CHRONIC KIDNEY DISEASE AND HEALTH LITERACY

RELATIONSHIP BETWEEN HEALTH LITERACY, KNOWLEDGE OF SELF-MANAGEMENT BEHAVIORS, DISEASE AWARENESS, AND KIDNEY FUNCTION
CHRONIC KIDNEY DISEASE

- Progressive and sustained kidney damage with or without reduction in renal function. (estimated GFR less than 60 ml/min/1.73m\(^2\) for 3 months or more irrespective of cause).

- eGFR rates used to measure stage of kidney disease.

- Five stage scheme (based on KDQOL guidelines)

<table>
<thead>
<tr>
<th>CKD Stage</th>
<th>Description</th>
<th>GFR (mL/min/1.73m(^2))</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>At risk</td>
<td>&gt;60 (with CKD risk factors)</td>
</tr>
<tr>
<td>Stage 1</td>
<td>Kidney damage with normal or increased GFR</td>
<td>≥ 90</td>
</tr>
<tr>
<td>Stage 2</td>
<td>Kidney damage with mildly diminished GFR</td>
<td>60 - 89</td>
</tr>
<tr>
<td>Stage 3</td>
<td>Moderately reduced GFR</td>
<td>30- 59</td>
</tr>
<tr>
<td>Stage 4</td>
<td>Severely reduced GFR</td>
<td>15-29</td>
</tr>
<tr>
<td>Stage 5</td>
<td>End-stage renal disease (Kidney failure)</td>
<td>≤ 15</td>
</tr>
</tbody>
</table>
BURDEN AND IMPACT OF CKD

- Incidence and Prevalence of CKD is increasing.
  - 2013 Prevalence=13.1% (USRDS).
  - More than 26 million Americans diagnosed with CKD.

- Impact of CKD
  - Higher PPPY costs incurred by patients with CKD than those without CKD.
  - Costs higher in the later stages of disease.

WHY THIS STUDY??

Risk factors of LHL

Complicated med regimen

Sense of shame

Complex self-management behaviors required for CKD

Written materials at higher grade level

Other factors
- HL and clinical outcome
- No evidence in earlier stages of CKD

Risk factors of LHL:
- Sense of shame
- Complicated medication regimen
- Written materials at higher grade level

CKD Progression/kidney failure

WHY THIS STUDY??

- Other factors
- HL and clinical outcome
- No evidence in earlier stages of CKD
STUDY PURPOSE

Examine the relationship between Health Literacy and:

i) CKD self-management knowledge

ii) eGFR

iii) CKD Awareness
METHODS

- Location: University of New Mexico Health Sciences Center Outpatient Nephrology Clinic
METHODS

- **Study Population:** Established adult patients with stages 1-4 CKD

- **Exclusion Criteria**
  - Age <21 years
  - Non English-speaking
  - Cognitive impairment (determined by 6 item validated screener). A SIS score of <4 indicates poor cognitive functioning.
  - Impaired vision (determined by Rosenbaum eye chart)/
  - Current acute kidney injury
METHODS

- Two stage data collection: Initial phone contact, followed by clinic visit.

- Instruments administered
  - Newest Vital Sign (NVS)
  - CKD-SMKT
    - 7 step process: Qualitative and quantitative review by expert jury.
    - 11 items
    - Overall Lexile score 470

- Single item CKD awareness
  - “Have you ever been told that you have weak or failing kidneys (excluding kidney stones, bladder infections, or incontinence (i.e., no bladder control)).

- Demographics

- Medical records: serum creatinine concentration (eGFR) calculated using MDRD equation.

Table 2
Final Chronic Kidney Disease Self-Management Knowledge Tool (CKD-SMKT)

