LKS Faculty of Medicine
School of Public Health
香港大學公共衞生學院

HKU JC Nursing Leadership Development Fellowship
香港大學賽馬會護理領袖發展計劃
Advance Level

Effect of an evidence-based assessment tool to minimize the use of physical restraint in general adult ward settings in Hong Kong: A cluster randomized controlled trial

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Declaration

I have no conflict of interest to the presentation.

Funding statement

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Introduction

Singapore (Ang et al., 2015)

A prospective observational study in an acute care hospital: 8% (n=84)

Germany (Krüger et al., 2013)

A cross-sectional study in an acute care hospital: 11.8% (n=1276)

Switzerland and Austria (Thomannet al., 2021)

A cross-sectional multi-centre design study in 140 hopsitals: 8.7% (n=2577)

Hong Kong NSD, HAHO, 2025

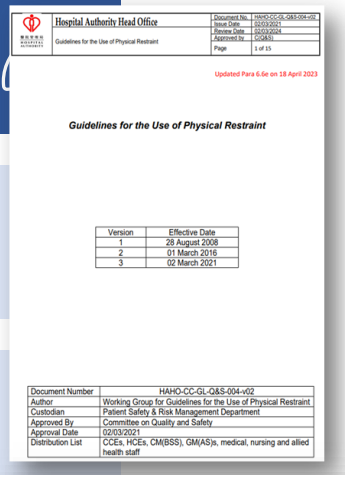
Group 1 Hospital Prevalence Rate (General acute hospitals with 24 hour Accidental & Emergency services): **9.17%**

- The prevalence rate of United Christian Hospital in Hospital Group 1 is as follows:

Hospital	2012	2013	2014	2015	2016	2017	2018	2019	2021	2024
UCH (Gen)*	8.91%	8.32%	8.07%	6.90%	9.46%	7.69%	6.52%	9.47%	11.76%	12.48%
Average (Gp 1)	8.84%	8.77%	8.30%	7.52%	7.68%	7.72%	7.62%	8.20%	10.22%	9.17%

NSD, HAHO, 2025

24.1% from 2019 to 2024


Hospital Authority Head Office

Guidelines for the Use of Physical Restraint

Updated Para 6.6e on 18 April 2023

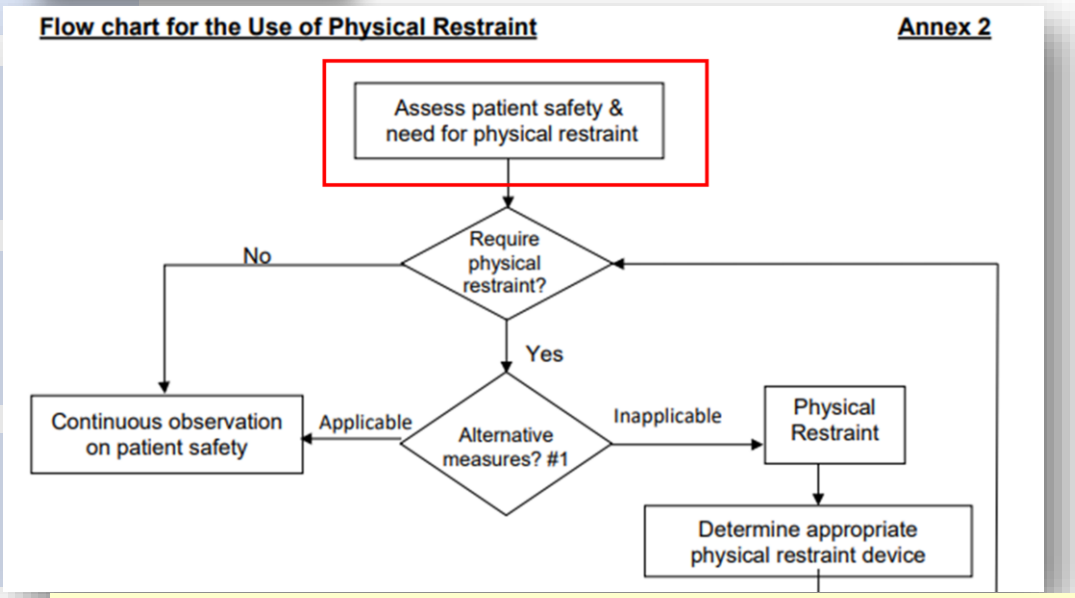
Guidelines for the Use of Physical Restraint

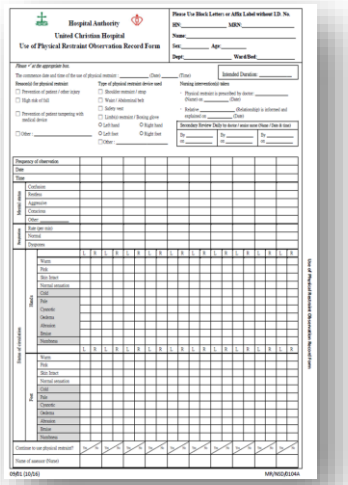
Version	Effective Date
1	28 August 2008
2	01 March 2016
3	02 March 2021

Document Number	HAHO-CC-GL-Q&S-004-v02
Author	Working Group for Guidelines for the Use of Physical Restraint
Custodian	Patient Safety & Risk Management Department
Approved By	Committee on Quality and Safety
Approval Date	02/03/2021
Distribution List	CCEs, HCEs, CM(BSS), GM(AS)s, medical, nursing and allied health staff

"Health care professionals must carefully weigh the benefits against the risks of using physical restraint in each particular case to ensure the least amount of physical restraint is used, and to limit usage to what is required."

How?




Hospital Authority
United Christian Hospital
Use of Physical Restraint Observation Record Form

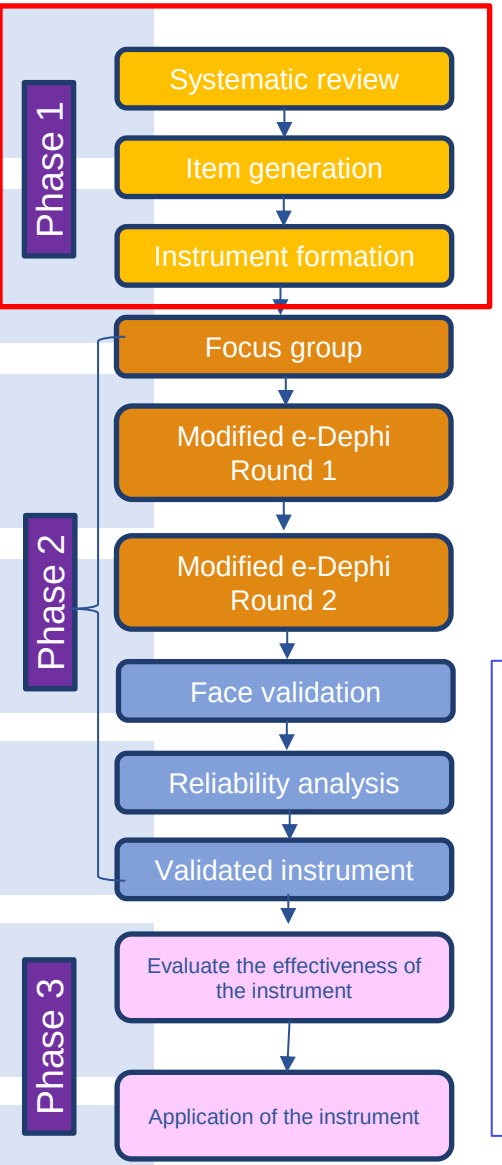
Common justifications for employing physical restraint

