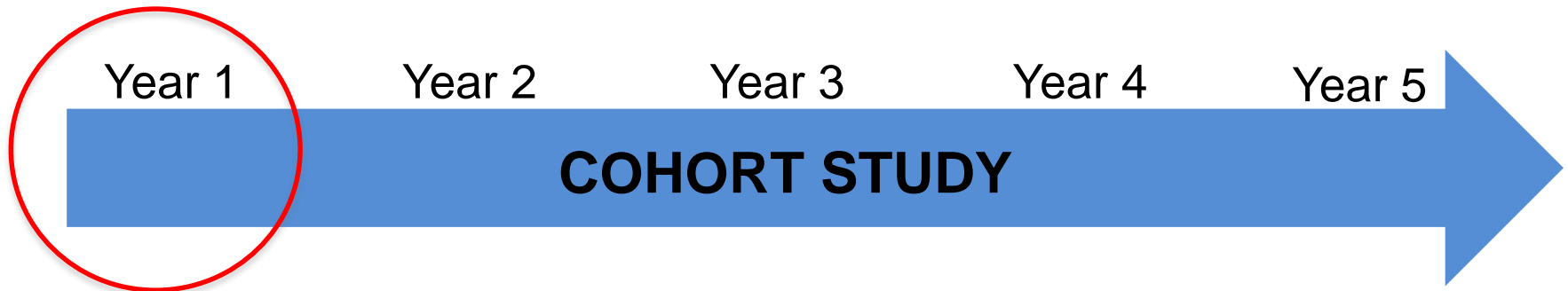
## Health-related Quality of Life (HRQL)

Perceived quality of an  
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Longitudinal prospective cohort  
Type 2 diabetes patients in Alberta, Canada  
(N=2040)



- Eligibility: T2DM,  $\geq 18$  years old, AB resident, able to communicate in English
- Data collection: mail-out of a self-administered survey







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# Health Literacy Measurement

How often do you have problems learning about your medical condition because of difficulty understanding written information?

- 1 ☐ All the time
- 2 ☐ Most of the time
- 3 ☐ Some of the time
- 4 ☐ A little bit of the time
- 5 ☐ None of the time

How confident are you filling out medical forms by yourself?

- 1 ☐ All the time
- 2 ☐ Most of the time
- 3 ☐ Some of the time
- 4 ☐ A little bit of the time
- 5 ☐ None of the time

How often do you have someone like a family member, friend, hospital or clinic worker or caregiver help you read health plan materials?

- 1 ☐ All the time
- 2 ☐ Most of the time
- 3 ☐ Some of the time
- 4 ☐ A little bit of the time
- 5 ☐ None of the time

**Sum of scores of 3 items**  
 **$\geq 9 \rightarrow$  inadequate HL**





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## EQ-5D-5L

- Health utility measure
- 5 dimensions (mobility, self-care, usual activities, pain/discomfort, anxiety/depression)
- 5 levels
- Provides one index score
- Range -0.11 to 1.0
- MCID = 0.03

Indicate which statement best describes your own health status **today**:  
{Please check the box that corresponds to your answer}

### a. Mobility:

- 1 ☐ I have **no** problems walking
- 2 ☐ I have **slight** problems walking
- 3 ☐ I have **moderate** problems walking
- 4 ☐ I have **severe** problems walking
- 5 ☐ I am **unable** to walk

### b. Self-Care:

- 1 ☐ I have **no** problems washing or dressing myself
- 2 ☐ I have **slight** problems washing or dressing myself
- 3 ☐ I have **moderate** problems washing or dressing myself
- 4 ☐ I have **severe** problems washing or dressing myself
- 5 ☐ I am **unable** to wash or dress myself

### c. Usual Activities (e.g. work, study, housework, family or leisure activities):

- 1 ☐ I have **no** problems doing my usual activities
- 2 ☐ I have **slight** problems doing my usual activities
- 3 ☐ I have **moderate** problems doing my usual activities
- 4 ☐ I have **severe** problems doing my usual activities
- 5 ☐ I am **unable** to do my usual activities

