

# Single Day Event

A Systematic Review & Meta-Analysis and  
Resulting Visualization of the Impact of  
Primary Sjogren's Syndrome (PSS) on  
Activities of Daily Living (ADL) using R

Presenters:

Nisha Bhatt,

Arockia Mary

Eli Lilly India Pvt Ltd.

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# Agenda

- Introduction and Epidemiology
- Survey Statistics
- Methodology
- Results
- Findings & Limitations
- Conclusion
- Visualization through R
- References
- Appendix



# Patient Stories



## Patient to Patient

APRIL IS SJÖGREN'S AWARENESS MONTH

**Sophia** | 31  
Dry Eyes and Sjögren's

“  
Sjögren's has completely changed my life. I am no longer able to enjoy activities, social events, or even managing daily tasks without experiencing symptoms.

It's a full-time job trying to manage this new life. It's important to dedicate time to take care of yourself and your needs.



#ThisIsSjögrens



*Venus Williams in action at the 2010 US Open, a year before she was diagnosed with Sjogren's syndrome*

**“I have been recently diagnosed with Sjogren's Syndrome, an autoimmune disease which is an ongoing medical condition that affects my energy level and causes fatigue and joint pain,” Venus Williams**



# About Sjogren

## Background

PSS is an autoimmune disease that affects the exocrine glands, leading to dryness in various parts of the body.

## Importance

ADL are crucial for maintaining independence and quality of life. Understanding the impact of PSS on them can lead to better management and treatment.



As many as  
**4 MILLION  
AMERICANS**  
have Sjogren's  
with an estimated  
**2.5 MILLION  
PATIENTS**  
currently  
undiagnosed



Impacts more  
than 60 out of  
every 100,000  
individuals  
worldwide.

It now takes an  
average of  
**2.8  
YEARS**  
to receive a  
Sjogren's  
Diagnosis