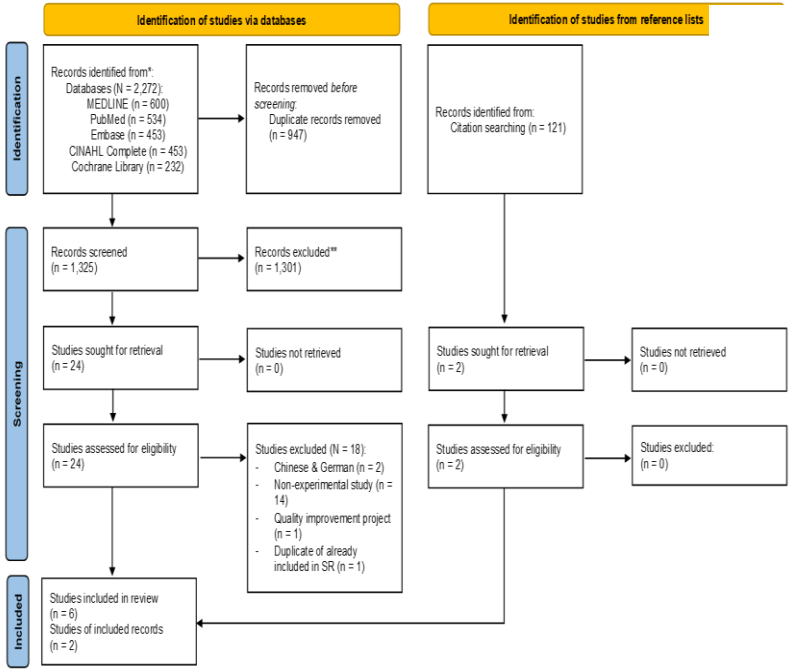
1. Prevent interference or interruption with medical treatment
2. Promote patient safety (e.g., fall prevention)
3. Protect others against unsafe behaviors, severe injury or physcial harm

Aim of the study

This study aimed to develop an evidence-based assessment tool to facilitate nurses in making decisions to minimize the use of physical restraint in general adult ward settings.

Phase 1: A systematic review





Decision making tools to determine when to restrain a patient in ICU settings

1. **Green** circle:
   Level of the patient's behaviors
2. **Yellow** circle:
   Level of device the patient has
3. **Orange** circle:
   Patient's level of independence

(Hevener et al., 2016)

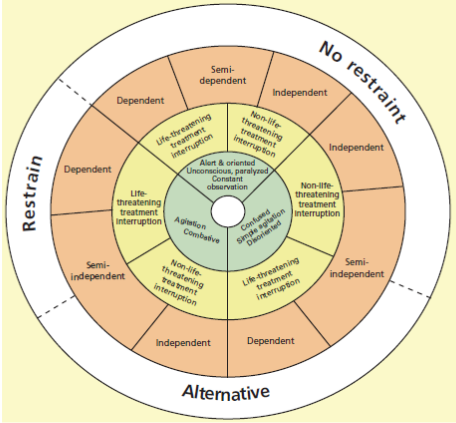


Fig 1. Restraint Decision Wheel (RDW)

Eight studies were included in this systematic review (SR), consisting of 6 cohort studies, 1 stepped-wedge randomized controlled trial (RCT), and 1 systematic review of 4 RCTs.

- The interventions retrieved from the included studies can be categorized as (1) restraint decision instruments, (2) restraint preventive interventions and (3) restraint preventive strategies.
- There is **currently no comprehensive and effective tool** to guide nurses through the decision-making process before resorting to physical restraint use in general acute wards.

Phase 1: A systematic review

Authors (Y)	Instruments	Results	Comments / Recommendations
Dauvergne et al (2023)[30]	Decision Support Tool (DST) – PR is not necessary: RASS ≤ −4, infusion of a neuromuscular blocking agent, tetraplegia or severe neuromyopathy, and ongoing noninvasive ventilation. – PR is recommended: RASS ≥ 1, discontinuation, or reduction of sedative treatments, and if the patient presented a risk of harm for him/herself. – The opinion of the attending physician was required to decide whether PR is needed and, if so, prescribes it.	– The prevalence of PR was 28% (95% CI: 25.1%-31.4%) in the control group and 25% (95% CI: 21.8%-29.1%) in the intervention group, respectively, ($\chi 2 = 1.35$; $P = 0.24$). – Restraint was applied by the nurse and/or nurse assistant in 96% of cases in both periods, mainly to wrists (89% vs. 83%, $P = 0.14$). – The patient-to-nurse ratio was significantly lower in the intervention period (1:3.0 ± 1 vs. 1:2.7 ± 0.7, $P < 0.001$). – In multivariable analysis, mechanical ventilation was associated with physical restraint [aOR (95% CI) = 6.0 (3.5–10.2)].	• Low to moderate quality of study • The study was applied in ICU settings • Reliability of nurses' satisfaction questionnaire was not evaluated • No mention on the details of data collection • Not applicable to implement in general ward settings
Johnson et al (2016)[33]	Education intervention – Nonpharmacological interventions included providing visual and hearing aids, frequent communication and reorientation with patient, familiar objects from patient's home in the room, attempt consistent nurse staff, allow television during the day with daily news, and nonverbal music. – Environmental approaches included sleep quiet time, lights on during the day, off at night, control excess noise, and ambulate patient early and often. – Alternative devices with hands on demonstration with the devices included pictures, features and benefits of the device were provided in the TICU on both day and evening shift. – Laminated posters displaying alternative devices, and instructions for documentation in the electronic medical record (EMR) were placed in different locations in the TICU.	• Mean and SD for restraints per 1000 patient days preintervention was 314.1 (35.4) and postintervention 237.8 (56.4) ($P = 0.008$). • Mean PRUQ overall, 3.57 (range 1-5) indicated that nurses had positive attitudes towards restraints in certain circumstances. • The primary reasons for using restraints were: "protecting patients from falling out of bed", 37 (72.5%), and "protecting patients from falling out of chair", 34 (66.7%).	• Restraint rate was not regarded as primary outcome • Poor study design with low quality of study • Easy access to instructions may draw staff attention by means of laminated posters
Wen et al (2020)[34]	A thematic and practical JBI standardized Training (9 hours) included pre-restraint assessment, principles of physical restraint, informed consent, using a restraint decision-making wheel, and alternatives to	• There was a significant difference in the incidence of adverse events before and after the application of JBI physical restraint standards ($P < 0.05$). • Skin bruising [4.7% (control) vs. 0.7% (intervention), $X^2 = 4.623$]	• Low quality of study • Baseline characteristics of participants are not described well enough to determine comparability between groups • No mention on the details of data collection

TABLE 1. Description of Instruments Used to Justify the Use of Physical Restraint and Their Associations With Outcomes Measured From All the Included Studies

REVIEW ARTICLE

Development of an Evidence-Based Instrument to Justify the Use of Physical Restraint in General Adult Ward Settings: A Systematic Review

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Kin Fung Sit, MSc(G), BSN, RN, Chenk Fung Ng, MSc(G), BSN, RN,
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Ka Po Lo, DN, Msc BA(Hon), BN(Hon), APN(HM), RN,
Siu Keung Tang, MBM, RN, and Lok Man Leung, MN, BN(Hon), RN