### d. Pain or Discomfort:

- 1 ☐ I have **no** pain or discomfort
- 2 ☐ I have **slight** pain or discomfort
- 3 ☐ I have **moderate** pain or discomfort
- 4 ☐ I have **severe** pain or discomfort
- 5 ☐ I have **extreme** pain or discomfort

### e. Anxiety/Depression:

- 1 ☐ I am **not** anxious or depressed
- 2 ☐ I am **slightly** anxious or depressed
- 3 ☐ I am **moderately** anxious or depressed
- 4 ☐ I am **severely** anxious or depressed
- 5 ☐ I am **extremely** anxious or depressed





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## SF-12 v2

- Profile measure
- 12 items
- 8 dimensions (physical functioning, role limitations due to physical problems, bodily pain, general health, vitality, social functioning, role limitations due to emotional problems, and mental health)
- 2 summary scores (PCS, MCS)
- T scores
- MCID = 5

**1) In general, would you say your health is:**

Excellent	Very good	Good	Fair	Poor
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**2) The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?**

	Yes, limited a lot	Yes, limited a little	No, not limited at all
a. <u>Moderate</u> activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Climbing <u>several</u> flights of stairs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**3) During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of your physical health?**

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a. <u>Accomplished less</u> than you would like	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Were limited in the <u>kind</u> of work or other activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**4) During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?**

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a. <u>Accomplished less</u> than you would like	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Did work or activities <u>less carefully than usual</u>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**5) During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?**

Not at all	A little bit	Moderately	Quite a bit	Extremely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**6) These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks...**

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a. Have you felt calm and peaceful?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Did you have a lot of energy?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Have you felt downhearted and depressed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**7) During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc.)?**

All of the time	Most of the time	Some of the time	A little of the time	None of the time
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



# Other Measures

- **Age, sex, income** (<\$80,000; >=\$80,000), **educational level** (less than high school; completed high school; higher than high school)
- **Diabetes duration**, number of **comorbidities**
- **Self-efficacy** (Self-Efficacy for Managing Chronic Disease 6-Item Scale; scores >= mean → high SE)
- **Depressive symptoms** (Patient Health Questionnaire 8; cut-off >=10 present)





## Prevalence of inadequate HL = 13%

Characteristic	Overall (N=1930)	Adequate HL (N=1685; 87.3%)	Inadequate HL (N=245; 12.7%)	P-value
	N (%) or mean $\pm$ SD	N (%) or mean $\pm$ SD	N (%) or mean $\pm$ SD	
Age	64.5 $\pm$ 10.7	64.3 $\pm$ 10.7	65.7 $\pm$ 11.2	0.061
Sex - female	868 (45.0)	766 (45.7)	102 (42.2)	0.299
Ethnicity				
White/Caucasian	1752 (90.8)	1535 (91.1)	217 (88.6)	0.867
Aboriginal	46 (2.4)	40 (2.4)	6 (2.4)	
Others	132 (6.8)	110 (6.5)	22 (9.0)	
Income				
<\$80,000	1479 (76.6)	1267 (75.2)	212 (86.5)	<0.001
>=\$80,000	451 (23.4)	418 (24.8)	33 (13.5)	
Educational level				
Less than high school	268 (13.9)	200 (11.9)	68 (28.0)	<0.001
Completed high school	775 (40.2)	668 (39.8)	107 (44.0)	
Higher than high school	876 (45.4)	808 (48.1)	68 (28.0)	
Diabetes duration	12.5 $\pm$ 8.8	12.5 $\pm$ 9.9	13.4 $\pm$ 10.9	0.299
Number of comorbidities	4.2 $\pm$ 2.3	4.1 $\pm$ 2.2	4.6 $\pm$ 2.4	<0.001
0	49 (2.5)	44 (2.6)	5 (2.0)	0.314
1	154 (8.0)	140 (8.3)	14 (5.7)	
2 or more	1727 (89.5)	1501 (89.1)	226 (92.2)	
Self-efficacy	7.5 $\pm$ 2.3	7.7 $\pm$ 2.2	6.3 $\pm$ 2.5	<0.001
Low	730 (37.8)	588 (34.9)	142 (58.0)	<0.001
High	1200 (62.2)	1097 (65.1)	103 (42.0)	
Depression (PHQ-8)	5.3 $\pm$ 5.4	5.1 $\pm$ 5.3	7.1 $\pm$ 6.1	<0.001
PHQ-8 < 10	1563 (81.0)	1386 (82.3)	177 (72.2)	<0.001
PHQ-8 $\geq$ 10	367 (19.0)	299 (17.7)	68 (27.8)	

