



NephU™

Improving Awareness & Patient Outcomes

Assessing Pain and Its Impact in Autosomal Dominant Polycystic Kidney Disease

The ADPKD Pain and Discomfort Scale (ADPKD-PDS)

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Speakers



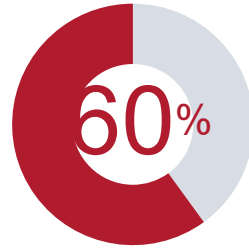
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Why Evaluate Pain in ADPKD?

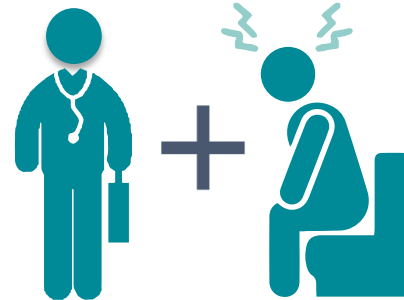
Most patients experience acute and/or chronic pain¹



Symptoms can be severe, persistent, and debilitating¹⁻²



Impacts mental health and interferes with daily activities²



Often under-reported or minimized by patients to their providers⁴

1. Bajwa ZH et al. *Kidney Int.* 2004;66:1561-9. 2. Oberdhan DO et al. *Clin J Am Soc Nephrol.* 2023;18:213-22. 3. Cho Y et al. *Am J Kidney Dis.* 2020;76:361-73.

4. Cho Y et al. *Am J Kidney Dis.* 2021;77:255-63.

Pain/Discomfort are Experienced Differently in ADPKD

- Earlier research had shown that the experience of ADPKD-related pain and discomfort is **qualitatively different** than in other chronic kidney diseases^{1,2}
- Unlike in other kidney conditions, symptoms and their associated burden often manifest long before onset of advanced chronic kidney disease²
- In fact, pain is the most common symptom leading to ADPKD diagnosis:

17.5%

ADPKD patients diagnosed due to back pain³

16.4%

ADPKD patients diagnosed due to abdominal pain³

42.2%

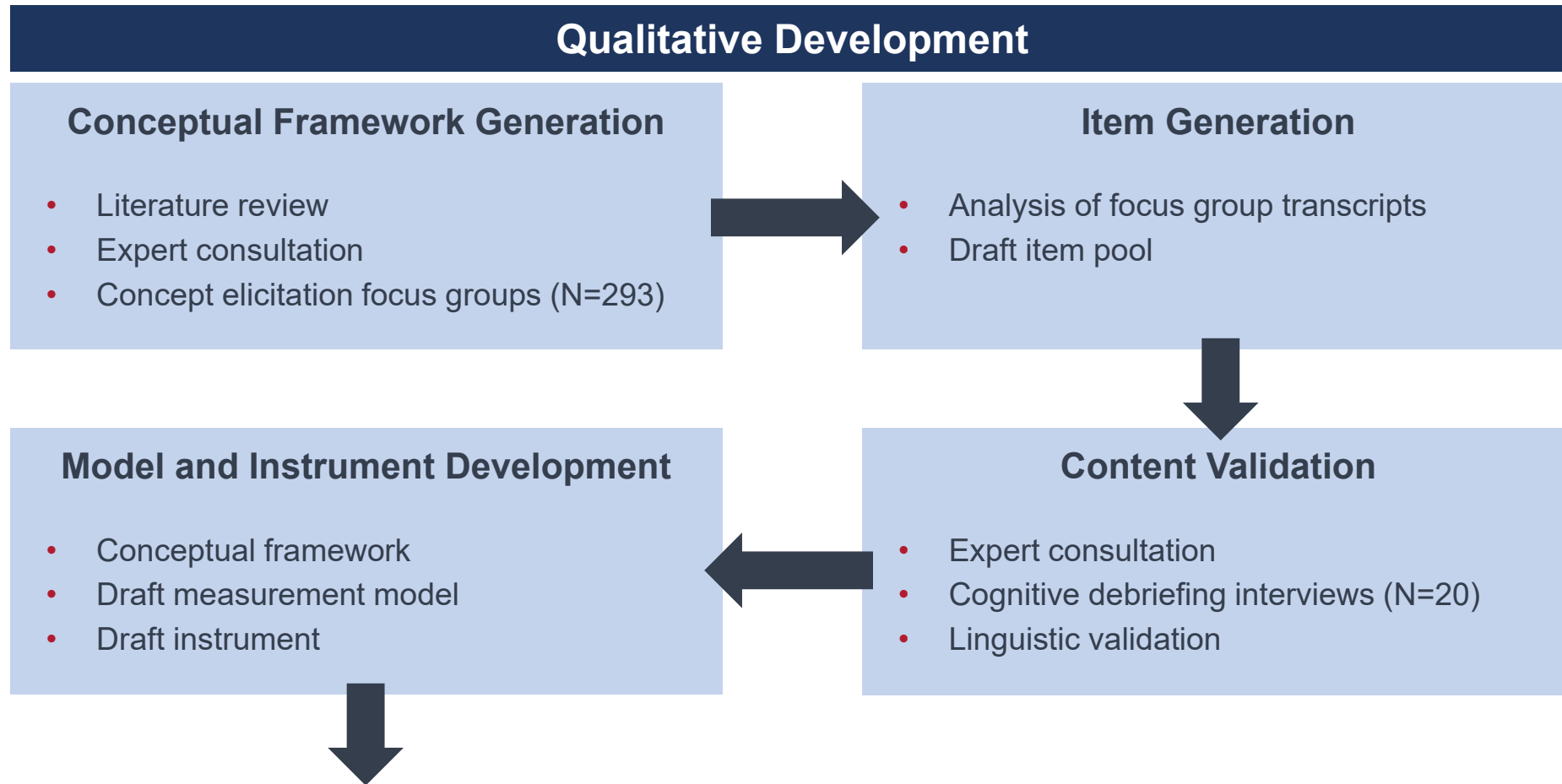
Recalled a history of frequent low back or abdominal pain before diagnosis³