Patient Safety

TABLE 3 - Analysis on the Interventions of Included Studies

Authors (Y)	Dauvergne et al (2023)[30]	Johnson et al (2016)[33]	Wen et al (2020)[34]	Yang et al (2023)[35]	Chen et al (2021)[29]	Abraham et al (2022)[36] Enns et al (2014)[9]	Kwok et al (2016)[37]	Lai et al (2011)[38]	Wong et al (2020)[39]	Hall et al (2018)[31]	Hevener et al (2016)[32]
						Systematic review					
Study design	An observational, multicentre study with a repeated one-day point prevalence design	Pre/Postintervention design	A prospective cohort study	A stepped-wedge, cluster, randomized controlled trial	Cohort	A stepped-wedge cluster RCT	Randomized controlled trial	Randomized controlled trial	Randomized controlled trial	Cohort	Cohort
Details of the interventions											
Thematic and practical JBI standardized training			V								
Decision Support Tool (DST)	V										
Restraint Decision Tree (focusing on muscle strength, comatose patient and catheter)					V						
Development of opinion leaders among the nursing leadership						V				V	
Education and training of physicians and nurses	V	V	V	V	V	V		V	V	V	
Implementation of weekly "least restraint rounds"						V					
Provision of pressure sensors (bed and chair) and information about their use							V				
A multidisciplinary restraint reduction committee to review patients with PR and conduct weekly meetings and further in-service sessions								V		V	
Case reviews for people with PR								V			
Consultation by a nurse specialist								V			
Provision of alternatives for PR								V			
Restraint Decision Wheel (RDW)		V		V							V

TABLE 2. Varying Levels for Consideration to Reduce the Use of Physical Restraint

(1) Mental / Behavior level

Restraint Level (With Reference to Alternatives Available)	Alert / Claim	Confusion *	Disorientation †	Agitation
No restraint	V	V	V	
Minimal restraint		V	V	
Restraint		V	V	V

Restraint level (with reference to alternatives available)	(2) Device level (2A) Non-Life-Threatening Peripheral IV Catheter	Wound Drain	Wound With Dressing	Monitoring Leads
No restraint	V	V	V	V
Minimal restraint	V	V	V	V
Restraint	V	V	V	V

Restraint Level (With Reference to Alternatives Available) (2B) Life-Threatening	Oxygen Therapy	Arterial / Central Catheter	Other Catheters (ie, Urinary Catheter, etc.)	Tracheostomy / Endotracheal / Chest tube	Other Tubes (ie, Nasogastric Tube, etc.)	Treatment Infusion	Other Drains	Other Device(s)
No restraint								V
Minimal restraint			V			V	V	V
Restraint	V	V	V	V	V	V	V	V

Restraint Level (With Reference to Alternatives Available) (3) Independence Level	Independent	Semi-Independent	Dependent
No restraint	V		
Minimal restraint	V	V	V
Restraint	V	V	V

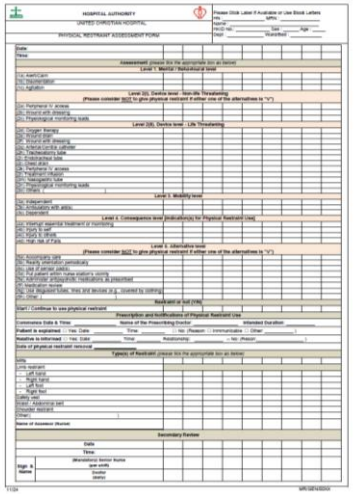
Restraint Level (With Reference to Alternatives Available) (4) Consequence Level (Reason)	Interrupt Essential Treatment or Monitoring	Injury to Self	Injury to Others	High Risk of Falls
No restraint				
Minimal restraint	V	V	V	V
Restraint	V	V	V	V

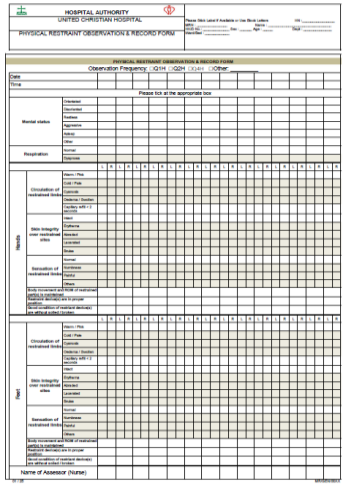
Remarks (5) Alternative Level [For Consideration]							
No restraint / minimal restraint if applicable	Accompany care	Reality orientation	Use of sensor pad(s)	Put patient within nurse station's vicinity	Use of psychotropic medications	Medication review	Disguise tubes and lines	Other
Minimal restraint if applicable	Use of mitts							

*Remarks: Delirium screening (ie, CAM).
†Mini-mental State Examination (MMSE) or Abbreviated Mental Test (AMT) or other cognitive assessment tests.

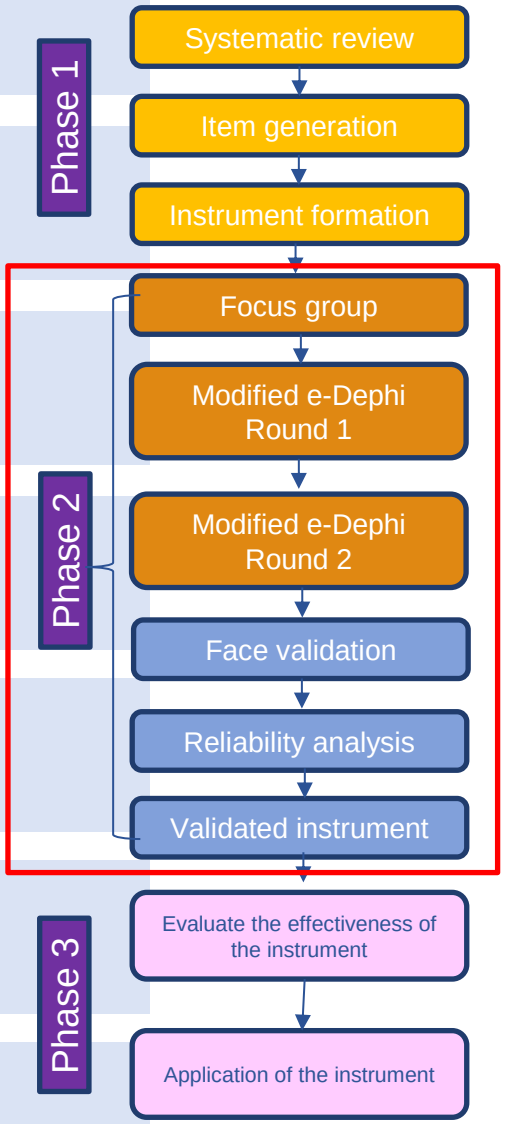
Version 1. An evidence-based Assessment and Observation record form

REVOLUTIONIZING PATIENT CARE : EVIDENCE-BASED STRATEGIES TO MINIMIZE PHYSICAL RESTRAINTS IN GENERAL ADULT SETTINGS: A SYSTEMATIC REVIEW





Phase 2: Development of the physical restraint decision making assessment tool – A validation study



- Follow **CREDES guidelines** for conducting and reporting Delphi studies
- **Focus group** discussion (AC, ANCs, and APNs)
- **Expert panel** with modified e-Delphi technique (2 NCs, Geriatrician, Psychiatric doctor, Professor from academic institution)
- **Face Validation**: Clinical teachers
- **Inter-rater reliability testing** using Fleiss' kappa: 3 clinical nurses

Remarks:

- Content Validity Index (CVI):
- Scale-Level CVI (S-CVI): Calculated using the S-CVI/Ave method, which averages the I-CVI scores for all items across experts
- Face Validity Index (FVI):
- Scale-Scale-Level FVI (S-FVI): Calculated using the S-FVI/Ave method, which averages the I-FVI scores for all items across raters
- Modified Kappa Statistic (*k**)