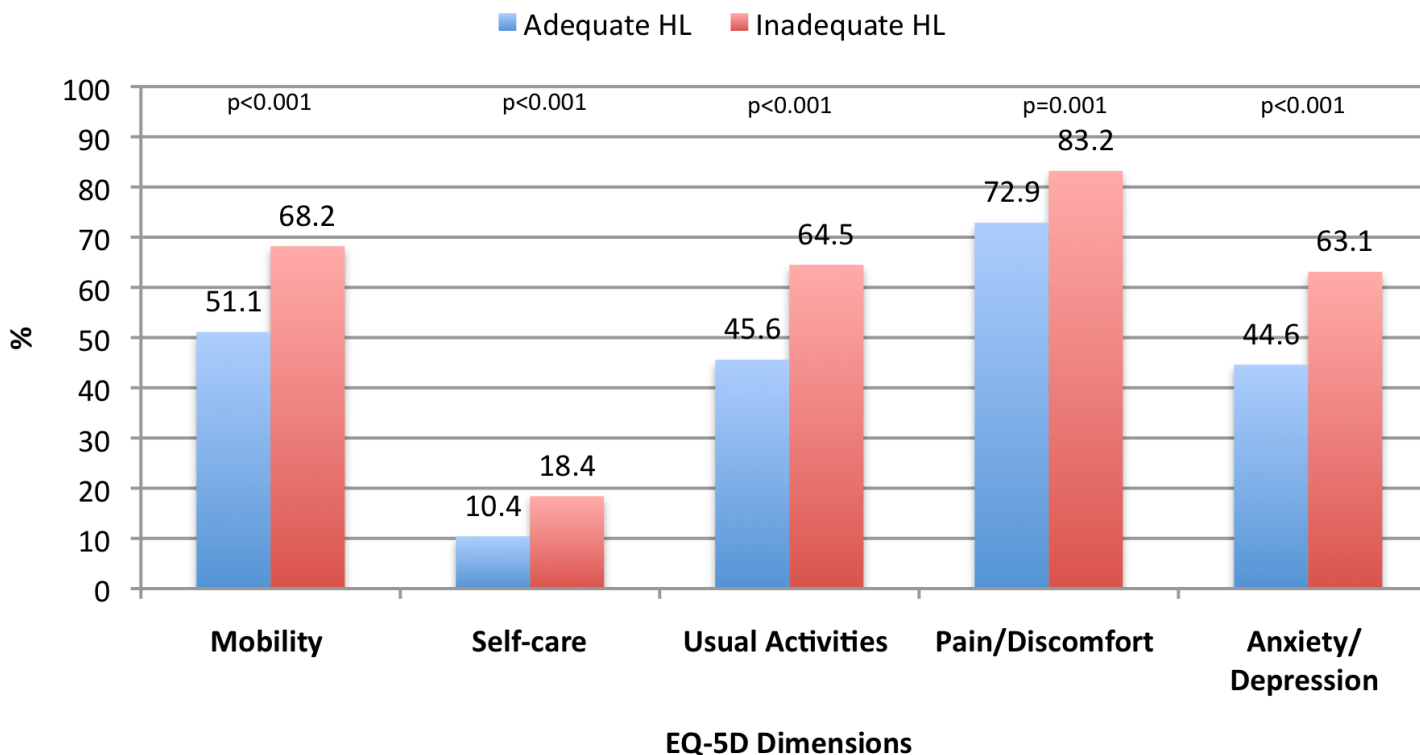




# EQ-5D index scores & dimensions

	Overall (N=1930)	Adequate HL (N=1685; 87.3%)	Inadequate HL (N=245; 12.7%)	P-value
EQ-5D index score	0.80 ± 0.14	0.80 ± 0.14	0.74 ± 0.15	<0.001

