



**The Hong Kong Polytechnic University**  
**Pamela Youde Nethersole Eastern Hospital**



# **Risk Factors Associate with Pressure Ulcer in Hong Kong Private Nursing Homes**

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# Outline

- Background & Literature Review
- Objectives of Study
- Significance of Study
- Method
- Results
- Discussion & Recommendation

# Background & Literature Review

- Technology driven healthcare (*Roscow & Grimes, 2003*)
- Rapid increase aging population
- Shift acute episode to chronic condition
- High cost of hospitalization
- Increase 50% nursing time (*Clark et al, 2005*)
- Early discharge from hospital
- Continuity care at home care setting
- Increase acuity & skilled nursing in nursing home
- Bedside care by semi-skilled workers

*Hanson et al (1993) Bergstrom et al (1996) Anthony et al (2002)*

*Health & Medical Development Advisory Committee (2005)*

*Hanson et al (1993), Vap & Dunaye (2000)*

*Langemo & Baranoski (2003)*

# Background & Literature Review

## ■ Incidence of pressure ulcer in nursing home

- 22% - 90% (Sullivan et al, 2003, Bergstrom et la, 1996, Braden, 1992)
- One private OAH - 45 % (Kwong et al, 2006)

## ■ Time of pressure ulcer developed in nursing home

- 7th to 14th day after admission (Smith,1995, Bergstrom et la, 1996)
- 3 weeks (Braden, 1992)
- average 9.56 observation days (range 5-23) (Kwong et al, 2006)

## Background & Literature Review

### ■ **Percent of reported cases having ulcer(s) on admission 03, 04, 05**

- Home – 34%, 31%, 37% (NSD PYNEH, 2006)
- Nursing home – 59%, 60%, 54% (PYNEH, 2006)
- US nursing home – 22% (Sullivan et al, 2003)

### ■ **Patient discharge with pressure ulcer**

- patient home – 16% (PYNEH, 2006)
- nursing home – 36.5% (PYNEH, 2006)
- US discharge to nursing home – 17% to 35% (Smith, 1995)

# Background & Literature Review

## Risk Factors: Nursing Home

- Age
- Immobility
- Sensory perception
- Friction & shear
- Moisture
- Malnutrition
- Medical condition & disease
- Gender & ethnicity

# Background & Literature Review

- Majority of pressure ulcer are preventable (AHPCR, 1992)
- Pressure ulcer prevention knowledge is crucial for prevention (Pieper & Mattern, 1997)
- Variation in standard & practice and compliance to nursing intervention (Defloor et al, 2005)
- Nursing home pressure ulcer activities based on old tradition (Buss et al, 2004)

# Gap in Existing Literature

- The situation of pressure ulcer in Hong Kong private nursing homes
- Any particular risk factors of pressure ulcer private nursing home



# Study Objectives

1. To identify the prevalence and incidence of pressure ulcer in nursing home
2. To delineate risk factors associated with pressure ulcer formation in nursing home
3. To examine the association between health status factors (medical problems, cognitive level and functional status) and pressure ulcer risk levels among the participants.
4. To determine the predictive validity of modified Braden Scale (MBS) in Hong Kong private nursing homes.

# Significance of the Study

- Develop a tailor-made pressure ulcer prevention program for nursing homes based on findings.

# Method

- **Design:** a prospective cohort study
- **Setting:** Four private nursing homes
- **Sampling:**
  - Purposely selected nursing homes
  - Cohort of participant
  - Selection Criteria
    - Chinese participants living in nursing homes
    - Consent to participate

