

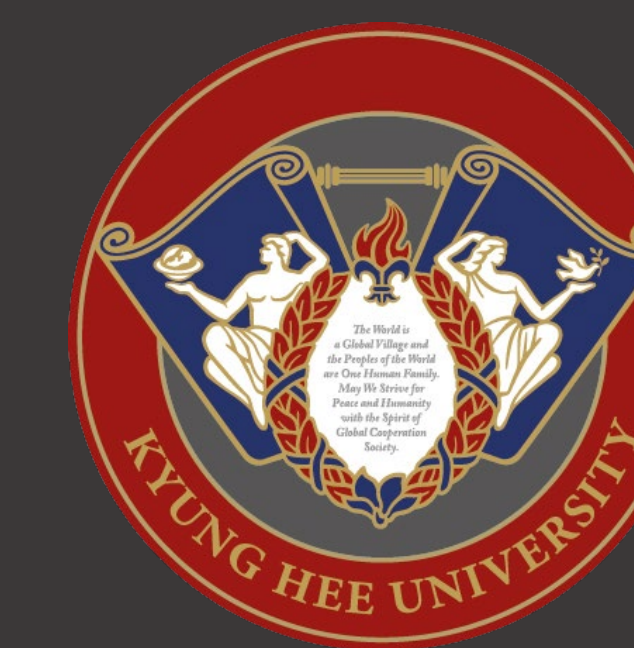
# Caregiver Productivity Loss and Health-Related Quality of Life Associated with Pediatric Respiratory Syncytial Virus Infection in Korea

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## Background

- Respiratory syncytial virus (RSV)** is a major cause of acute lower respiratory tract infections (LRTIs) in infants and young children worldwide, with seasonal outbreaks typically lasting 3 to 8 days<sup>1-3</sup>.
- A meta-analysis of Korean studies found that RSV was detected in 18.1% of respiratory samples from patients with acute respiratory infections<sup>4</sup>, and recent surveillance data indicate that the median age of infected patients was 2 years<sup>5</sup>.
- This study evaluated **caregiver burden** using validated patient-reported outcome measures (PROMs) to assess productivity loss and health-related quality of life (HRQoL).

## Methods

### Study Design

- This cross-sectional survey recruited South Korean mothers of children under five with RSV infection using the Master-Sample<sup>®</sup> Panel (Hankook Research), a voluntarily registered panel comprising approximately 940,000 individuals in Korea as of 2024.
- A total of 300 participants were enrolled (January 17–February 10, 2025) through proportional stratification based on 2023 female labor force statistics, with reported RSV episodes occurring during the 2022–2025 seasons.

### Study Population and Study Groups

#### Eligible participants

- Mothers with caregiving experience for children aged <5 years with RSV infection from the Seoul metropolitan area and five major cities.

#### Study groups

- Participants were subsequently classified into four groups based on the child's treatment setting and the caregiver's employment status:
  - outpatient-employed
  - outpatient-unemployed
  - inpatient-employed
  - inpatient-unemployed
- Employment status (employed vs. unemployed) were treated as mutually exclusive, whereas medical care settings (outpatient vs. inpatient) were not mutually exclusive.
- In cases where a child had multiple RSV infections or where multiple children in the household were infected, caregivers were asked to respond with reference to the most severe episode experienced.

### Measures

#### Productivity loss

- Work Productivity and Activity Impairment: Specific Health Problem (WPAI:SHP)**
  - Productivity loss scores (%): absenteeism score, presenteeism score, overall work impairment score, and daily activity impairment score
  - Weekly productivity loss costs (USD): absenteeism cost, presenteeism cost, and overall work impairment cost
  - All costs were converted from KRW to USD at a fixed exchange rate (1 USD = 1300 KRW).

#### HRQoL

- EQ-5D-5L utility score, EQ-5D visual analogue scale (VAS)**
  - For the utility score, the Korean value set for the general population was used.
- PedsQL Family Impact Module (PedsQL FIM)**
  - Total Score, Parent HRQoL Summary Score, and Family Functioning Summary Score

### Statistical analysis

- For all outcomes, group-specific means and weighted averages across the four study groups were calculated.
- Descriptive statistics were conducted using Microsoft Excel.

## Results

### Baseline Characteristics

- After data quality assessment, 248 female caregivers (mothers) were included in the final sample, with 81% of patients receiving outpatient care and 65% hospitalized due to RSV infection.

Table 1. Baseline characteristics

Parental Characteristics	Total (n=248)	Infant Characteristics	Total (n=248)
Age, mean (SD), years	36 (4.4)	Infant age at time of RSV infection, mean (SD), years	1.8 (1.3)
Age group, n (%)		Infant age at time of RSV infection, n (%)	
20–29	15 (6.0)	0	41 (16.5)
30–39	180 (72.6)	1	65 (26.2)
40–49	53 (21.4)	2	69 (27.8)
Employment status, n (%)		3	42 (16.9)
Employed	169 (51.0)	4	31 (12.5)
Unemployed	84 (33.0)	Clinical Settings, n (%)	
Residential district		Outpatient	200 (80.6)
Seoul	86 (34.6)	Inpatient	161 (64.9)
Gyeonggi-do	110 (44.4)		
Incheon	21 (8.5)		
Metropolitan city (Busan, Daegu, Daejeon, Gwangju, Ulsan)	31 (12.5)		

Abbreviations: RSV, respiratory syncytial virus; SD, standard deviation.

