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Health-Related Quality of Life in COVID-19: A Vignette Study

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OBJECTIVES

- To conduct a large UK-based vignette study with the aim of estimating health-related quality of life (HRQoL) utility scores for non-death COVID-19 disease states.

BACKGROUND

- COVID-19 is an acute respiratory illness caused by the SARS-CoV-2 virus.[1] Severe disease can require hospitalisation and respiratory support, which can cause longer-term morbidity.[1]
- Literature on patient HRQoL is limited, particularly for severe disease (where patients may be hospitalised and/or unconscious) as HRQoL collection can be challenging or unethical.
- In an ongoing appraisal of therapies for COVID-19 (ID6261) by the National Institute for Health and Care Excellence (NICE), stakeholders criticised the use of data from a non-COVID-19 population to inform utility decrements for severe COVID-19.[2] The use of COVID-19 severity-specific vignettes with EQ-5D questionnaires completed by the UK general population was proposed, in line with NICE recommendations.[2,3]
- When patient-completed HRQoL measures are not feasible or appropriate a vignette-based approach may be the only available option to supplement important data gaps for decision making. Accordingly, vignette studies have been used to inform economic evaluations across various Health Technology Assessment bodies, including NICE, particularly in rare diseases where elicitation of HRQoL is challenging due to small patient numbers.[4]

METHODS

- UK adults (N=500) were recruited in September 2021, and completed the EQ-5D-5L questionnaire for eight vignettes as patient proxies (Figure 1).
- Vignettes described different hospitalisation and disease severity permutations in a qualitative framework (Table 1).
- Vignette content was informed by a large UK COVID-19 Office for National Statistics infection survey, relevant clinical trials and observational studies, and was validated by medical experts and in a pilot study.[5–7]
- The EQ-5D-5L crosswalk algorithm was used to estimate EQ-5D-3L utility index scores as per NICE recommendations.[8]
- Descriptive statistics and box plots were used to evaluate utility scores for each vignette (Figure 2).

Table 1 Overview of health vignettes

Vignette	Description of condition	Disease severity	Treatment setting	Ventilation status	Underlying health condition	Symptoms	Long-term complications
1	No COVID-19	N/A	N/A	N/A	Present	N/A	N/A
2	COVID-19	Mild	Not in hospital	None	Present	Fever Cough Fatigue Headache Muscle pain Loss of smell Nasal congestion	N/A
3	COVID-19	Moderate	Not in hospital	None	Present	Fever Cough Fatigue Headache Muscle pain Loss of smell Nasal congestion	N/A
4	COVID-19	Severe	General hospital ward	Via nasal canula	Present	Fever Cough Fatigue Confusion Muscle pain	N/A
5	COVID-19 where the patient requires supplemental oxygen through a face mask	Severe	HDU in a hospital	Via face mask	Present	Fever Cough Fatigue Confusion Muscle pain	N/A
6	COVID-19 where the patient cannot breathe on their own and will die if not treated	Critical	ICU in a hospital	Intubated	Present	N/A	N/A
7	Recovered from COVID-19 with no long term health issues	N/A	N/A	N/A	Present	N/A	None
8	Recovered from COVID-19 and suffering from long term health issues as a result	N/A	N/A	N/A	Present	N/A	Fatigue Shortness of breath Muscle and/or joint pain

Figure 1 Study design

Recruitment

- September 2021, 500 members of the UK general public were recruited via an online panel: Prolific (www.prolific.co)
- Demographic details on age, sex and ethnicity were collected from the platform, and used to stratify recruitment

Online Survey

- Clinical details on prior COVID-19 infection and vaccination status were collected
- Participants were administered the survey via SurkeyMonkey (Survey-Monkey Inc., San Mateo, California, USA; www.surveymonkey.com)
- To familiarise participants with the questionnaire format, a self-report version of the EQ-5D-5L was completed, followed by a warm-up exercise explaining the proxy-reporting task
- Participants completed the proxy-report version of the EQ-5D-5L questionnaire for the eight vignettes
- Each dimension of the EQ-5D-5L was presented on an individual page, which had been reviewed for approval by EuroQol