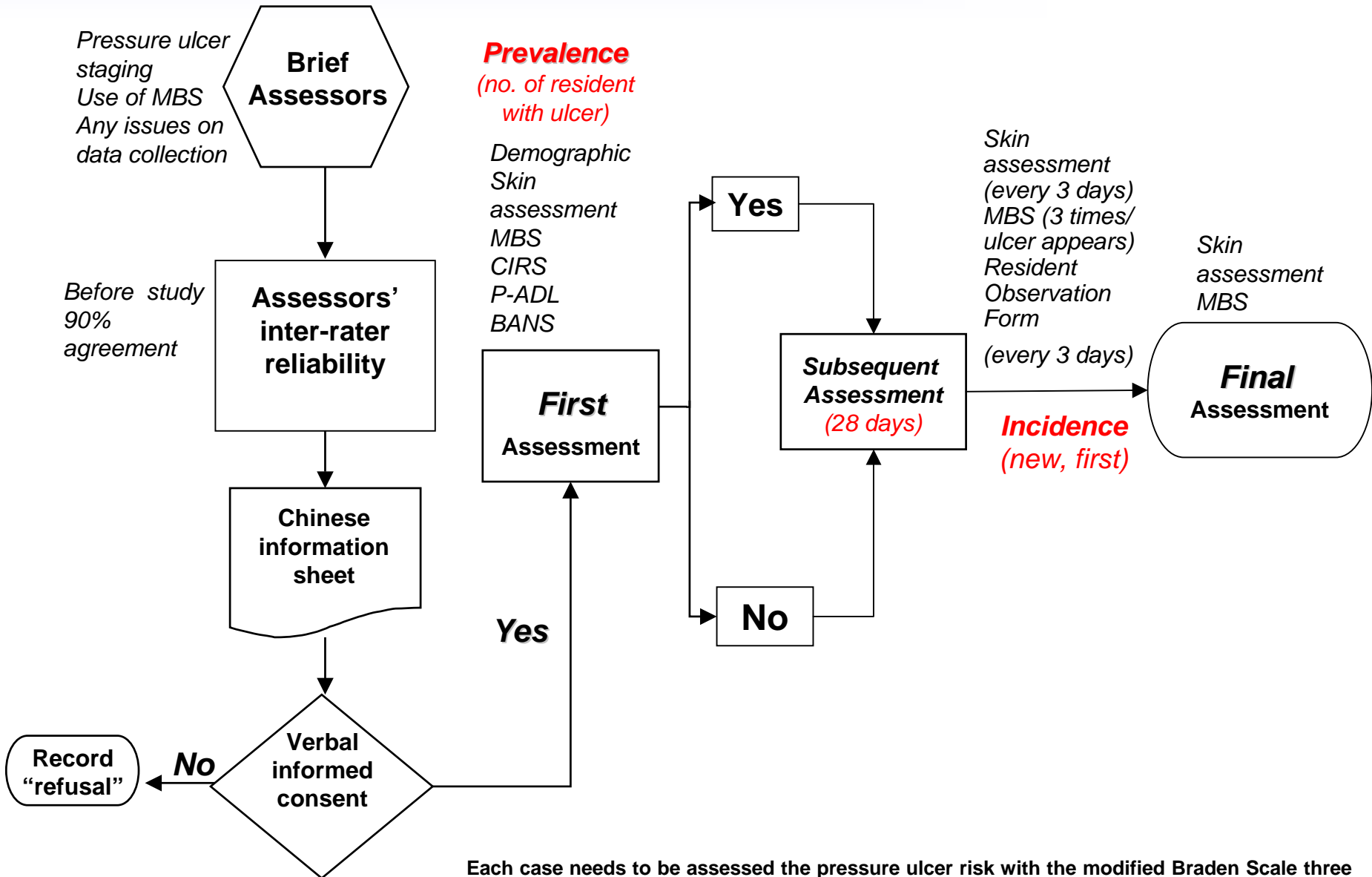
# Instrument

- Demographic Data Collection Form
- Cumulative Illness Rating Scale (CIRS) (Chi and Leung, 1995)
- Bedford Alzheimer Nursing Severity Subscales (BANS-S) (Pang et al, 2004 )
- Personal Daily Life Activities (P-ADL) (Chi and Leung, 1995, Chan and Pang, 2006)
- Skin Assessment Chart
- Modified Braden Scale (Kwong et al, 2006)
- Resident Observation Sheet

# Enhance Reliability & Validity

- Data collection by trained assessors
- Establish interrater agreement – 90%
- Information sessions to nursing home staff
- Unannounced visit by investigators

# Study Procedure



Each case needs to be assessed the pressure ulcer risk with the modified Braden Scale three times in 4 weeks. The times for the assessment are: T0 (starting date) , T6 ( the first day of the 3rd week) and T11 (completed date) . Extra times are needed when pressure ulcers are 14 detected.