1. Cho Y et al. *Am J Kidney Dis.* 2021;77:255-63. 2. Obderdhan DO et al. *Am J Kidney Dis.* 2018;71:225-35. 3. Bajwa ZH et al. *Kidney Int.* 2004;66:1561-9.

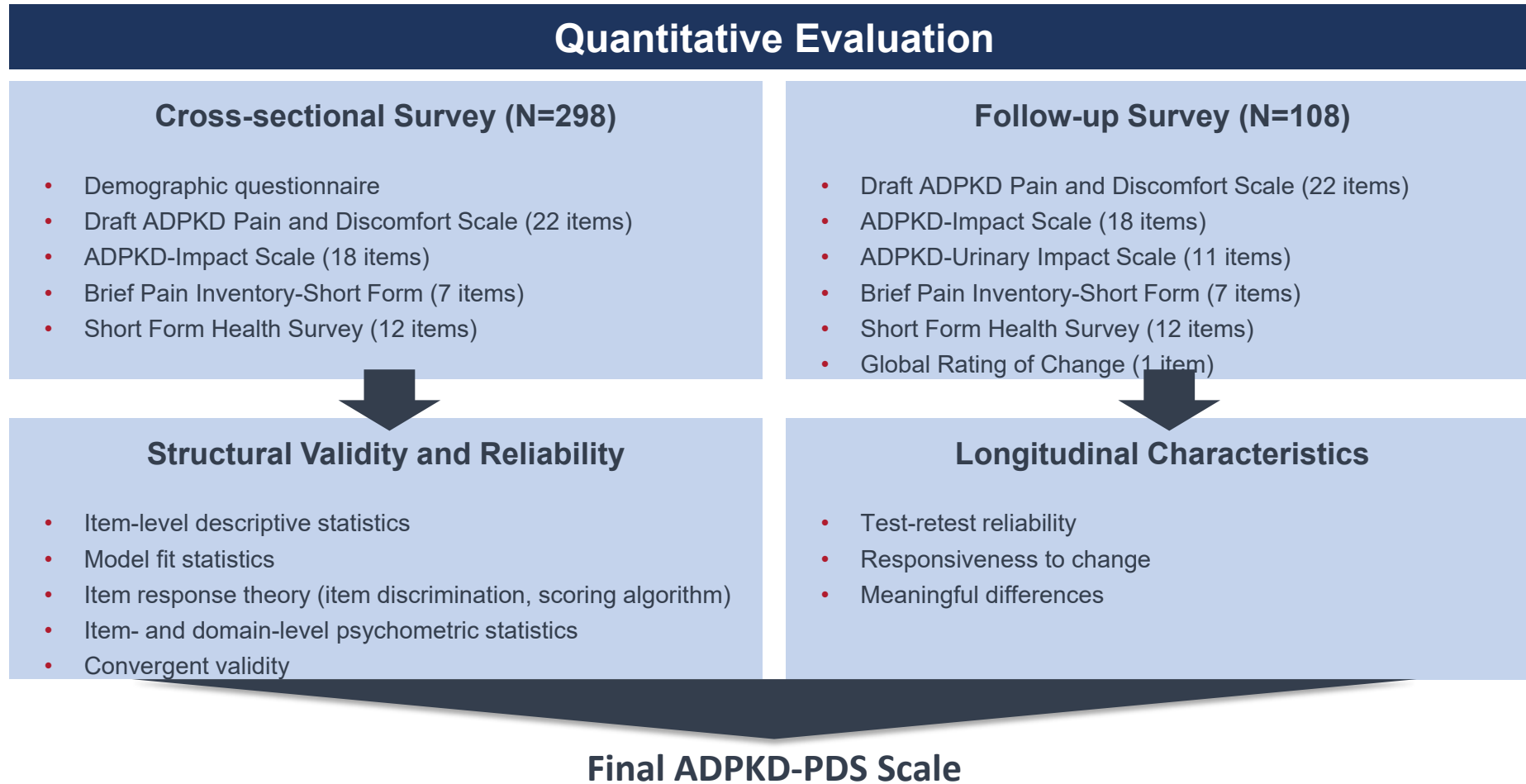
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Development Process of the ADPKD-PDS (1/2)