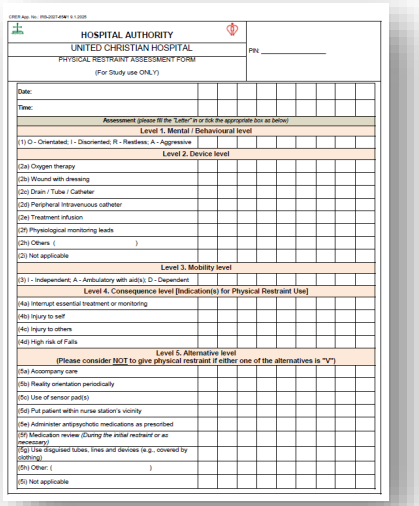
Benchmarks:

- S-SVI/Ave: at least 0.9 for acceptability
- Modified kappa Statistic: >0.74: excellent
- Acceptable S-FVI: a minimum of 0.83 for acceptability
- Fleiss' Kappa: IBM SPSS Statistics (Version 29): 0.81-1.0: Almost perfect agreement

(Fleiss, 1981; Cicchetti & Sparrow ,1981; Landis & Koch, 1977; Lynn, 1986; Polit & Beck, 2006; Yusoff, 2019)

Round 1 Delphi	• S-CVI/Ave
	  • Relevance: 0.95
	  • Clarity: 0.97

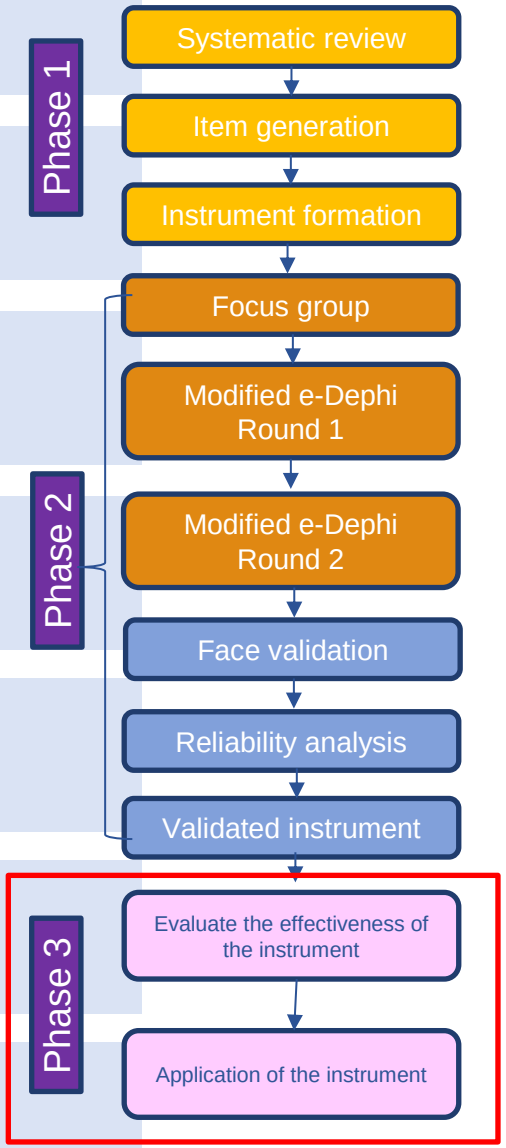
Round 2 Delphi	• S-CVI/Ave • Relevance: 0.99 • Clarity: 0.99
Face Validity	• S-FVI/Ave: 0.89 • 3 items I-FVI < 0.80
Inter-rater reliability	• k= 0.822, 95% CI[.615,1.0], SE=.105, z = 7.797, p<0.001



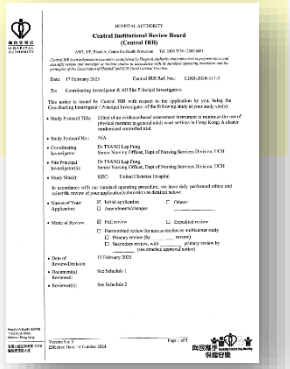
Version 3: Evidence-based assessment form

HA convention 2025

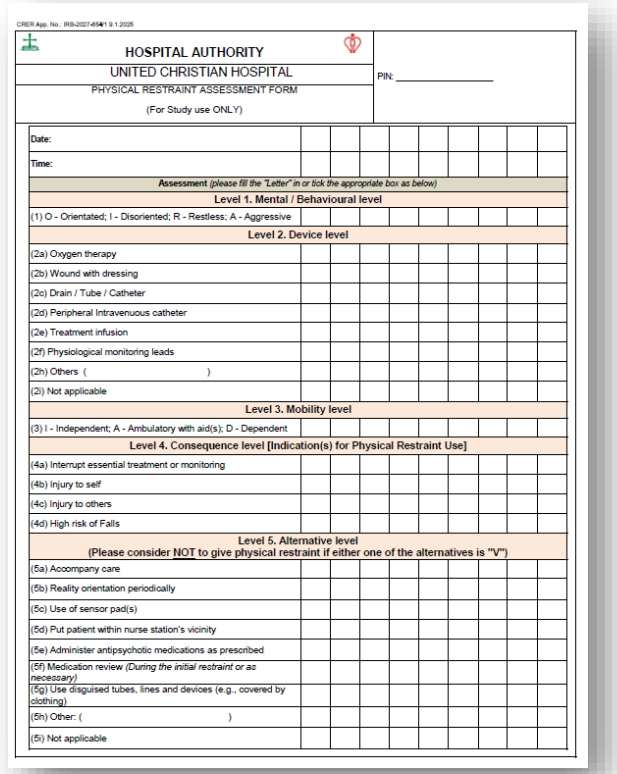
Phase 3: A cluster RCT Research Study



- ***Research question***
  - Is the evidence-based assessment instrument effectively to minimize the use of physical restraint in general ward settings in Hong Kong?
- ***Objectives***
  - To evaluate the effect of the evidence-based assessment instrument to minimize the use of physical restraint in general adult ward settings
  - To conduct the process evaluation and satisfaction of the evidence-based assessment instrument when applying in general adult ward settings in Hong Kong
- ***Intervention***
  - A validated assessment instrument for the use of physical restraint
- ***Control***
  - Usual practice