# Data Analysis

## ■ Descriptive statistics

- Characteristics of participants
- Prevalence & incidence of pressure ulcer

## ■ Risk factors & pressure ulcer formation

- Bivariate analysis: association (Chi-square / independent t-test)
- Logistic regression: contributory factors

## ■ Modified Braden Scale

- MBS score (develop pressure ulcer): independent t-test
- Cutoff score: sensitivity, specificity
- Cluster analysis: high, moderate and low risk groups residents

## ■ Resident observation

- Content analysis: environmental-related and care practice related factors

## **Pilot study**

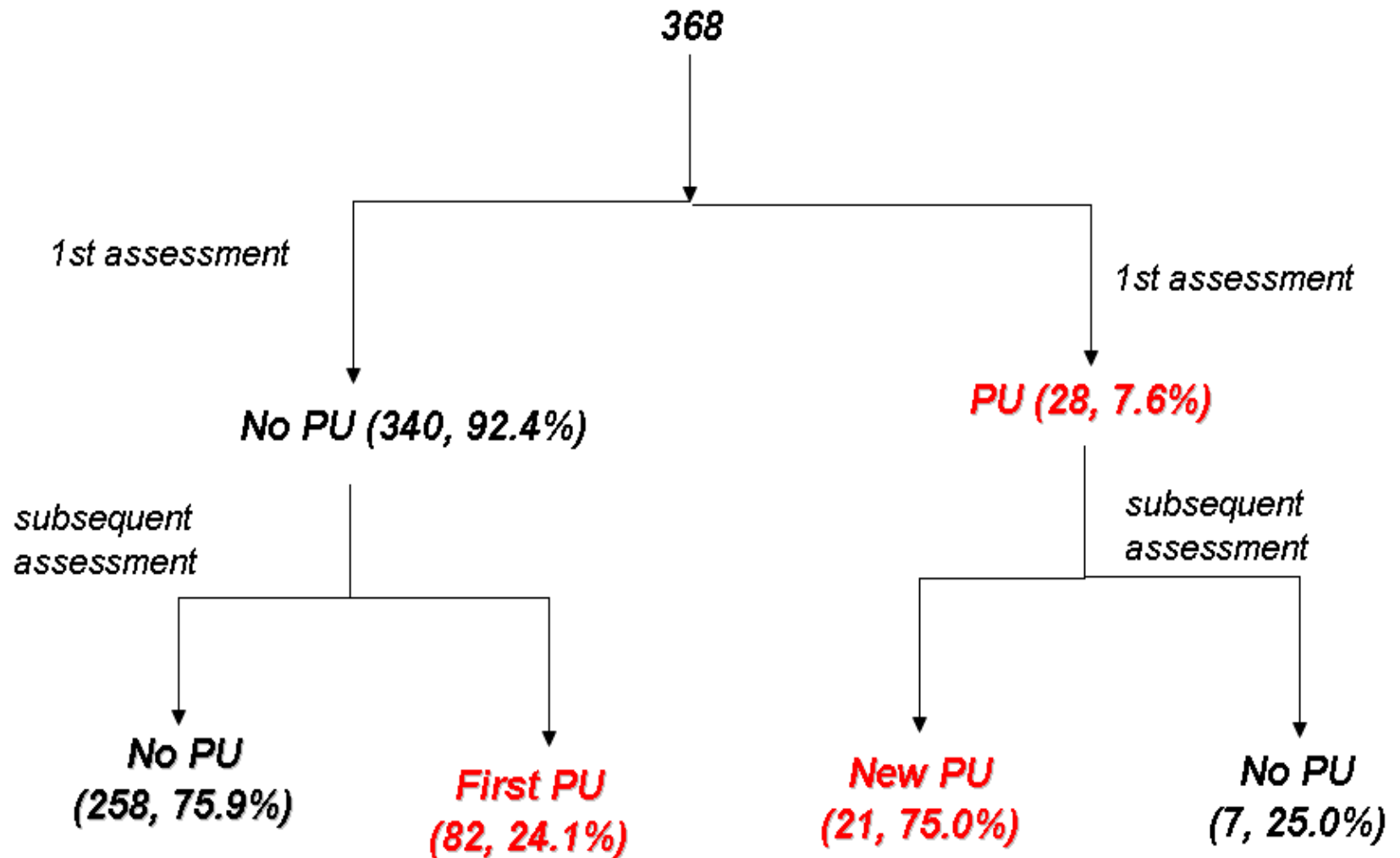
- Test feasibility of study procedure

## **Ethical Consideration**

- HK PolyU Ethical Review Committee
- HKEC Ethics Committee
- Verbal informed consent
- Information sheet
- Identity anonymous
- Raw data / study record kept confidential
- Record destroy after completion one year



# Results



## **Most prevalent locations**

- Coccyx
- Sacrum
- Ischial tuberosities
- Ankle

## **Commonest stages**

- stage 1 (71%)
- stage 2 (23%)

## **Average time pressure ulcer develop**

- 9 days (range: 1-28 days)

## Socio-demographic difference between participants with and without pressure ulcer by Chi-square

Variables		Valid Cases	%	Subjects with pressure ulcers	%	Subjects without pressure ulcers	%	x <sup>2</sup>	df	p value
<b>Gender</b>	M	140	38.04%	47	33.57%	93	25.27%	0.62	1	0.000
	F	228	61.96%	56	15.22%	172	46.74%			
	Total	368	100.00%	103	27.99%	265	72.01%			
<b>Smoke</b>	Smoker	257	71.60%	71	19.80%	186	51.80%	0.028	2	0.986
	Ex-smoker	84	23.40%	24	6.70%	60	16.70%			
	Non-smoker	18	5.00%	8	1.40%	13	3.60%			