Development Process of the ADPKD-PDS (2/2)



Qualitative Research Phase

- We initiated development of the ADPKD-PDS with qualitative research on pain/discomfort in ADPKD patients

46 Patient Focus Groups

293 Participants

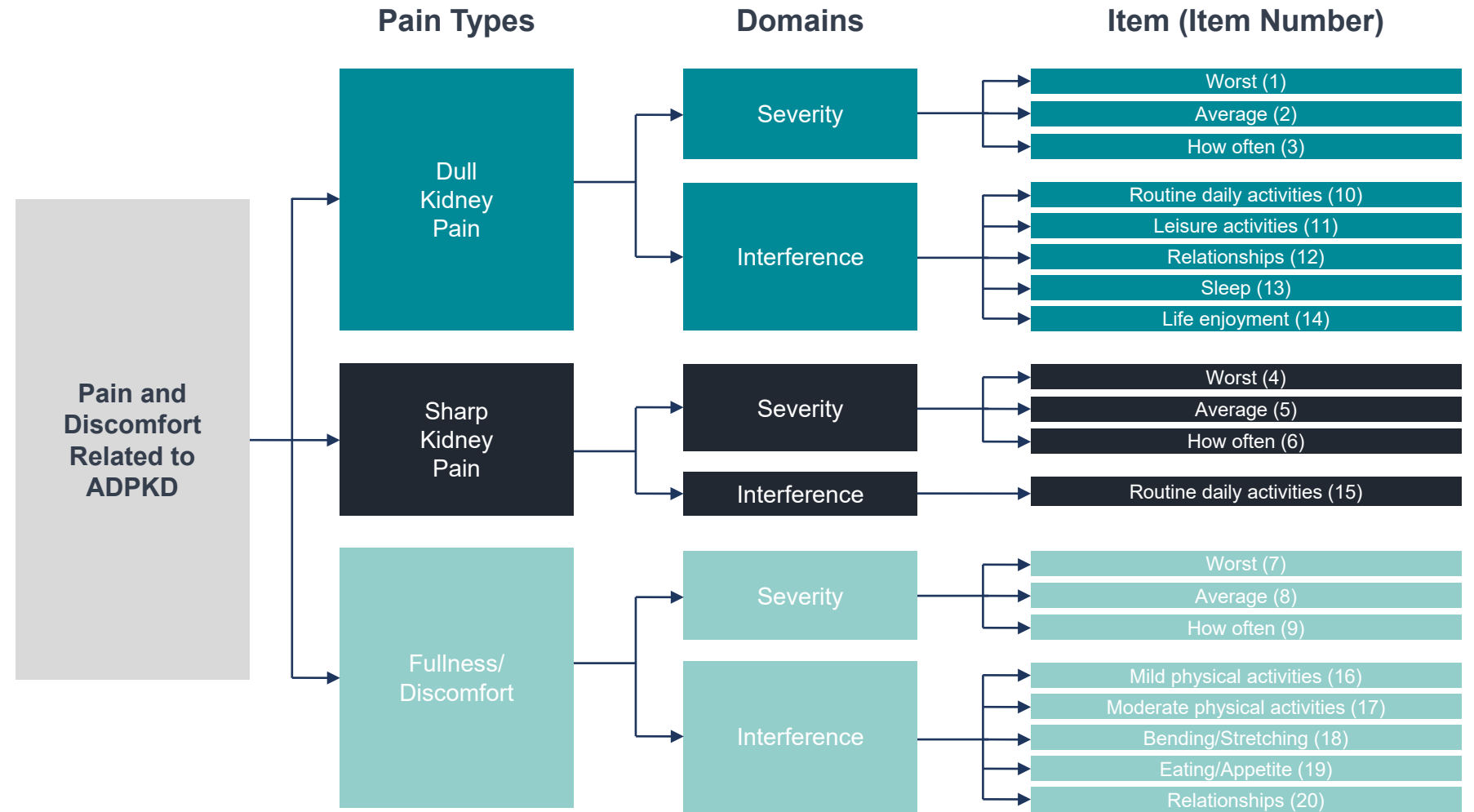
18 Countries



- Focus groups/interviews were conducted to elicit pain-related concepts from patients
- Semi-structured questionnaires were developed to guide the sessions based on literature and consultation with medical experts
- Results shaped the development of the first draft of the assessment instrument