9 out of 10 Sjogren's  
patients are **WOMEN**

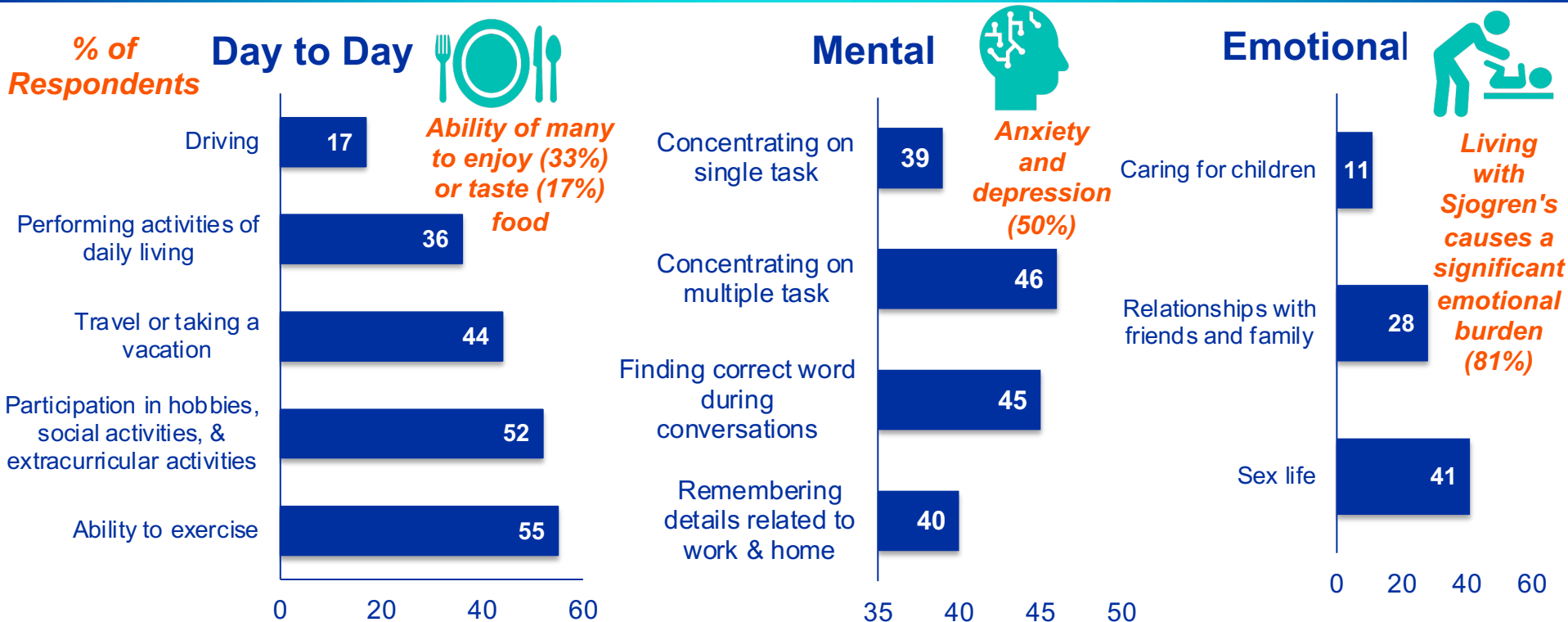


The average age of  
Sjogren's  
diagnosis is 40  
**YEARS**. It can  
occur in **ALL AGE  
GROUPS**.  
Frequency  
appears to  
**INCREASE WITH  
AGE**





# Survey Statistics – Impact of PSS



*The Living with Sjogren's patient survey was conducted by The Harris Poll on behalf of the Sjogren's Foundation in 2021 (Adults in US)*