	Total	359	100.00%	100	27.90%	259	72.10%			
<b>Previous history of pressure ulcer</b>	Yes	103	28.14%	20	5.46%	83	22.68%	28.09	1	0.000
	No	263	71.86%	8	2.19%	255	69.67%			
	Total	366	100.00%	28	7.65%	338	92.35%			
<b>Feeding</b>	Self-help	257	72.00%	54	15.10%	203	56.90%	52.71	4	0.000
	Oral feed with assistance	40	11.10%	9	2.50%	31	8.70%			
	Oral feed by others	26	7.30%	20	5.60%	6	1.70%			
	Nasogastric tube feeding	32	9.00%	19	5.30%	13	3.60%			
	NGT feeding and supplement with oral feeding by others	2	0.60%	1	0.30%	1	0.30%			
	Total	357	100.00%	103	28.80%	254	71.20%			
<b>Sedative / transquiallizer</b>	Yes	63	17.90%	21	6.00%	42	11.90%	1.03	1	0.31
	No	289	82.10%	78	22.20%	211	59.90%			
	Total	352	100.00%	99	28.10%	253	71.90%			

## Participants likely to develop pressure ulcer by Logistic Regression (Backward Stepwise)

- Poorer ADL (OR = 0.85, 95% CI, 0.76-0.95,  $p=0.005$ )
- Better cognitive function (OR = 0.82, 95% CI, 0.71-0.94,  $p=0.004$ )
- Required assistance in feeding (OR = 8.3, 95% CI, 2.08-33.0,  $p=0.03$ )

# Care- practice Related Factors

- Pressure re-distribution devices
  - Lack well-fitted cushions in armchair or wheelchair, specialized beds, mattress
  - Use of rubber ring or buoy
  - Use of plastic draw sheets / sheep skin
- Lack of turning schedules / re-positioning
- Infrequent bathing / active skin program

## Care- practice Related Factors (2)

- Over use of physical restraint
- Inappropriate care practice; e.g.
  - prop up > 30°
  - wet sheets
  - pain assessment
- Inadequate staff communication on participant's condition
- Wrong resident identification
- Caregiver's knowledge on pressure ulcer prevention & care