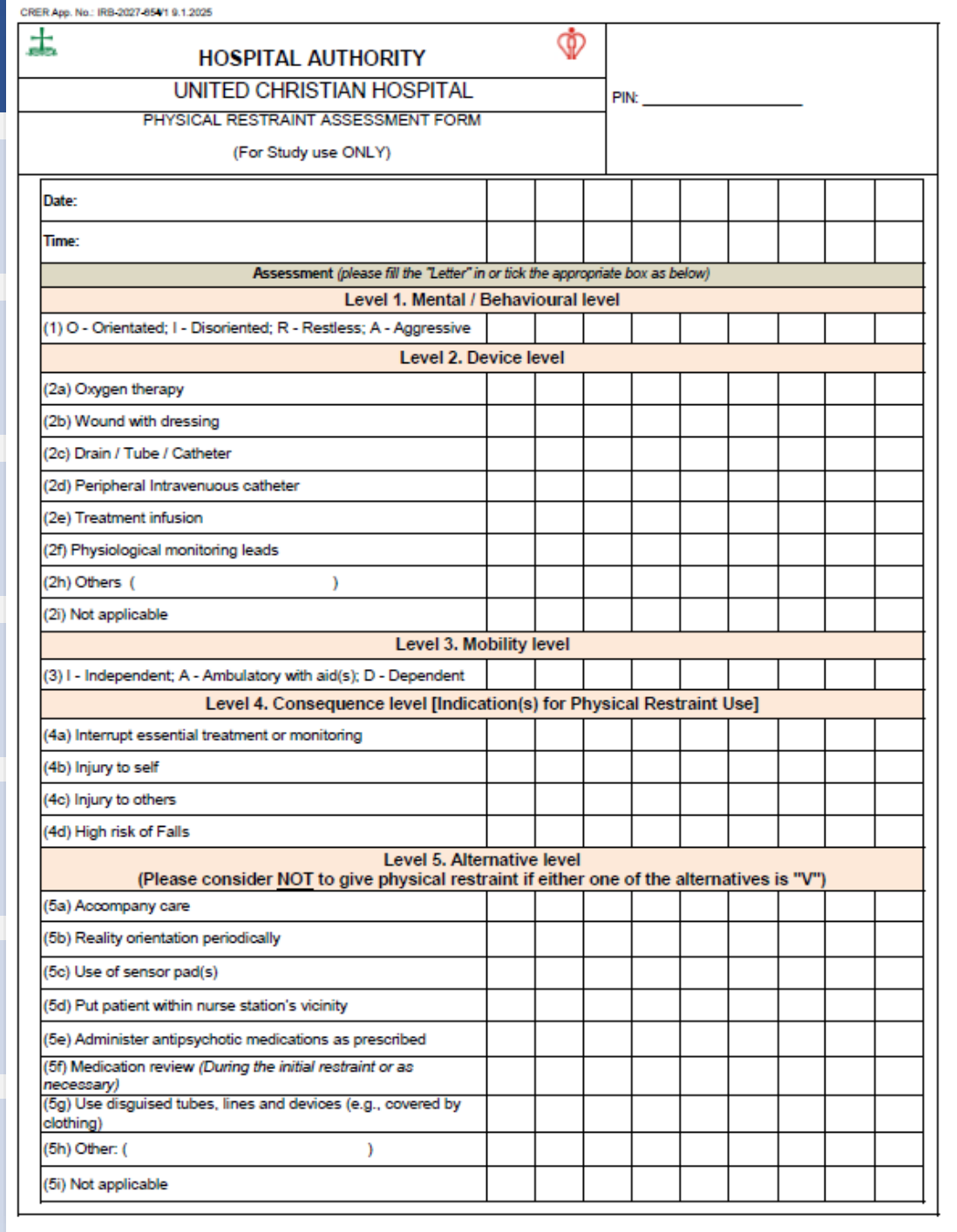


Evidence-based Assessment tool (Research version)



HOSPITAL AUTHORITY
UNITED CHRISTIAN HOSPITAL
PHYSICAL RESTRAINT ASSESSMENT FORM
(For Study use ONLY)
PIN: _____

Date:										
Time:										
Assessment (please fill the "Letter" in or tick the appropriate box as below)										
Level 1. Mental / Behavioural level										
(1) O - Orientated; I - Disoriented; R - Restless; A - Aggressive										
Level 2. Device level										
(2a) Oxygen therapy										
(2b) Wound with dressing										
(2c) Drain / Tube / Catheter										
(2d) Peripheral Intravenuous catheter										
(2e) Treatment infusion										
(2f) Physiological monitoring leads										
(2h) Others ( )										
(2i) Not applicable										
Level 3. Mobility level										
(3) I - Independent; A - Ambulatory with aid(s); D - Dependent										
Level 4. Consequence level [Indication(s) for Physical Restraint Use]										
(4a) Interrupt essential treatment or monitoring										
(4b) Injury to self										
(4c) Injury to others										
(4d) High risk of Falls										
Level 5. Alternative level (Please consider NOT to give physical restraint if either one of the alternatives is "V")										
(5a) Accompany care										
(5b) Reality orientation periodically										
(5c) Use of sensor pad(s)										
(5d) Put patient within nurse station's vicinity										
(5e) Administer antipsychotic medications as prescribed										
(5f) Medication review *(During the initial restraint or as necessary)*										
(5g) Use disguised tubes, lines and devices (e.g., covered by clothing)										
(5h) Other: ( )										
(5i) Not applicable										



CRER App. No.: IRB-2027-654/1 9.1.2025

HOSPITAL AUTHORITY

UNITED CHRISTIAN HOSPITAL

PHYSICAL RESTRAINT ASSESSMENT FORM

(For Study use ONLY)

PIN: _____

Date:									
Time:									
Assessment *(please fill the "Letter" in or tick the appropriate box as below)*									
Level 1. Mental / Behavioural level									
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Level 2. Device level									
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(2d) Peripheral Intravenuous catheter									
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(4d) High risk of Falls									
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(5f) Medication review *(During the initial restraint or as necessary)*									
(5g) Use disguised tubes, lines and devices (e.g., covered by clothing)									
(5h) Other: ( )									
(5i) Not applicable									

Evidence-based Assessment tool (Research version)

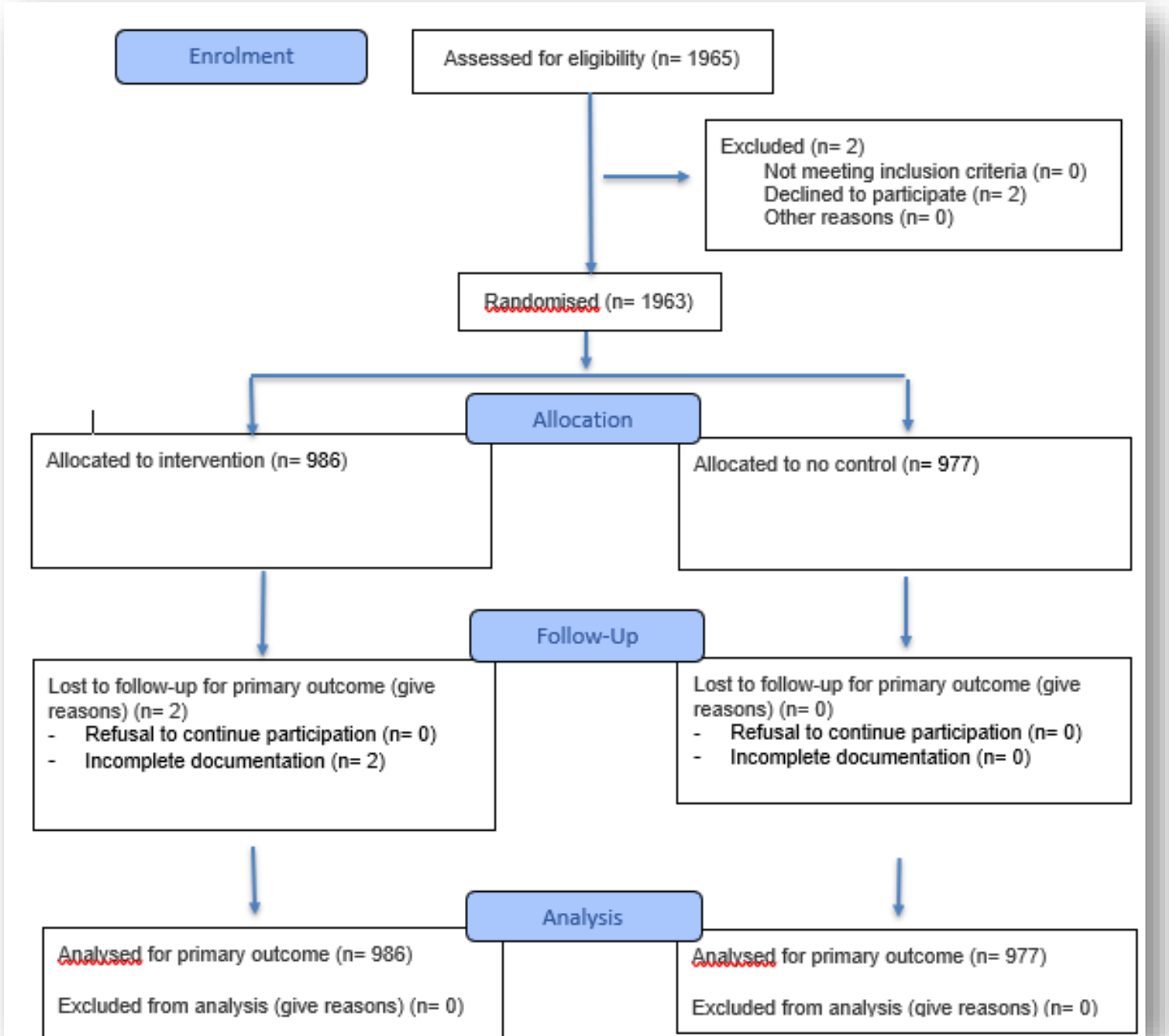
- Level 1: Mental / Behavioral level
- Level 2: Device level
- Level 3: Mobility level
- Level 4: Consequence level
- Level 5: Alternative level