<table>
<thead>
<tr>
<th>Section A</th>
<th>True</th>
<th>False</th>
<th>Don’t know</th>
<th>I have done this in the past 3-6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>To help my kidneys, I need to:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Know what my blood pressure goal is.</td>
<td>T</td>
<td>F</td>
<td>DK</td>
<td>YES NO</td>
</tr>
<tr>
<td>Take my blood pressure medicine(s) like my doctor tells me to.</td>
<td>T</td>
<td>F</td>
<td>DK</td>
<td>YES NO</td>
</tr>
<tr>
<td>Have my urine (“pee”) tested at least once a year.</td>
<td>T</td>
<td>F</td>
<td>DK</td>
<td>YES NO</td>
</tr>
<tr>
<td>Get my blood checked every few months.</td>
<td>T</td>
<td>F</td>
<td>DK</td>
<td>YES NO</td>
</tr>
<tr>
<td>Eat more salt.</td>
<td>T</td>
<td>F</td>
<td>DK</td>
<td>YES NO</td>
</tr>
<tr>
<td>Keep a healthy body weight.</td>
<td>T</td>
<td>F</td>
<td>DK</td>
<td>YES NO</td>
</tr>
<tr>
<td>Not take some over-the-counter pain medicines (Motrin®, Aleve®, Ibuprofen, Naproxen).</td>
<td>T</td>
<td>F</td>
<td>DK</td>
<td>YES NO</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you have diabetes? If YES, answer the 3 items below. If NO, skip to Section C. To help my kidneys, I need to:</td>
</tr>
<tr>
<td>Keep track of my blood sugar each day.</td>
</tr>
<tr>
<td>Eat less sugar.</td>
</tr>
<tr>
<td>Take my diabetes medicine(s) like my doctor tells me to.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section C</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>How much do you know about your kidney health?</td>
<td>I need to know</td>
<td>I know nothing</td>
<td>I know a little</td>
<td>I know some</td>
<td>I know a lot</td>
</tr>
</tbody>
</table>
RESULTS

- Data collected between 3/21/12 and 7/31/12
- Number of people approached = 181
- Declined= 15
- Failed screening=16
- Fully interviewed = 150

- Data Analysis
  - eGFR was log transformed.
  - Regressions performed after controlling for demographics
**DEMOGRAPHICS**

**Health Insurance Status**
- Other: 34.0%
- Combination (private & Medicare): 15.3%
- Private: 4%
- Govt insurance: 44%
- Uninsured: 2.7%

**Annual Household Income**
- Less than $15K: 46.0%
- $15K - $30K: 28.0%
- More than $30K: 26.0%

**Duration of CKD**
- Don't have CKD: 14.1%
- Less than 1 year: 5.4%
- 1-5 yrs: 11.4%
- 6-10 yrs: 17.4%
- More than 10 years: 51.7%
Do you have or have you been told that you have:

- Diabetes: 58%
- Hypertension: 76.7%
- Family history of kidney disease: 25.3%

Key Related Health Conditions

CKD Stage

- Stage 1: 5.3%
- Stage 2: 11.3%
- Stage 3: 50%
- Stage 4: 33.3%
CKD AWARENESS AND HEALTH LITERACY

CKD Awareness by CKD stage

N=69

N=48

N=11

N=4

Pearson Chi-sq = 23.84, df=3; p<0.001

Distribution of Health Literacy Levels

High Likelihood of LL: 32.7%
Possible Likelihood of LL: 30.7%
Adequate Literacy: 36.7%
KNOWLEDGE OF CKD SELF-MANAGEMENT BEHAVIORS

Knowledge Percent correct

How much do you know about your kidney health?

- Know nothing: 1.3%
- Know a little: 14.1%
- Know some: 42.3%
- Know a lot: 28.9%
- Know everything I need to know: 13.4%
CKD SELF-MANAGEMENT BEHAVIORS KNOWLEDGE BY CKD STAGE

Mean Knowledge percent correct

Model $F=7.11$, df=3,144; $p<0.05$)
RELATIONSHIP BETWEEN HEALTH LITERACY AND eGFR

- Model F (21,128)=2.39, p=0.002.
- R square=0.282, R=0.531
- Health Literacy significantly related to log eGFR after controlling for demographics. beta = 0.210, t=2.12; p=0.035
- For each unit increase in NVS score, the eGFR increased by 23%.
RELATIONSHIP BETWEEN CKD SELF-MANAGEMENT BEHAVIORS AND eGFR

- Model F (21,126) = 2.75, p<0.001
- R square =0.315, R=0.56
- CKD self-management behaviors significantly predicted log eGFR, after controlling for demographics beta= - 0.28, t=-3.37, p=0.001
RELATIONSHIP BETWEEN CKD AWARENESS AND EGFR

- Model $F(21,128)=2.97$, $p<0.00$
- $R^2 = 0.33$, $R=0.57$
- CKD awareness significantly predicted log eGFR after controlling for demographics.
- $\beta=0.34$, $t=3.37$, $p <0.001$
SUMMARY

- Health literacy is an independent predictor of kidney function after controlling for confounders.
  - There was a 23% increase in eGFR value for every unit increase in NVS score.

- CKD awareness and self-management behavior knowledge are also independent predictors of kidney function.

- CKD awareness was a better predictor of kidney function than health literacy.
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