ADPKD-PDS Final Conceptual Framework Structure

- Final framework as refined during psychometric evaluation
- 4 Pain Severity domains
 - Dull Pain Severity
 - Sharp Pain Severity
 - Discomfort Severity
 - Overall Pain and Discomfort Severity
- 3 Pain Interference domains
 - Dull Pain Interference
 - Sharp Pain Interference
 - Discomfort Interference



3 Distinct Pain Types Identified

Sharp kidney pain

- Often associated with infection or cyst rupture
- *“I’d feel a sharp pain in my back like someone put a knife in my back”*

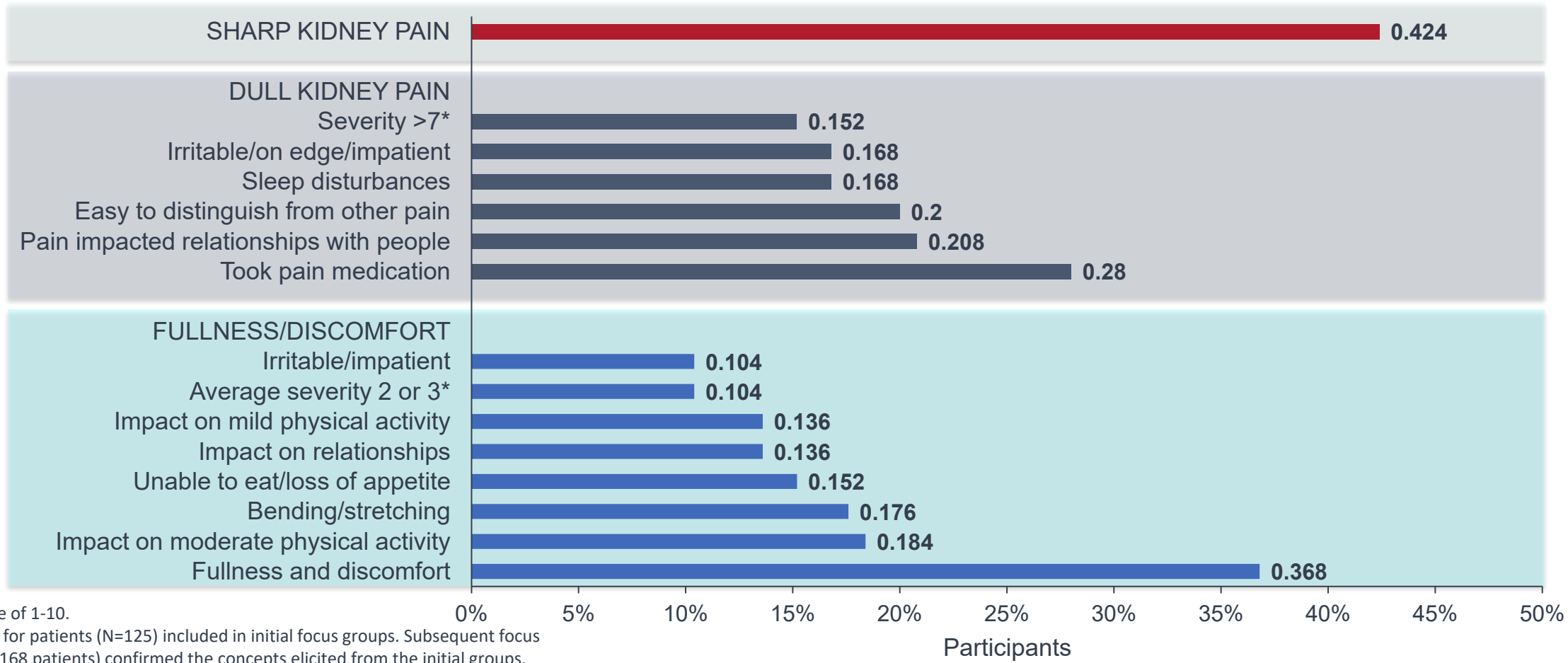
Dull kidney pain

- *“Occasional dull ache...in the flanks on both sides occasionally”*
- *“That’s probably my main one. I do get some flank pain in the side sometimes”*

Sensation of fullness/discomfort

- *“The fullness is just so all-encompassing. It’s like...there’s no room”*
- *“The abdomen is very sensitive. I can’t wear tight elastic waistbands, belts”*

