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Health State Utility Values for Sleep Disturbance and Early Morning OFF Symptoms in Advanced Parkinson's Disease: A Vignette-Based Approach Using the EQ-5D

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OBJECTIVES

To estimate health state utility values (HSUVs) and disutilities associated with sleep disturbance (Sd) and early morning OFF (EMO) in people with advanced Parkinson's Disease (aPD) using vignettes and the EQ-5D-5L.

CONCLUSIONS

Sd and EMO individually have a negative impact on health-related quality of life (HRQoL), with EMO showing a greater impact than Sd (disutilities of 0.21 and 0.12, respectively). Moreover, presence of both Sd and EMO has a synergistic impact on HRQoL (disutility of 0.38; which is greater than sum of individual impacts).

EMO without Sd is associated with more moderate and severe problems in the EQ-5D domains of self-care, usual activities and pain/discomfort than Sd without EMO. The combination of Sd and EMO results in the most severe impact across all domains, particularly in usual activities, pain/discomfort, and mobility.

Incorporating the impact of Sd and EMO in economic modelling for aPD treatments provides a more comprehensive assessment of treatment benefits. Considerations should be placed on treatments that provide continuous symptom coverage across the morning, day and night to reduce burden on patients' overall HRQoL.

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INTRODUCTION

- Parkinson's disease (PD) is characterized by a range of motor symptoms such as tremors, stiffness and difficulty walking, as well as non-motor symptoms including sleep problems, drooling and anxiety. As PD progresses to advanced Parkinson's disease (aPD), symptoms become increasingly difficult to control with oral medications, especially at night and in the early morning, significantly impacting patients' lives.
- The effect of oral medications wears off during the night. This can lead to worsening of symptoms that not only disrupt sleep (sleep disturbance [Sd]) but can also hinder the start of an individual's day as they may have reduced mobility until the morning dose of oral PD medication takes effect (early morning OFF time [EMO]). Poor quality sleep at night and delay to ON-time in the morning can negatively impact patients and their caregivers' health-related quality-of-life (HRQoL) and cause considerable disability.
- Newer aPD treatments have been shown to improve Sd and EMO in clinical trials. However, health state utility values (HSUVs) quantifying the impact of Sd and EMO are limited and not adequately captured for use in economic evaluations.

METHODS

- Four vignettes were developed based on published literature and qualitative input from patients, care partners, and clinicians to represent four possible aPD health states: (A) No Sd nor EMO, (B) Sd (without EMO), (C) EMO (without Sd), and (D) both Sd and EMO (**Table 2**).
- Adults diagnosed with aPD for at least 5 years, experiencing at least 2 hours/day of OFF-time, on oral PD medications, and residing in the US or UK were asked to complete the EQ-5D-5L and EQ-VAS for each vignette in an online survey. EQ-5D-5L responses were converted into US utility values[1].
- The utility values were re-scaled based on the min and max utility values reported in vignettes A and D, given the substantial impact of a few outliers on the utility estimates[2].
- The disutility associated with each of the vignette states B, C or D was calculated as the difference in utility between that state and state (A) No Sd nor EMO.

RESULTS

75 individuals completed the survey; respondents in this study were generally reflective of the aPD population. 52.0% were male and 78.7% were from the US. Respondents were on average 64.3 years old, mean time since diagnosis was 9.8 years, and average OFF-time was 3.9 hours/day (**Table 1**).

Table 1. Respondent Demographics (n=75)

Characteristics	Mean (Std Dev) / n [%]
Age, Years	64.3 (9.6)
Gender, Male	39 [52.0%]
Country of residence United States (US) United Kingdom (UK)	 59 [78.7%] 16 [21.3%]
PD duration, Years	9.8 (4.6)
Self-reported OFF time, Hours/day	3.9 (2.7)
Frequency of taking oral PD medications per day Twice a day or less 3-4 times a day 5 or more times a day	 13 [18.3%] 46 [64.8%] 12 [16.9%]
Frequency of EMO in past week Once a week or less 2-3 times a week 4 or more times a week	 9 [12.0%] 42 [56.0%] 24 [32.0%]
Frequency of sleep disturbance in past week Once a week or less 2-3 times a week 4 or more times a week	 14 [18.7%] 32 [42.7%] 29 [37.7%]
PDSS-2* Total Score PDSS-2 score ≥18 (poor quality sleep)[3]	25.52 (10.57) 54 [72.0%]