### Productivity Loss

Table 2. WPAI productivity loss scores and weekly productivity loss costs

	Outpatient-employed	Outpatient-unemployed	Inpatient-employed	Inpatient-unemployed	Weighted average (per RSV episode)
<b>WPAI productivity loss scores (%)</b>					
Absenteeism score	52	60	60	<b>87</b>	61
Presenteeism score	73	77	76	<b>84</b>	76
Overall work impairment score	86	89	89	<b>97</b>	89
Daily activity impairment score	77	83	79	<b>90</b>	81
<b>Weekly productivity loss costs (USD)</b>					
Absenteeism cost	385.15	173.07	<b>443.57</b>	251.48	341.09
Presenteeism cost	<b>260.17</b>	89.86	225.23	32.45	181.88
Overall work impairment cost	635.07	258.82	<b>660.51</b>	282.54	515.85

Abbreviations: RSV, respiratory syncytial virus; WPAI, work productivity and activity impairment.

## Acknowledgment

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### HRQoL

Figure 1. Frequency distributions of responses in the EQ-5D-5L domains among all participants

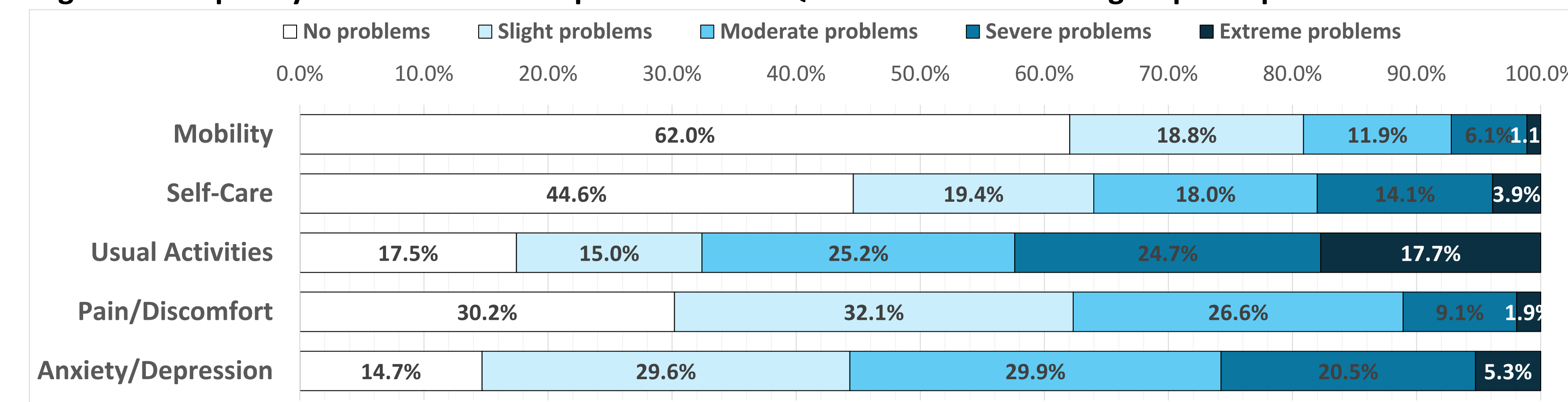


Table 3. HRQoL outcomes assessed by EQ-5D-5L utility score, EQ VAS, and PedsQL Family Impact Module

	Outpatient-employed	Outpatient-unemployed	Inpatient-employed	Inpatient-unemployed	Weighted average (per RSV episode)
<b>EQ-5D-5L utility score, mean (SD)</b>	0.674 (0.182)	0.649 (0.177)	0.644 (0.206)	<b>0.542 (0.198)</b>	0.639 (0.196)
<b>EQ VAS score, mean (SD)</b>	57.46 (20.82)	52.68 (21.01)	53.40 (22.35)	<b>45.87 (22.05)</b>	53.54 (21.86)
<b>PedsQL Family Impact Module</b>					
Total Score	44.38	43.80	<b>42.60</b>	46.47	44.13
Parental HRQL Summary Score	43.14	39.75	<b>40.92</b>	41.88	41.70
Family Functioning Summary Score	44.75	45.70	<b>43.56</b>	48.44	45.20

Abbreviations: EQ-5D-5L; EuroQol 5-Dimension 5-Level, PedsQL, Pediatric Quality of Life Inventory; RSV, respiratory syncytial virus; SD, standard deviation; VAS, visual analogue scale.

## Discussion

### Summary

- Inpatient caregiver groups (both employed and unemployed) experienced greater economic burden and lower HRQoL scores than outpatient caregiver groups.
- This study is the first to quantify the multidimensional burden associated with pediatric RSV infection in terms of productivity loss and HRQoL using generic instruments (EQ-5D-5L and EQ VAS) and a family impact instrument (PedsQL FIM).

### Strength

- This study captured real-world variations in caregiver burden through stratification by care setting and employment status.

### Limitations

- The classification of RSV infection relied on caregiver-reported experiences without medical record confirmation; a structured screening question was used to increase specificity.
- The analysis focused on a single one-week RSV episode, potentially underestimating cumulative burden in households with recurrent or multiple child infections.

### Implications

- These findings underscore the considerable burden of RSV caregiving, highlighting the need for effective interventions and supportive policies to mitigate caregiver burden and promote family well-being.

## Conclusions

- This study provides the first comprehensive evidence on the multidimensional burden experienced by caregivers of children aged 0–4 years with RSV infection in Korea, highlighting substantial impacts on productivity and HRQoL.