Percentages of Patients Endorsing Pain Concepts



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ADPKD-PDS Final Version

Autosomal Dominant Polycystic Kidney Disease – Pain & Discomfort Scale (ADPKD-PDS®)

This questionnaire asks about different types of pain related to ADPKD:

- **Dull kidney pain** refers to chronic uncomfortable ache or discomfort, often felt in the lower to middle back, abdomen, or sides.
- **Sharp kidney pain** refers to intense, acute pain that may be caused by a burst cyst or infection in your kidney(s).
- **Fullness/discomfort** refers to feeling full or bloated pressure, as if you had eaten a very large meal. This feeling may restrict flexibility in the stomach area, and require you to eat small portions or not eat at all.

Please mark one box per question to indicate your response over the **past 7 days**, unless otherwise noted. Please respond to every question. Please provide only one answer for each question.

Dull kidney pain refers to chronic uncomfortable ache or discomfort, often felt in the lower to middle back, abdomen, or sides.

Over the past 7 days ...

	None	Mild	Moderate	Substantial	Extreme
1. Please rate your dull kidney pain at its worst ?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
2. Please rate your dull kidney pain on average ?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Over the past 7 days ...

	Not at all	1 time	2 – 3 times	Almost daily	Constantly
3. How frequently did you experience dull kidney pain?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Sharp kidney pain refers to intense, acute pain that may be caused by a burst cyst or infection in your kidney(s).

Over the past 7 days ...

	None	Mild	Moderate	Substantial	Extreme
4. Please rate your sharp kidney pain at its worst ?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
5. Please rate your sharp kidney pain on average ?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Over the past 7 days ...

	Not at all	1 time	2 – 3 times	Almost daily	Constantly
6. How frequently did you experience sharp kidney pain?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Fullness/discomfort refers to feeling full or bloated pressure, as if you had eaten a very large meal. This feeling may restrict flexibility in the stomach area, and require you to eat small portions or not eat at all.

Over the past 7 days ...

	None	Mild	Moderate	Substantial	Extreme
7. Please rate your fullness/discomfort at its worst ?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
8. Please rate your fullness/discomfort on average ?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Over the past 7 days ...

	Not at all	1 time	2 – 3 times	Almost daily	Constantly
9. How frequently did you experience fullness/discomfort?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Autosomal Dominant Polycystic Kidney Disease – Pain & Discomfort Scale (ADPKD-PDS®)

Dull kidney pain refers to chronic uncomfortable ache or discomfort, often felt in the lower to middle back, abdomen, or sides.

Over the past 7 days ...

	Not at all	Slightly	Somewhat	Very Much	Completely
10. Has your dull kidney pain interfered with your ability to perform your routine daily activities such as walking, bending, light lifting or housework?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
11. Has your dull kidney pain interfered with your ability to engage in leisure activities such as gardening, doing hobbies, traveling, playing with kids?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
12. Has your dull kidney pain interfered with your relationships with other people such as limiting social activities, not spending time with other people?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
13. Has your dull kidney pain interfered with your sleep ?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
14. Has your dull kidney pain interfered with your enjoyment of life ?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Sharp kidney pain refers to intense, acute pain that may be caused by a burst cyst or infection in your kidney(s).

Over the past 7 days ...

	Not at all	Slightly	Somewhat	Very Much	Completely
15. Has your sharp kidney pain interfered with your ability to perform your routine daily activities such as walking, bending, light lifting or housework?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

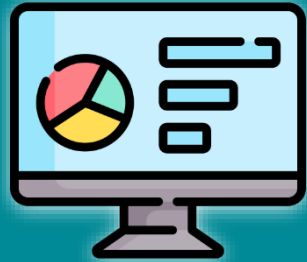
Fullness/discomfort refers to feeling full or bloated pressure, as if you had eaten a very large meal. This feeling may restrict flexibility in the stomach area, and require you to eat small portions or not eat at all.

Over the past 7 days ...

	Not at all	Slightly	Somewhat	Very Much	Completely
16. Has your fullness/discomfort interfered with your ability to perform mild physical activities such as walking, lifting/carrying light objects?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
17. Has your fullness/discomfort interfered with your ability to perform moderate physical activity such as brisk walking, dancing, walking up stairs?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
18. Has your fullness/discomfort interfered with bending/stretching such as tying shoes, household chores, gardening?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
19. Has your fullness/discomfort interfered with eating or your appetite ?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
20. Has your fullness/discomfort interfered with your relationships with other people such as limiting social activities, not spending time with other people?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

