

Background

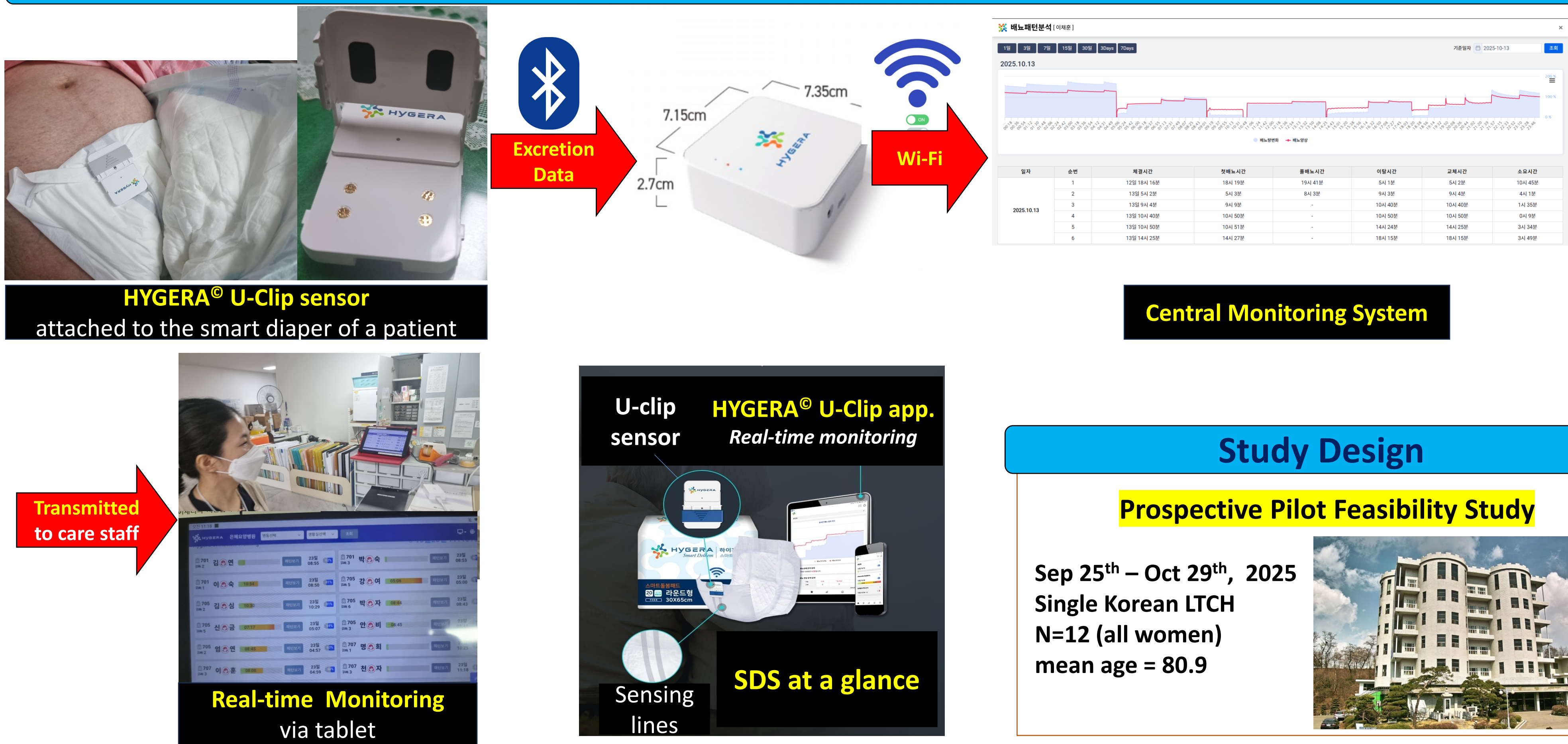
- Urinary incontinence is highly prevalent among frail older adults in Korean long-term care hospitals (LTCHs). Delayed diaper replacement may result in **incontinence-associated dermatitis, pressure ulcers, and other skin complications**, while frequent diaper checks impose a **considerable burden on care staffs**.
- To avoid these complications and reduce caregiving workload, some patients continue to use **indwelling urinary catheters**. However, catheter use increases the risk of catheter-associated urinary tract infections and remains an important quality indicator in Korean LTCHs.
- A recent nationwide survey in Korea¹** found that healthcare providers perceived **smart diapers as a promising technology** for improving continence care and reducing workload. Nevertheless, evidence from real-world LTCH settings remains scarce.
- This pilot study evaluated the **feasibility, safety, and potential role of a Smart Diaper System (SDS)** as an alternative continence management strategy in Korean LTCHs.

Research Question

“Can a Smart Diaper System safely support continence care and reduce dependence on urinary catheters in frail older adults?”

Methods

Smart Diaper System(SDS) Diagram



Study Design

Prospective Pilot Feasibility Study

Sep 25th – Oct 29th, 2025
Single Korean LTCH
N=12 (all women)
mean age = 80.9



Results

1. Patients' Characteristics (n=12)

Variable	Value
Age	80.9 ±11.8
Bed-ridden	6 (50%)
Urinary catheter	3 (25%)
PUBS	3 (25%)
Pressure ulcer	3 (25%)

2. Clinical Outcomes (n=12)

- ✓ Skin complications = 0
- ✓ UTI = 0
- ✓ Sleep disturbance = 0
- ✓ 1,227 diaper replacement events
- ✓ Mean 3.2 changes/day

3. After Catheter Removal

3/3 urinary catheters successfully removed
No urinary retention
No UTI
No adverse events

Novel Clinical Observation

Purple Urine Bag Syndrome (PUBS) disappeared
Reduction of foul odor by PUBS
Improved dignity of care (self voiding)
More efficient continence management

Purple Urine Bag Syndrome (PUBS)



Potential Benefits for Korean LTCHs

Patient Level

- Prevention of skin complications
- Better continence care
- Reduced catheter dependence

Staff Level

- Reduced workload
- Timely diaper replacement
- Improved workflow

Institutional Level

- Reduction in catheter utilization rate
- Improvement in quality indicators
- Support for digital transformation

Conclusion

- SDS was safely implemented without major adverse events.
- SDS showed potential as an alternative to indwelling urinary catheters.
- SDS may improve quality of care while reducing staff burden in LTCHs.

References

1) Kim GS, Jang S, Ga H. Healthcare Providers' perspectives on the adoption of Smart Care Technologies in Korean Long-Term Care Hospitals. Ann Geriatr Med Res, 2026 May 14. doi: 10.4235/agmr.26.0019. Online ahead of print.