Method

Study design	• A single blinded cluster randomized controlled trial was conducted in a total of eight wards within the department of Medicine & Geriatrics (M&G), the department of Orthopaedics & Traumatology (O&T), and the Department of Surgery (SUR).
Inclusion criteria	• [*Research*] Participants aged 18 or above admitted to the designated general adult ward settings. • [*Satisfaction survey*] All nurses who provided direct patient care, were included for the process evaluation and satisfaction review.
Exclusion criteria	• [*Research*] For the clinical study, there were no exclusion criteria, as all patients were under treatment and care during hospitalization. • [*Satisfaction survey*] Participation in the evaluation was voluntary for healthcare providers who wish to give feedback and participate in the survey.
Allocation concealment	• Different departments were stratified, and TLF and SKF used a method of flip coin to allocate the wards into intervention and control groups. • A centralised randomization system with a third party of the Admission Registry handled the subject allocation.
Blinding	• This was an open-labeled study and there was no blinding for healthcare providers, but patients were blinded. It was feasible to blind patients regarding the assessment form they receive. • Nurses in the intervention and control units could not be blinded to the newly developed evidence-based assessment form. • The investigators responsible for data acquisition could not be blinded.
Feasibility of the study	• Four wards in the intervention group conducted a pilot between 25 March and 7 April 2025 to evaluate the feasibility of the assessment tool implementation.
Study period	• 8 April to 5 June 2025

Outcomes	• The primary outcome measure was evaluated by comparing the prevalence of restrained patients per day, in average, and the incidence rates between the intervention and control groups, one of which implemented the evidence-based assessment instrument. • The secondary outcomes included the duration of physical restraint use, the assessment of patient safety incidents such as accidental catheter removal and falls, length of stay during hospitalization, and overall nurse satisfaction with the instrument.
Data Collection	• Data were collected by reviewing patient medical records upon discharge throughout the study period, as well as through surveys of nurses at the end of the study. • All nurses in the intervention group received an invitation to participate in the self-administered satisfaction survey in late-May until mid-June 2025.
Sample size estimation	• The required sample size per group was estimated as 221 to accomplish the physical restraint reduction prevalence from 10.22% to 7.22% at a 5% level of significance and achieved a power of 80% by using a chi-square test. • A 5% attrition rate is added to the sample size estimation. Hence, the required sample size per group was 221/0.95 = 233. Then, the study required a total of 466 subjects in each specialty (2 wards). • A total of 1,864 of subjects would be recruited.
Data analysis	• A statistical analysis package was used to perform data analysis using SPSS 29.0. • Continuous data of normal distribution was expressed as mean ± standard deviation, and categorical variables was expressed as number and percentage. • The mean of two samples of normal distribution quantitative data was compared with the student t-test • The comparison of two independent samples of skewness distribution of quantitative data was conducted by the non-parametric Wilcoxon-Mann-Whitney U test, and $p < 0.05$ was considered statistically significant. • Chi-square or exact Fisher test was used to evaluate the number of restrained patients in two groups. • Missing data (Missing Completely at Random / Missing at Random / Missing Not at Random) were observed and handled. • The principle of Intention-to-Treat was followed throughout the study
Ethical considerations	• The Institutional Review Board (IRB) of the Hospital Authority Central Institutional Review Board (Central IRB) [CIRB-2024-517-3] had been sought for approval prior to the study. • The study complies with the Helsinki Declaration and the good clinical practice guidelines of the International Conference on Harmonisation.

Result: CONSORT Flow Diagram



Result: Average prevalent rate & incidence rate of physical restraints by wards in both groups

	Control group					Intervention group					Total
	9B	2C	10A	8A	Sub-total	11B	2DM	10B	7A	Sub-total	
No. of patients in ward at noon (mean) (SD), (95%CI)	55.93 (1.39) [55.39 – 56.47]	39.17 (3.54) [37.97 – 40.36]	44.25 (2.16) [43.65 – 44.86]	53.04 (5.56) [50.84 – 55.24]	46.94 (7.21) [45.74 – 48.13]	52.16 (4.29) [50.59 – 53.73]	28.21 (2.45) [27.34 – 29.08]	47.78 (3.74) [46.58 – 48.97]	52.77 (4.73) [51.00 – 54.53]	45.09 (10.60) [43.28 – 46.90]	52.16 (4.29) [50.59 – 53.73]
No. of patients being restrained at noon (mean) (SD), (95%CI)	9.29 (1.58) [8.67 – 9.90]	10.58 (1.99) [9.91 – 11.26]	3.16 (1.55) [2.72 – 3.59]	6.19 (2.39) [5.24 – 7.13]	6.82 (3.62) [6.22 – 7.42]	7.39 (2.50) [6.47 – 8.30]	4.33 (1.95) [3.64 – 5.02]	4.20 (2.10) [3.53 – 4.87]	5.60 (2.13) [4.81 – 6.39]	5.28 (2.50) [4.86 – 5.71]	7.39 (2.50) [6.47 – 8.30]
No. of patients being restrained newly within 24 hours (mean) (SD), (95%CI)	0.93 (0.98) [0.55 – 1.31]	2.00 (1.74) [1.41 – 2.59]	0.33 (0.62) [0.16 – 0.51]	0.59 (0.97) [0.21 – 0.98]	0.92 (1.3) [0.71 – 1.14]	1.87 (1.59) [1.29 – 2.45]	1.24 (1.00) [0.89 – 1.60]	0.40 (0.63) [0.20 – 0.60]	0.63 (0.67) [0.38 – 0.88]	1.00 (1.16) [0.80 – 1.20]	1.87 (1.59) [1.29 – 2.45]
Prevalence rate (%) (SD), (95%CI)	16.61 (2.81) [15.52 – 17.70]	27.05 (4.74) [25.44 – 28.65]	7.11 (3.43) [6.15 – 8.07]	11.58 (4.38) [9.85 – 13.32]	14.89 (8.78) [13.43 – 16.34]	14.26 (4.94) [12.45 – 16.07]	15.46 (7.07) [12.95 – 17.97]	8.83 (4.41) [7.42 – 10.24]	10.54 (3.80) [9.12 – 11.96]	12.10 (5.84) [11.10 – 13.10]	14.26 (4.94) [12.45 – 16.07]

Study characteristics		**Control group**	**Intervention group**	**Independent t-test / Chi-square test (df) [Control - Intervention]**	**P-value (95% CI)**
Prevalence Rate of physical restraint use (%) [range]		14.89 [41.67 – 2.17]	12.10 [29.17 – 0.00]	3.09	0.002 (0.0101 – 0.0456)
Incidence rate of physical restraint use, no (%)	No	811 (83.0)	812 (82.5)	0.082(1)	0.774
	Yes	166 (17.0)	172 (17.5)		

Other results

Frequency of physical restraint use during the same episode No statistically significant difference

- Most patients in both study groups experienced physical restraint use only once during a single episode.
- 97.0% of patients were restrained once, 3.0% twice, and none three times in the control group whereas 95.9% were restrained once, 3.5% twice, and 0.6% three times in the intervention group (X^2=1.03, df=2, **p=0.596**).