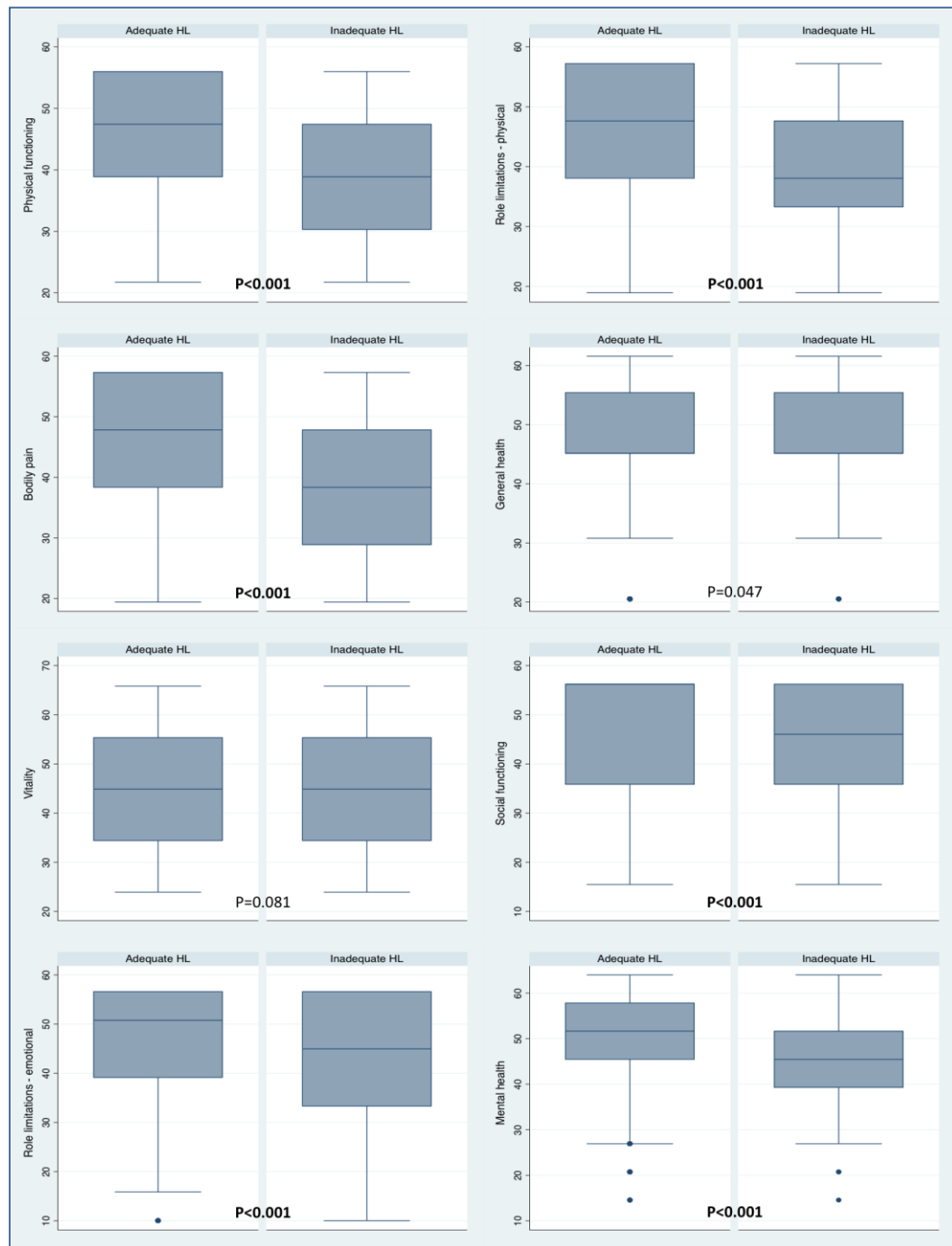
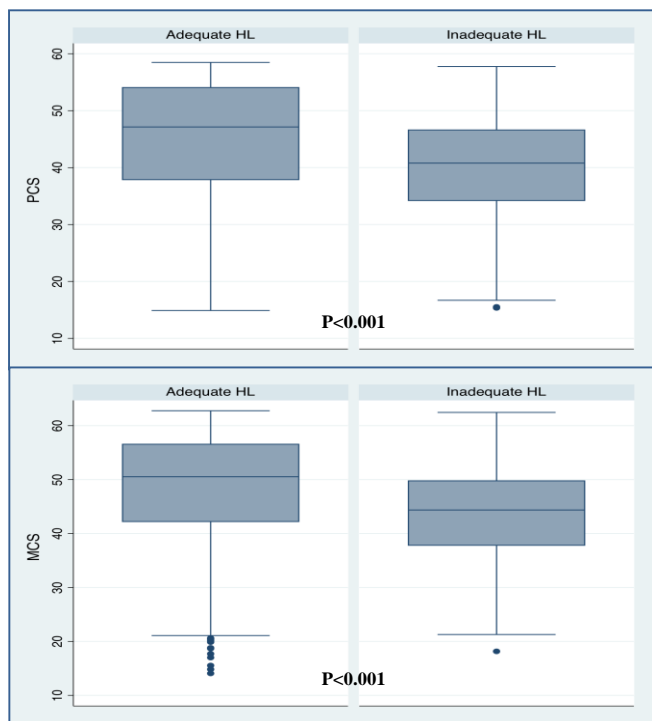
## Presence of problems in EQ-5D Dimensions by HL level