Evaluating the Performance of the ADPKD-PDS

Initial and Follow-up Survey Populations



298 participants completed the online survey

80% female

48 years mean age



108 participants completed the follow-up survey

3-4 weeks after the first survey

- Recruitment was via the PKD Foundation to its members
- Participants in the online survey completed the draft ADPKD-PDS as well as the ADPKD Impact Scale (ADPKD-IS), Brief Pain Inventory Short Form (BPI-SF), and 12-Item Short-Form Health Survey version 2 (SF-12v2)

Additional Psychometric Characteristics



Gender effects

- Given that approximately 80% of the respondents were women, differential item function analyses were conducted to determine if there were sex differences in psychometrics^{1,2}
- No uniform differential item function was observed for any item on the ADPKD-PDS, therefore, therefore the large proportion of women should not alter interpretation of the results

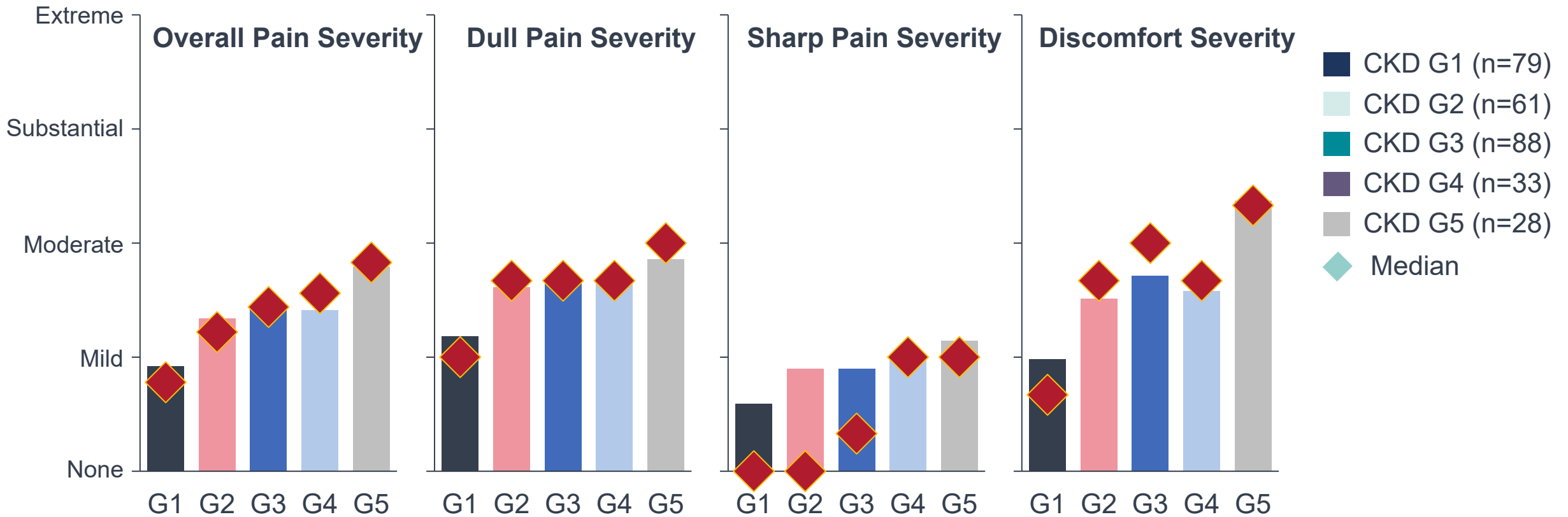


Convergent validity

- ADPKD-PDS Pain Severity and Pain Interference scales were evaluated for convergent validity with instruments sharing similar constructs using Pearson product-moment correlation coefficients (Pearson's r)
- Correlations between the ADPKD-PDS Pain Severity scales and the BPI-SF Intensity scale (0.56-0.76) reflected strong convergence, as did correlations between the ADPKD-PDS Pain Interference scales and the BPI-SF Impact scale (0.59-0.84), likely because these scales have very similar measurement constructs
- Correlations with the SF-12v2 were lower due to less similar, yet related constructs. The Pain Interference scales correlated more strongly with the SF-12v2 Physical Component Scale and Mental Component Scale (-0.37 to -0.67) than did the Pain Severity scales (-0.35 to -0.58)
- Correlations were also moderate to high between ADPKD-PDS scales and the ADPKD-IS Physical, Fatigue, and Emotional scales (0.37-0.76 for ADPKD-PDS Pain Severity scales and 0.40-0.86 for ADPKD-PDS Pain Interference scales)