# Methodology – Data Driven Decision Making

★ *"Pioneering a New Frontier: The Inaugural Breakthrough in this Field"*



1. Know your Mission



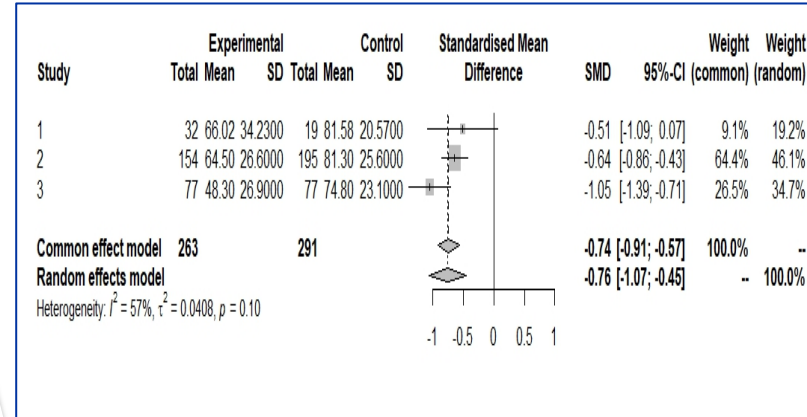
2. Identification of Data Sources



3. Clean and Organize Data



4. Perform Statistical Analysis

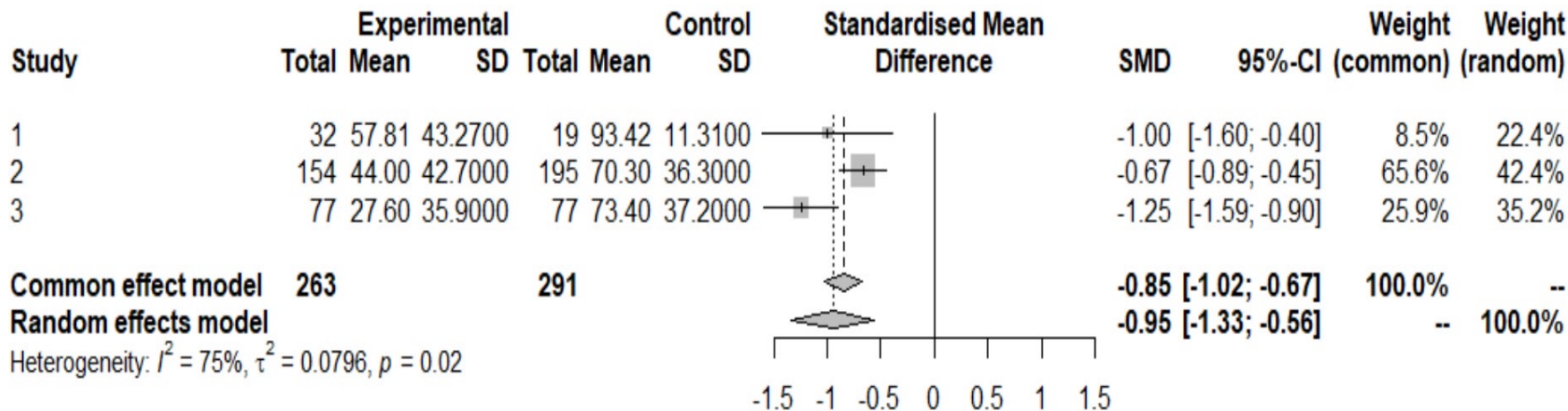


5. Data Visualization



6. Draw Conclusions & Decision Analysis Report for Assisted Decision Making

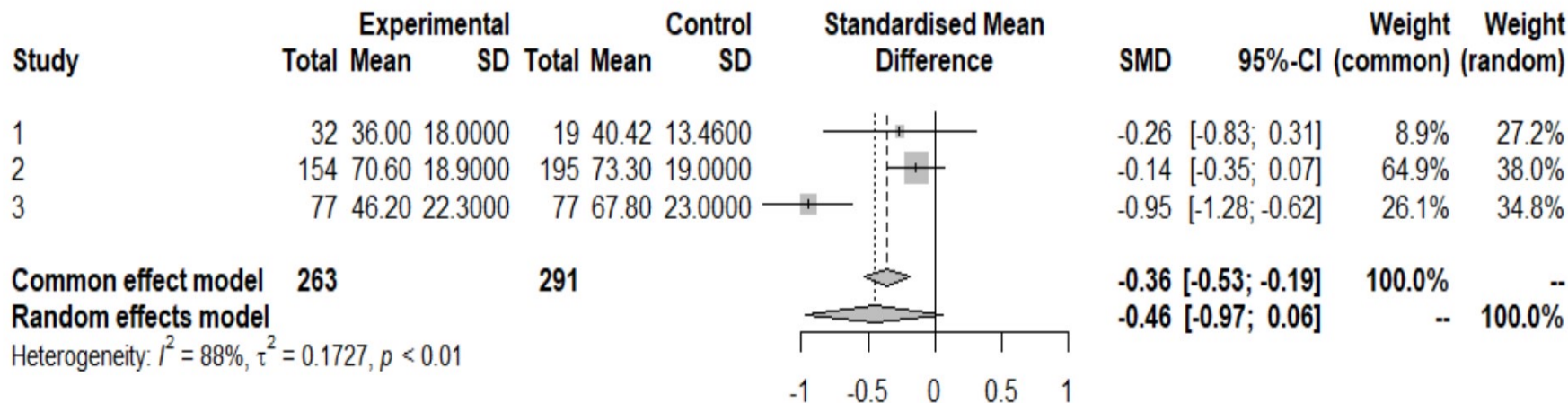
# Results: Forest Plots Across All SF-36 Domains



➤ The forest plots showed **statistical significance** in RLP, BP, V, SF, RLE and GH domains of SF-36 (one example shown above).

*\*Role limitations due to physical (RLP); Bodily pain (BP); Energy/vitality (V); Social functioning (SF); Role limitations due to emotional problems (RLE); General health (GH) perception*

# Results: Forest Plots Across All SF-36 Domains (Cont..)



➤ The forest plots showed **statistical insignificance** in MH and PF domains of SF-36 (one example shown above).

\* **Mental health (MH); Physical functioning (PF)**



# Results: Forest Plots Across All SF-36 Domains (Cont..)

| SF-36 Domains | Inference                                                                                                                                                                                                                                                                                                                                                                       |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>RLP</b>    | Inability to confidently carry out everyday tasks due to physical health challenges                                                                                                                                                                                                                                                                                             |
| <b>BP</b>     | Presence of severe or restrictive bodily pain                                                                                                                                                                                                                                                                                                                                   |
| <b>V</b>      | Overwhelming fatigue associated with the condition.                                                                                                                                                                                                                                                                                                                             |
| <b>SF</b>     | They often grapple with social isolation due to difficulties related to eating and speaking.                                                                                                                                                                                                                                                                                    |
| <b>RLE</b>    | They often grapple with discomfort during sexual activities and challenges in personal relationships                                                                                                                                                                                                                                                                            |
| <b>GH</b>     | Linked to uncertainties concerning their future health status in relation to PSS                                                                                                                                                                                                                                                                                                |
| <b>MH</b>     | Individuals with PSS make a concerted effort and often succeed in maintaining a positive outlook regarding their treatment and condition. This positive outlook may be partially reflected in the MH domain score, which appears to align more closely with normative data                                                                                                      |
| <b>PF</b>     | Absence of significant differences in the PF domain suggests that this domain provides insights into a broad spectrum of disability severity, ranging from a complete inability to perform even the most basic physical activities, such as bathing or dressing, to achieving autonomy in all types of physical activities without limitations imposed by health-related issues |

# Findings & Limitations

- Heterogeneity of the included studies.
- Scarcity of comparative studies between pSS and healthy individuals.