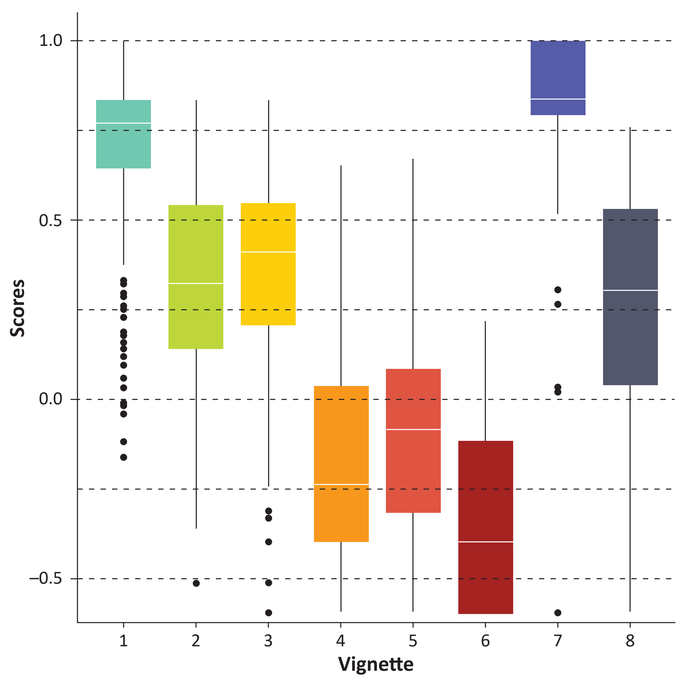
Quality Control

- Poor quality responses were excluded, and replacement participants recruited to ensure the sample remained representative:
  - Participants who failed an attention check (n=9)
  - Participants with incomplete responses or an unusually short survey time (<5 minutes) (n=8)
  - Participants with illogical responses, where higher utility was reported for the highest (vignette 6) versus lowest (vignette 1 and 7) severity states (n=2)

Analysis

- The EQ-5D-5L crosswalk algorithm was used to estimate EQ-5D-3L utility index scores as per NICE recommendations[8]

Figure 2 Boxplots for utility values derived for each vignette (N=500)



1 Baseline (pre-infection)
2 Mild disease (outpatient)
3 Moderate disease (outpatient)
4 Severe disease (general hospital ward)
5 Severe disease (HDU)
6 Critical disease (ICU)
7 Full recovery with no long-term sequelae
8 Recovery with long-term sequelae

RESULTS

- Respondent characteristics were in line with the UK population: mean age of participants was 44.15 (standard deviation [SD]: 15.5), 48.8% were male, and 80.4% where white. Most participants were fully vaccinated (83.8%) and 11.8% had previously experienced COVID-19.

Vignette utility values (mean [SD])

- The highest utility was reported for the state reflecting full recovery with no long-term sequelae (0.87 [0.16]); this value aligns well with the age/sex-matched general population norm (0.88 [0.05]).
- This was followed by baseline utility pre-infection (0.73 [0.22]).
- The intensive care unit state had the lowest utility (–0.37 [0.22]).
- Mild and moderate outpatient states reported similar utility (0.32 [0.25] vs 0.35 [0.25]).
- The severe general hospital ward state had lower utility than the high dependency unit (HDU) state (–0.19 [0.29] vs –0.09 [0.30]).
- Low utility was also reported for the state reflecting recovery with long-term sequelae (0.26 [0.28]).

CONCLUSIONS

- Utility values were estimated by a representative UK population sample, vignettes were designed according to best practice guidelines, and the survey was designed to ensure response quality and limit bias.[9,10]
- Our findings provide a reasonable alternative to patient-reported utility values, and thus may resolve data gaps in future economic evaluations of COVID-19 therapies.

Limitations

- There were some cases where reported mean utility values were similar for different states, or misaligned with disease severity:
  - Participants may not have been able to meaningfully distinguish between mild and moderate outpatient states, given perception may be more sensitive to aspects of vignette descriptions that were common across states (such as symptoms and treatment setting).
  - Similarly, participants may not have been able to distinguish between severe states, where vignette descriptions were identical except for oxygen delivery and treatment setting. Alternatively, this may reflect differences in the perception of oxygen delivery method (a nasal canula may sound more invasive than a face mask) and setting (participants may perceive a higher level of care described for HDU to be favourable compared to a general hospital ward).
  - These marginal differences may suggest that states should be combined or pooled utility values used should these results inform future economic models.
- Vignette studies are naturally limited by reliance on hypothetical disease states and contextualisation that cannot capture all aspects of patient experience. Seeking input from patients via interviews or focus groups during vignette development and providing images alongside descriptions may have helped participants differentiate between health states.
- The eight vignettes were presented in a pre-defined random order to mitigate the influence of order bias for progressively severe health states, but this may also have contributed to the lack of differentiation between states. Presenting vignettes in a random order unique to each participant may represent a better approach.

Abbreviations

HDU: high dependency unit; HRQoL: health-related quality of life; ICU: intensive care unit; N/A: not applicable; NICE: National Institute for Health and Care Excellence; SD: standard deviation.

References

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Disclosures

DN, VN and SB are employees of Merck Sharp & Dohme (UK) Limited, London, UK and APu and LS are employees of Merck Sharp & Dohme LLC, a subsidiary of Merck & Co., Inc., Rahway, NJ, USA. APo, AN and JP are employees of Costello Medical Ltd., a company which received funding from Merck Sharp & Dohme LLC, a subsidiary of Merck & Co., Inc., Rahway, NJ, USA to conduct this study.

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