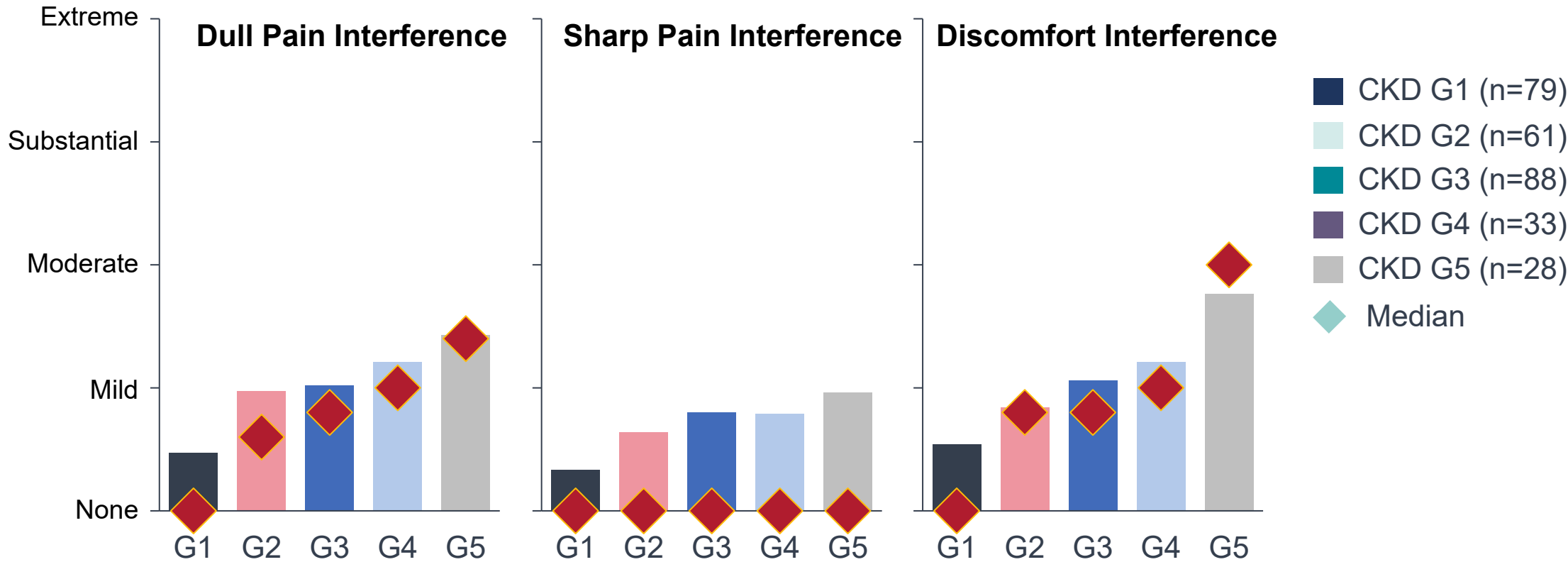
1. Glas CAW et al. Tests of fit for polytomous Rasch models. In: Fischer GH, Molenaar IW, eds. Rasch Models—Foundations, Recent Developments, and Applications. 325–352. Berlin, Germany: Springer, 1995. 2. Crane PK et al. Med Care. 2006;44(11 Suppl 3):S115–23.

ADPKD-PDS Pain Severity by CKD Stage



- The ADPKD-PDS showed greater overall pain severity in individuals with more advanced CKD

ADPKD-PDS Pain Interference by CKD Stage



- Dull Pain Interference aligned with worse CKD. Sharp Pain Interference differentiated slightly between CKD stages, and Discomfort Interference showed the most differentiation between CKD stages and the most difference in median values

Limitations

- Whereas the focus groups were convened internationally, recruitment for the online survey was conducted only in the United States
- The psychometric measurement sample was approximately 80% female, whereas an even distribution between genders would have been ideal. However, analysis revealed no substantive differences between genders for item-level psychometrics
- The relatively short (7-day) recall period of the ADPKD-PDS was selected to facilitate good recall and was considered to be more practical for clinical trial use. Combined with the relatively short study period, however, the short recall window may have reduced the chance of capturing episodic or sporadic sharp pain symptoms
 - Due to the relative rarity of sharp kidney pain in the studied population, there was an inadequate structural basis for a multi-item Sharp Pain Interference domain, and a single item assesses this outcome
- The ADPKD-PDS was developed for use in an adult population only

Take-Aways (1/2)