## Limitations

- Inconsistency in the rating scales and parameters used to assess ADL.
- Similar scale studies, but further limited by the outcome statistics (i.e., continuous or binary, no SD value).

**1**

## Overall Findings

- PSS patients exhibited lower or worse SF-36 scores in all domains compared to healthy population.
- However, significant in all, except MH and PF

**2**

1

## Summary

- Empower clinicians to provide valuable guidance to patients for managing symptoms at home.
- ADL was significantly impaired or negatively affected in patients with PSS compared to healthy individuals.
- Despite the inherent heterogeneity within the PSS population, our meta-analyses have highlighted the influence of this disease on various aspects, including BP, GH, RLP, RLE, SF and V.

## Importance

2

- Encourage families to create tailored accommodations within the household to better support individuals with PSS.



3

## Suggestions

- Need for a disease-specific, validated measure
- Call for further research to thoroughly assess the extent of PSS impact on ADL.
- Understanding the impact of PSS on ADL is crucial for the development of effective management and treatment strategies.



# Visualization - Generate Forest Plot in R Studio Using Meta Package

A screenshot of the RStudio application window. The top menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, and Help. Below the menu is a toolbar with icons for file operations and running code. The main editor pane shows a script with a single line of code: "1". The console pane at the bottom displays the R startup output, including the version (4.3.1), copyright information, and usage instructions. The environment pane on the right is empty, showing "Project: (None)". The bottom right pane shows the "Files" tab with a "Zoom" and "Export" button.

```
R version 4.3.1 (2023-06-16 ucrt) -- "Beagle Scouts"
Copyright (C) 2023 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
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'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

[Workspace loaded from ~/.RData]

> |
```

- Koçer B, Tezcan ME, Batur HZ, Haznedaroğlu Ş, Göker B, İrkeç C, Çetinkaya R. Cognition, depression, fatigue, and quality of life in primary Sjögren's syndrome: correlations. *Brain Behav.* 2016 Oct 13;6(12):e00586. doi: 10.1002/brb3.586. PMID: 28032007; PMCID: PMC5167008.
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- <https://www.sportskeeda.com/tennis/how-venus-williams-overcame-sjogren-s-syndrome-make-comeback-age-37>



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# Characteristics of Included Studies In Meta-Analysis

21 studies were incorporated  
into the systematic review



Only 3 studies included in  
meta-analysis (Kocer 2016;  
Meijer 2009; Dias 2021)



Used same outcome measure  
(i.e., SF-36 scale) & outcome  
statistics (i.e., Mean and SD)  
to assess ADL in PSS and  
healthy population

| Author Year | Sample size                                                                                         | Trial design       | Baseline characteristics                                                                                                                               | Country         |
|-------------|-----------------------------------------------------------------------------------------------------|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Koçer 2016  | <ul style="list-style-type: none"> <li>➤ 32 PSS</li> <li>➤ 19 Controls</li> </ul>                   | Case-control study | <ul style="list-style-type: none"> <li>➤ <b>PSS:</b> Mean age: 45.19 Female: 100%</li> <li>➤ <b>Control:</b> Mean age: 44.53; Female: 100%</li> </ul>  | Turkey          |
| Meijer 2009 | <ul style="list-style-type: none"> <li>➤ 154 PSS</li> <li>➤ 195 General Dutch Population</li> </ul> | Survey             | <ul style="list-style-type: none"> <li>➤ <b>PSS:</b> Mean age: 54.6; Female: 92.9%</li> <li>➤ <b>GP:</b> Mean age: 58.9; Female: 87.8%</li> </ul>      | The Netherlands |
| Dias 2021   | <ul style="list-style-type: none"> <li>➤ 77 PSS</li> <li>➤ 77 Control</li> </ul>                    | Cross-sectional    | <ul style="list-style-type: none"> <li>➤ <b>PSS:</b> Mean age: 52.34; Female: 100%</li> <li>➤ <b>Control:</b> Mean age: 52.27; Female: 100%</li> </ul> | Brazil          |