*Std Dev = Standard deviation; PD = Parkinson's disease; EMO = early morning OFF-time; PDSS-2 = Parkinson's Disease Sleep Scale version 2. *PDSS-2 is a patient-completed clinical rating scale that assesses the frequency of sleep disturbances over the past week. Each question is scored between 0 ("never") and 4 ("very often"), and a total score is calculated by summing a patient's responses to each of the 15 questions.*

Table 2. Description of the Health State Vignettes

No Sd • You **sleep well** and **are not disturbed** by **Parkinson's symptoms at night**. • You **do not have difficulties** falling or staying asleep due to Parkinson's. • You wake in the morning **feeling well-rested and refreshed.**	**Sd** • You **do not sleep well**, as you **are disturbed** by **nighttime Parkinson's symptoms**. • You **have difficulty** falling or staying asleep due to Parkinson's symptoms. • You wake in the morning **feeling tired.**
No EMO • You **do not experience early morning Parkinson's symptoms.** • You **do not have Parkinson's symptoms** when you to get out of bed and start your morning routine activities, such as bathing, dressing, and having a cup of coffee. • You **do not have to wait** for your Parkinson's medication to start working to begin your day.	**EMO** • You **experience early morning Parkinson's symptoms.** • You **struggle** to get out of bed and start your morning routine due to Parkinson's symptoms. Simple tasks such as bathing, dressing, and having a cup of coffee become **time-consuming and exhausting, and you may need assistance**. • You **have to wait** for your Parkinson's medication to start working.
Parkinson's symptoms during the rest of your day • How well your Parkinson's symptoms are controlled throughout the night and as you wake in the morning influences your functioning **during the rest of your day**. • You take medications multiple times throughout the day to control your Parkinson's symptoms.	

- Presence of **Sd (0.80, Std Dev = 0.13)** or **EMO (0.70, Std Dev = 0.17)** resulted in lower **EQ-5D-5L utilities**, with presence of **both** valued as the lowest **(0.53, Std Dev = 0.23)**, compared to when both Sd and EMO were **absent (0.91, Std Dev = 0.098)** (**Figure 1**).
- Mean EQ-VAS scores per vignette followed the same trend as the EQ-5D utilities, decreasing from **81** to **48** from health state **A** to **D**. (**Figure 2**).
- **Disutility values** for **(B) Sd without EMO (0.12, Std Dev = 0.13)**, **(C) EMO without Sd (0.21, Std Dev = 0.17),** and **(D) Sd and EMO (0.38, Std Dev = 0.23)** were calculated.
  - The highest disutility was for the presence of both Sd and EMO suggesting that the combined impact of these symptoms was more severe than the simple sum of Sd or EMO alone.

Figure 1. EQ-5D-5L Utilities by Vignettes

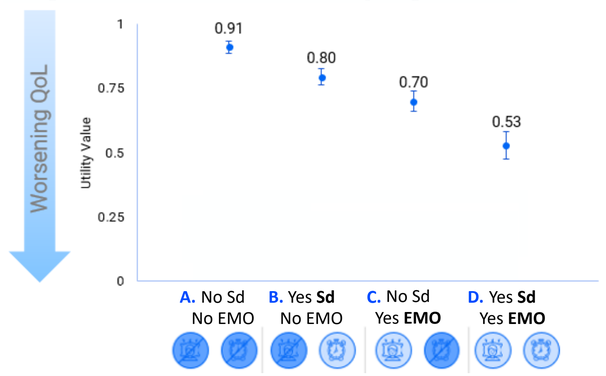
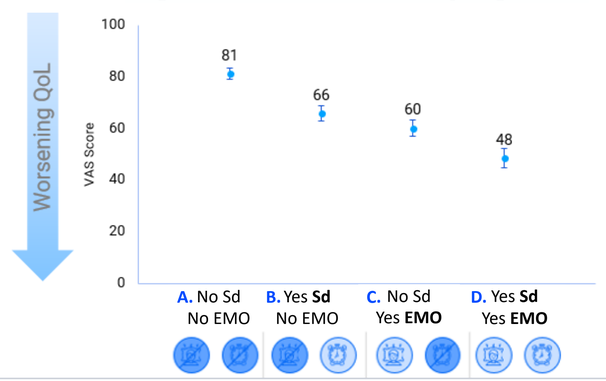