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# SF-12 Domain and Summary Scores by HL level





# Results

	Model 1: Adjusted for age, sex, income, education, diabetes duration, & number of comorbidities		Model 2: model 1 + depressive symptoms		Model 3: model 2 + self- efficacy	
HRQL indicators	Beta	P-value	Beta	P-value	Beta	P-value
EQ-5D index score	-0.04	<b>&lt;0.001</b>	-0.03	<b>0.001</b>	-0.01	0.063
SF-12 PCS	-2.9	<b>&lt;0.001</b>	-2.3	<b>&lt;0.001</b>	-1.1	<b>0.041</b>
SF-12 MCS	-3.3	<b>&lt;0.001</b>	-2.3	<b>&lt;0.001</b>	-1.5	<b>0.001</b>

	Low Self-efficacy				High Self-efficacy	
	PHQ8 < 10 (N=423)		PHQ8 ≥ 10 (n=308)		PHQ8 < 10 (n=1245)	
HRQL indicators	Beta	P-value	Beta	P-value	Beta	P-value
EQ-5D index score	-0.01	0.650	0.01	0.467	-0.03	<b>0.011</b>
SF-12 PCS	0.3	0.719	0.8	0.452	-3.2	<b>&lt;0.001</b>
SF-12 MCS	-1.4	0.088	2.1	<b>0.033</b>	-3.8	<b>&lt;0.001</b>





## Key Findings

- Inadequate HL was independently associated with lower HRQL in adults with T2DM, although the difference could be considered minimal after accounting for socio-demographic and clinical characteristics associated with HL.
- The association between HL and HRQL varied by the level of self-efficacy and presence of depressive symptoms.
- Limitations: 1) self-reported data; 2) cross-sectional
- Future research should examine longitudinal associations between HL and HRQL, as well as further explore the role of self-efficacy and depressive symptoms in these associations.





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**Thank you for your attention!**

**Questions?**

*Say not, 'I have found the truth,' but rather,  
'I have found a truth.'*

*Gibran Khalil Gibran*

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