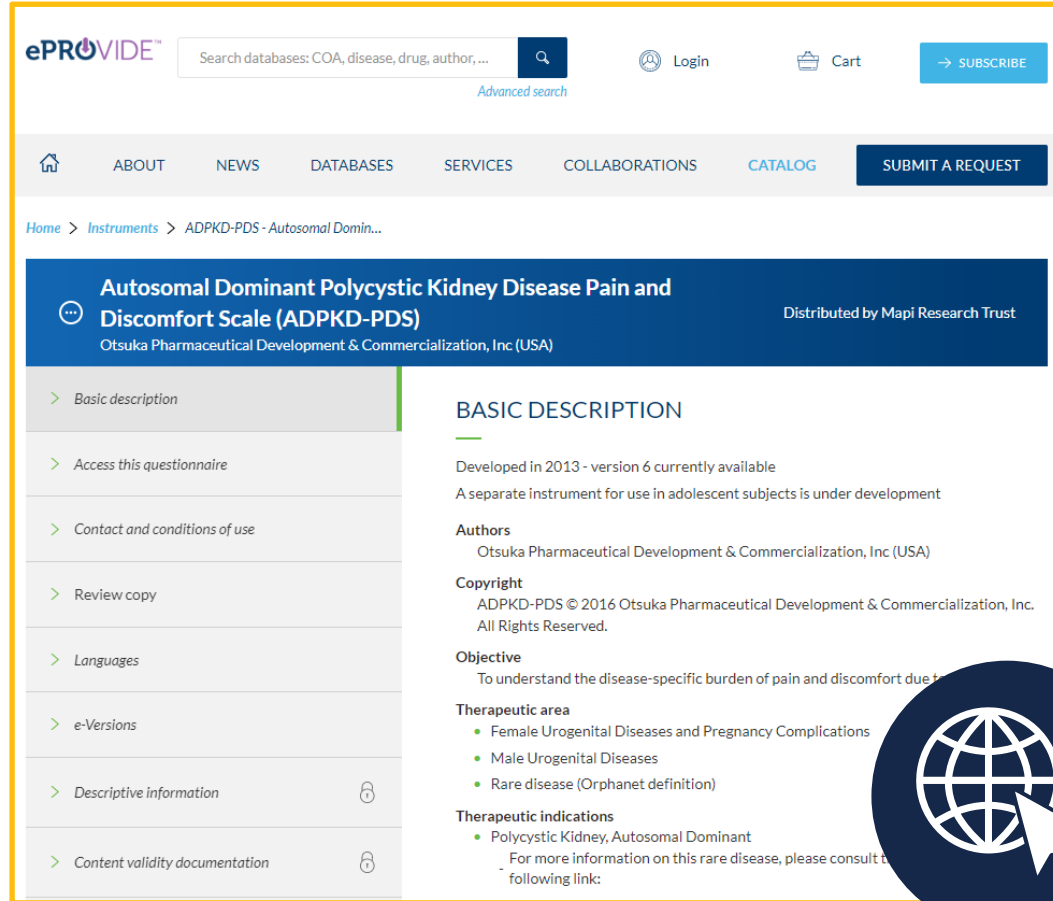
- Patients and healthcare providers agree that pain is the most important patient-reported outcome in ADPKD
- The experience of pain/discomfort in ADPKD is distinct from other kidney diseases and consists of sharp pain, dull pain, and a feeling of fullness or discomfort
- Pain can be severe in ADPKD and can impede the ability to perform daily activities, create emotional distress, and affect relationships
- Pain-related symptoms are often unreported or minimized by patients to their healthcare providers
- Until development of the ADPKD-PDS, no validated, disease-specific instrument to assess pain in ADPKD was available

Take-Aways (2/2)



- The ADPKD-PDS enables standardized assessment of the severity and impact of pain/discomfort in clinical trials and practice settings
- The instrument exhibits robust psychometric properties and was developed using patient-centric focus groups to elicit pain concepts
- Pain-related data collected on the ADPKD-PDS differentiates patients by CKD stage
- The ADPKD-PDS can capture changes in the severity and impact of pain over time, as measured by clinically meaningful changes in score

Licensing of ADPKD-PDS



The screenshot shows the ePROVIDE website interface. At the top, there is a search bar with the text "Search databases: COA, disease, drug, author, ..." and a search icon. To the right of the search bar are links for "Login", "Cart", and "SUBSCRIBE". Below the search bar is a navigation menu with links for "ABOUT", "NEWS", "DATABASES", "SERVICES", "COLLABORATIONS", "CATALOG", and "SUBMIT A REQUEST". The main content area displays the title "Autosomal Dominant Polycystic Kidney Disease Pain and Discomfort Scale (ADPKD-PDS)" and indicates it is "Distributed by Mapi Research Trust". A sidebar on the left contains a list of links: "Basic description", "Access this questionnaire", "Contact and conditions of use", "Review copy", "Languages", "e-Versions", "Descriptive information", and "Content validity documentation". The main content area includes sections for "BASIC DESCRIPTION", "Authors", "Copyright", "Objective", "Therapeutic area", and "Therapeutic indications".

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<https://eprovide.mapi-trust.org/instruments/autosomal-dominant-polycystic-kidney-disease-pain-and-discomfort-scale>



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Improving Awareness & Patient Outcomes

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