# Known about SF-36

## About SF-36

- Multipurpose, short-form health survey
- Includes 36 Questions
- Useful for comparing general & specific populations rather than individuals
- **Widely used to measure perceived health or health-related quality of life**

## Scales Included

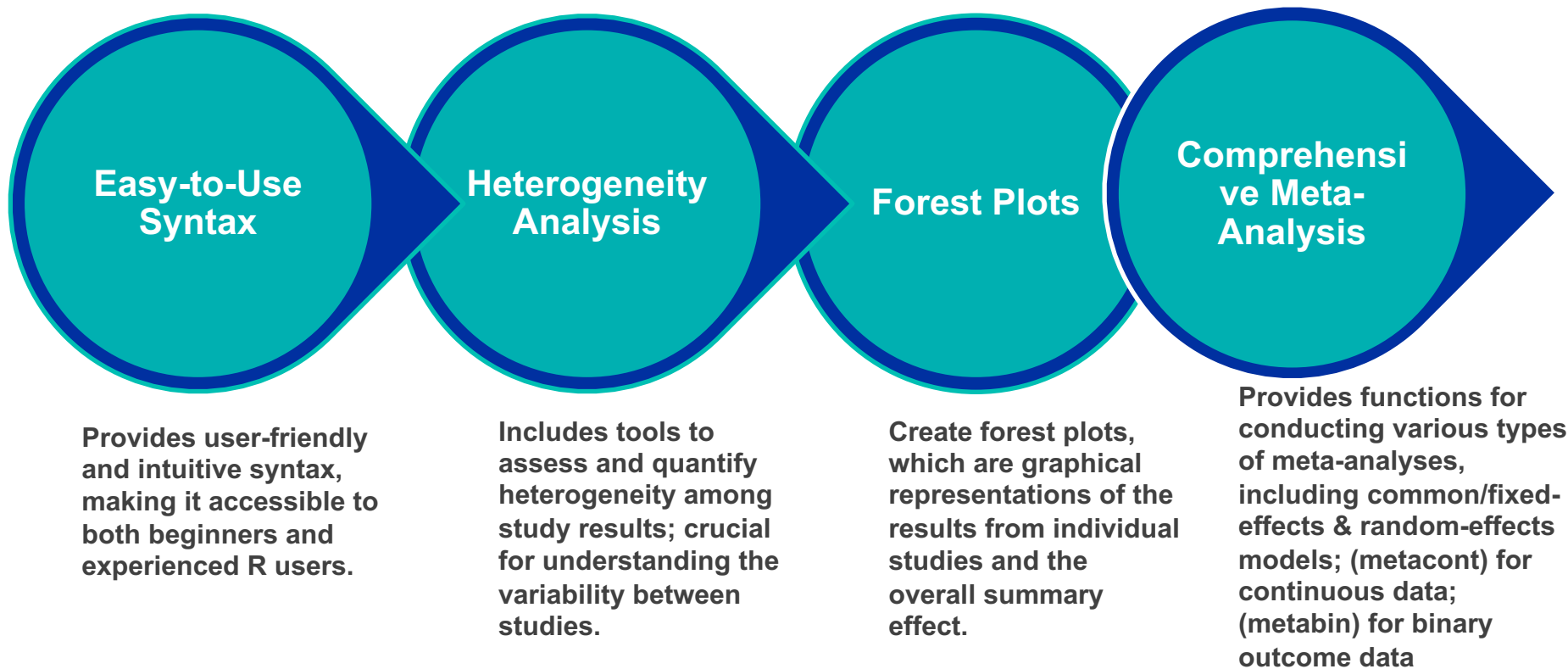
- Physical functioning (**PF**)
- Social functioning (**SF**)
- Role limitations due to physical (**RLP**)
- Role limitations due to emotional problems (**RLE**)
- Mental health (**MH**)
- Energy/vitality (**V**)
- Bodily pain (**BP**)
- General health (**GH**) perception

## Score Interpretation

- **High score corresponds to better health status or less disability**
- Score of zero = maximum disability
- Score of 100 = no disability



# About Meta Package of R



# End



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