Figure 2. EQ-VAS Scores by Vignettes

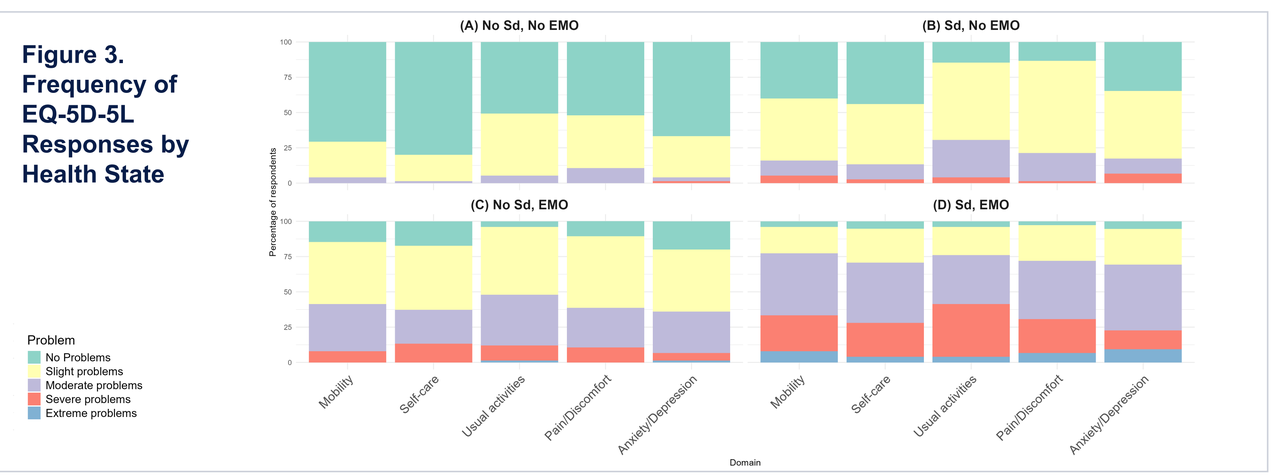


Sd = sleep disturbance; EMO = early morning OFF-time; QoL: Quality of life; VAS: Visual analogue scale

Figure 3 displays the distribution of EQ-5D-5L responses by vignette, revealing a rise in the severity of problems with the presence of Sd and EMO.

- **(A) No Sd nor EMO** resulted in most respondents reporting no problems across all 5 domains, with 44.0% experiencing slight problems with usual activities, and 37.3% for pain/discomfort.
- **(B) Sd without EMO** led to more moderate problems, particularly in usual activities (26.7%) and pain/discomfort (20.0%). 6.7% reported severe problems with anxiety/depression.
- **(C) EMO without Sd** resulted in increasing reporting of moderate and severe problems across domains compared to Vignette B. The greatest worsening of problems was observed in mobility.
- **(D) Sd and EMO** brought nearly half of respondents reporting moderate to severe problems. Extreme problems were found in anxiety/depression (9.3%), mobility (8.0%), and pain/depression (6.7%). Only 4.0% of people reported no problems with mobility and usual activities.

Figure 3. Frequency of EQ-5D-5L Responses by Health State



LIMITATIONS

Some limitations are present when conducting a vignette-based study:

- Utilities derived from vignettes may not perfectly reflect the utility of patients experiencing these health states. While the vignettes were completed by aPD patients, the values still rely on the ability of those patients to accurately imagine their health in each of the states described.
- The reliability of vignette-based utilities depends on the accuracy and comprehensiveness of the health state descriptions, which are inherently limited in their ability to capture all aspects of the patient experience.
- The survey relied on recruitment via online panels, which might have introduced selection bias into the sample, and impacted the generalizability of the results.

References:

1. *Pickard AS, Law EH, Jiang R, et al. United States Valuation of EQ-5D-5L Health States Using an International Protocol. Value Health. Aug 2019;22(8):931-941. doi:10.1016/j.jval.2019.02.009*
2. *Bobinac, A., Van Exel, N. J. A., Rutten, F. F., & Brouwer, W. B. (2010). Willingness to pay for a quality-adjusted life-year: the individual perspective. Value in Health, 13(8), 1046-1055.*
3. *Muntean, M. L., Benes, H., Sixel-Döring, F., Chaudhuri, K. R., Suzuki, K., Hirata, K., ... & Trenkwalder, C. (2016). Clinically relevant cut-off values for the Parkinson's Disease Sleep Scale-2 (PDSS-2): a validation study. Sleep medicine, 24, 87-92.*

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