Duration of physical restraint use No statistically significant difference

- The average duration of physical restraint use per episode was slightly lower in the intervention group [133.66 hours (SD=208.64)] compared to the control group, with no significant difference [152.63 hours (SD=191.45)] (t=0.822, **p=0.412**, 95% CI: -26.47-64.40).

Length of hospital stay No statistically significant difference

- The average duration of hospital stay was 9.46 days (SD=13.75) in the control group, while that was 7.85 days (SD=7.8) in the intervention group, with no significant difference (t=1.33, **p=0.184**, 95% CI: -0.771-3.991).

Other results

Incidents and its nature during physical restraint period

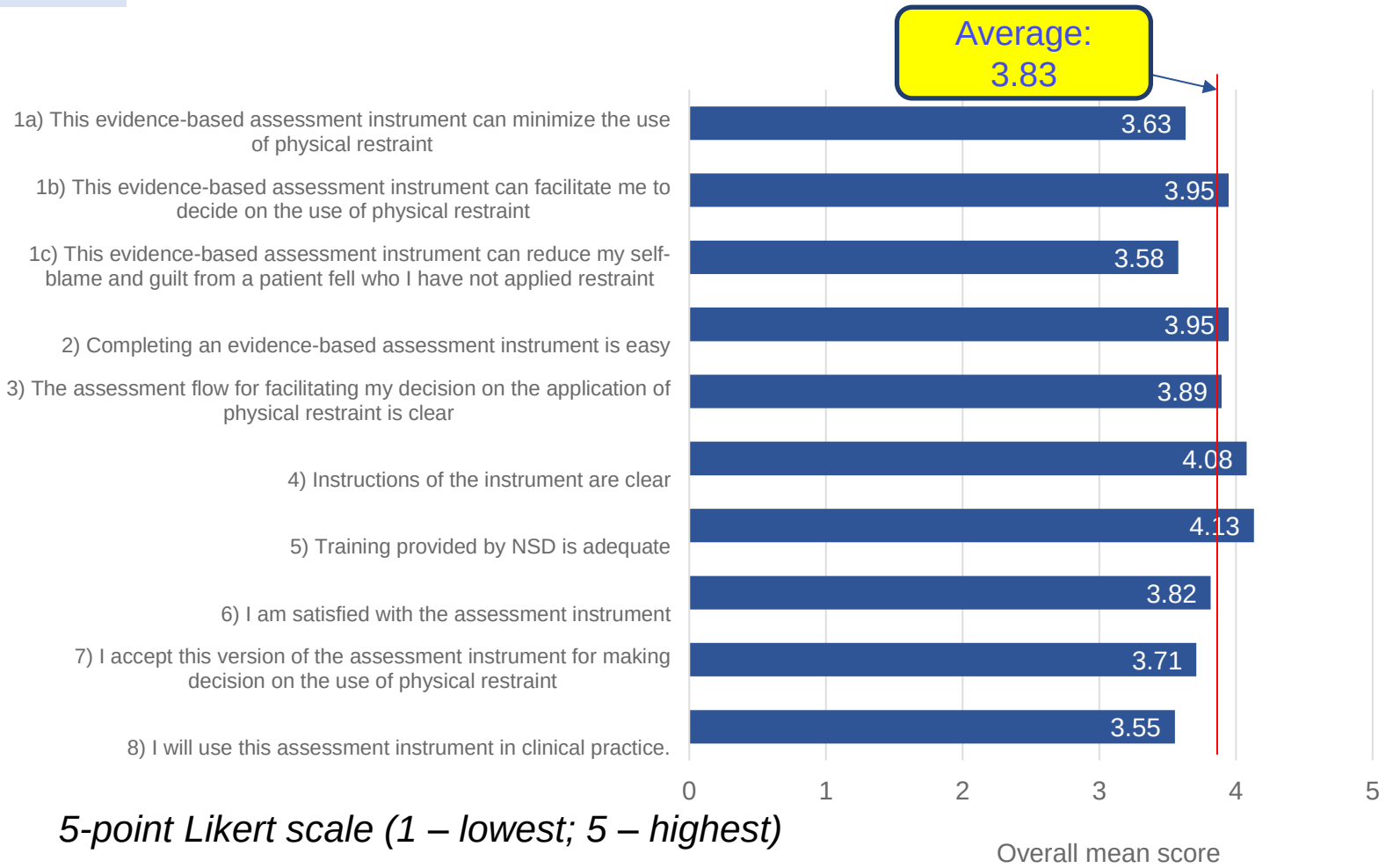
No significant difference

- Most patients did not experience incidents during the restraint period. Only 10.5% of patients had incidents in the control group while 7.8% in the intervention group (X^2=0.8, df=1, **p=0.371**).
  - Among those who experienced incidents during restraint, 9.4% of patients in the control group and 7.8% in the intervention group, with catheter-related incidents that were the most common.
  - Falls occurred in 1.2% of the control group and none in the intervention group. No incidents were reported associated with drains or other causes. No significant differences were found between both groups.

Incidence measures of physical restraint use		**Control group (n = 166)**	**Intervention group (n = 172)**	**Non-parametric test**	
				***Chi-square test (df)**	**P-value**
Number of incidents during the period of being restrained, No. (%) [Episode]	No	153 (89.5%)	166 (92.2%)	0.80(1)*	0.371
	Yes	18 (10.5%)	14 (7.8%)		
If yes, it is related to, No. (%)	Catheter	16 (9.4%)	14 (7.8%)	2.43(2)*	0.296
	Drain	0 (0.0%)	0 (0.0%)		
	Fall	2 (1.2%)	0 (0.0%)		
	Other	0 (0.0%)	0 (0.0%)		
Remark: No. – Number; SD – Standard Deviation; df – Degree of freedom					

The staff satisfaction survey in the intervention group

- The overall response rate to the staff satisfaction survey was 37.3%, with the highest rates among Advanced Practice Nurses (APNs) (77.8%), followed by Enrolled Nurses (ENs) at 50.0%, and Registered Nurses (RNs) at 26.3%.
- Most respondents covered three specialty groups were female (78.6% to 100% in some groups) and primarily RN or APN. The average working experience after graduation varied significantly between groups, from 6.35 to 16.8 years, and experience within the current specialty ranged from about 4.7 to 15 years.



5-point Likert scale (1 – lowest; 5 – highest)

- Nurses tended to agree that,
  - its instructions were clear (mean score: 3.95),
  - the instrument could facilitate decision-making regarding physical restraints (mean score: 3.89),
  - the instrument minimized restraint use (mean score: 3.63), and
  - they would use it in clinical practice (mean score: 3.55).