# Environmental Related Factors

## ■ **Limited space**

- Accessories / personal belongings placed on bed

## ■ **Having time / being rush**

- Dignity
- Clothing / trousers no or not properly worn

## ■ **Privacy**

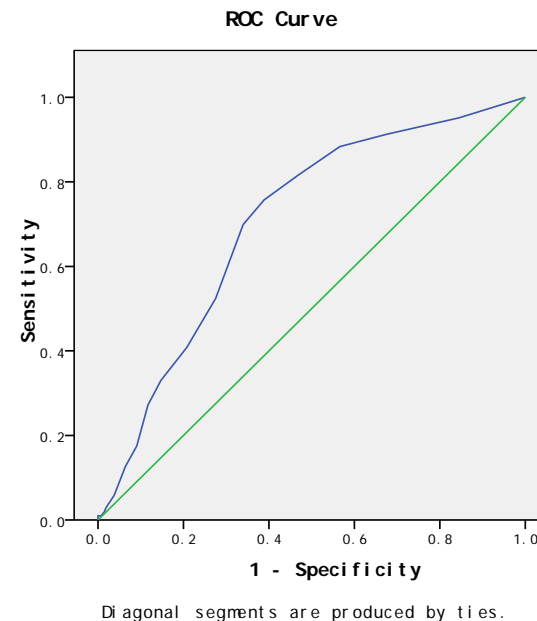
- Privacy of the body (being exposed)
- Gaze of others

## ■ **Autonomy, control, choice, individual diversity**

- Participants requested to put on napkins
- No choice of food / meal time

# Discriminative Validity of Modified Braden Scale

Cut off point	Sensitivity (%)	Specificity (%)
9	0.50%	100.00%
10	1.00%	99.60%
12	1.45%	98.85%
13	2.40%	98.30%
14	4.35%	97.15%
15	9.20%	94.90%
16	15.05%	92.25%
17	22.35%	89.60%
18	30.10%	86.80%
19	36.90%	82.25%
20	46.60%	75.85%
21	61.15%	69.25%
<b>22</b>	<b>72.80%</b>	<b>63.55%</b>
23	78.65%	57.15%
24	84.95%	48.30%
25	89.80%	37.95%
26	93.20%	24.00%
27	97.55%	7.75%



The area under the ROC curve was 0.705 (95% CI, 0.648-0.761,  $p = 0.5$ ).

Cutoff level of 22

- sensitivity was 72.8%
- specificity was 63.55%



## Pressure Ulcer Risk Identified by MBS

Risk Groups	No.	Pressure Ulcer		Mean	SD	MBS	
		Yes	No			Min	Max
<b>Low</b>	187	25	162	25.29	1.39	23	27
<b>Moderate</b>	122	50	72	20.17	1.24	18	22
<b>High</b>	59	28	31	15.15	1.89	9	17
<b>Total</b>	368	103	265	21.97	4.03	9	27

# Key Factors of Three Risk Groups

## ■ High

- no significant factor

## ■ Moderate

- moisture (OR=2.380, 95% CI, 1.499-3.779, p=0.000)
- activity (OR=0.292, 95% CI, 0.136-0.626, p=0.0002)

## ■ Low

- mobility (OR=0.457, 95% CI, 0.219-0.955)

Kwong et al (2008)

# Discussion

## ■ Pressure ulcer prevention strategies based on factors:

- Pressure ulcer occurrence
- Patient-related
- Care-practice
- Environmental-related

# Recommendation

## ■ Develop a dignified care pressure ulcer prevention program

- Available evidence-based guidelines & standard
- Develop by CGAT, PYNEH & PolyU
- Protocol
  - Risk assessment: *high, moderate, low*
  - Regular skin assessment, pressure relieving devices
  - **Dignified care pressure ulcer preventive & nursing actions**
    - *elderly residents*
    - *family members / caregivers*
    - *Nursing home staff*
- Educational package
  - *VCD, Poster, Booklet and educational sessions*

# Study Limitation

- Study at selected four private homes in one district
- Generalization

# Acknowledgment

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