Interpretation of the findings

- Significant reduction in prevalence rate of physical restraint use in intervention wards (12.10%) vs. control wards (14.89%) (t=3.09, p=0.002, 95% CI:0.01-0.05)
    - Minimize ongoing or repeat restraint rather than initial application
- Incidence rates remained similar between intervention (17.36%) and control (16.90%) wards (X^2 = 0.08, p = 0.774)
    - Suggest underlying patients and contextual factors or clinical triggers influence initial application of restraint rather than the ongoing use of restraints
- The average duration of physical restraint use per episode was slightly lower in the intervention group without statistically significant difference.
    - Most patients in both groups experienced physical restraint only once during their admission, reflecting a possible shift toward more restrictive use as a result of the structured assessment instrument with evidence-based support.
    - Suggest improved vigilance and a possible tendency for earlier release from restraint

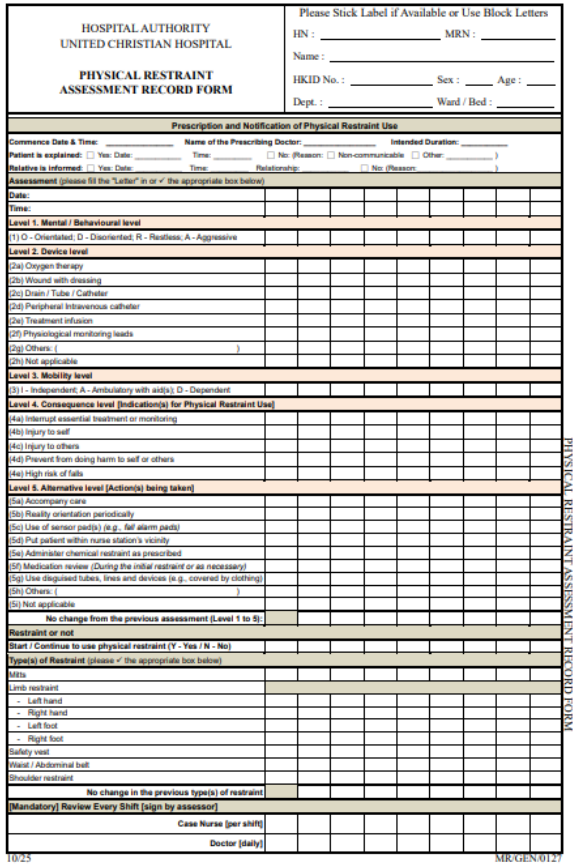
Interpretation of the findings

- The frequency and types of incidents during the periods of restraint were low and comparable between groups, with catheter-related issues and falls nearly absent in the intervention group.
  - Indicate restraint reduction through the assessment instrument did not negatively impact patient safety
- Observe a significant upsurge in using alternative strategies such as reality orientation, sensor pads, proximity to nurse station, and antipsychotic use in the intervention group
  - Promote the systematic use of alternative strategies indicating a positive shift in staff practice toward minimizing restraint reliance
- More thorough documentation and assessment reviews, suggesting higher administrative burden
  - The assessment instrument may need to be redesigned to save time for assessment

Limitations

- While the study employed a cluster RCT design, potential contamination of effect between control and intervention wards cannot be eliminated due to staff movement in the same department.
- The data were limited to physical restraint use observed at midday, which may not obtain full daily fluctuation in restraint practices.
- Some wards had relatively small patient numbers, which might have influenced the statistical power for incidence.
- The study was conducted in several specific wards within an acute hospital, which may limit applicability of the findings to other settings with different nurses' competency and ward natures.
- A short study period might be insufficient to capture the long-term effects or sustainability of the assessment on restraint practices.

"Fung Po Po" Assessment Tool



HOSPITAL AUTHORITY
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PHYSICAL RESTRAINT ASSESSMENT RECORD FORM

Please Stick Label if Available or Use Block Letters

HN : _____ MRN : _____
Name : _____
HKID No. : _____ Sex : ____ Age : ____
Dept. : _____ Ward / Bed : _____

Prescription and Notification of Physical Restraint Use

Commence Date & Time: _____ Name of the Prescribing Doctor: _____ Intended Duration: _____
Patient is explained: ☐ Yes: Date: _____ Time: _____ ☐ No: (Reason: ☐ Non-communicable ☐ Other: _____)
Relative is informed: ☐ Yes: Date: _____ Time: _____ Relationship: _____ ☐ No: (Reason: _____)

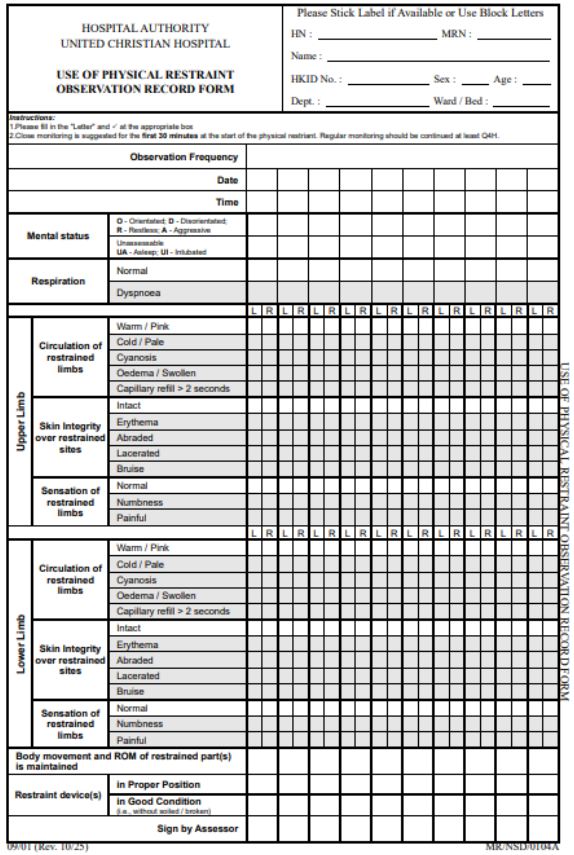
Assessment (please fill the "Letter" in or ✓ the appropriate box below)

Date:										
Time:										
Level 1. Mental / Behavioural level										
(1) O - Orientated; D - Disoriented; R - Restless; A - Aggressive										
Level 2. Device level										
(2a) Oxygen therapy										
(2b) Wound with dressing										
(2c) Drain / Tube / Catheter										
(2d) Peripheral Intravenous catheter										
(2e) Treatment infusion										
(2f) Physiological monitoring leads										
(2g) Others: ( )										
(2h) Not applicable										
Level 3. Mobility level										
(3) I - Independent; A - Ambulatory with aid(s); D - Dependent										
Level 4. Consequence level [Indication(s) for Physical Restraint Use]										
(4a) Interrupt essential treatment or monitoring										
(4b) Injury to self										
(4c) Injury to others										
(4d) Prevent from doing harm to self or others										
(4e) High risk of falls										
Level 5. Alternative level [Action(s) being taken]										
(5a) Accompany care										
(5b) Reality orientation periodically										
(5c) Use of sensor pad(s) *(e.g., fall alarm pads)*										
(5d) Put patient within nurse station's vicinity										
(5e) Administer chemical restraint as prescribed										
(5f) Medication review *(During the initial restraint or as necessary)*										
(5g) Use disguised tubes, lines and devices (e.g., covered by clothing)										
(5h) Others: ( )										
(5i) Not applicable										
No change from the previous assessment (Level 1 to 5):										
Restraint or not										
Start / Continue to use physical restraint (Y - Yes / N - No)										
Type(s) of Restraint (please ✓ the appropriate box below)										
Mitts										
Limb restraint										
- Left hand										
- Right hand										
- Left foot										
- Right foot										
Safety vest										
Waist / Abdominal belt										
Shoulder restraint										
No change in the previous type(s) of restraint										
[Mandatory] Review Every Shift [sign by assessor]										
Case Nurse [per shift]										
Doctor [daily]										

PHYSICAL RESTRAINT ASSESSMENT RECORD FORM

10/25 MR/GEN/0127

Use of Physical Restraint Observation Record Form



HOSPITAL AUTHORITY
UNITED CHRISTIAN HOSPITAL

USE OF PHYSICAL RESTRAINT OBSERVATION RECORD FORM

Please Stick Label if Available or Use Block Letters

HN : _____ MRN : _____
Name : _____
HKID No. : _____ Sex : ____ Age : ____
Dept. : _____ Ward / Bed : _____

Instructions:
1.Please fill in the "Letter" and ✓ at the appropriate box
2.Close monitoring is suggested for the **first 30 minutes** at the start of the physical restraint. Regular monitoring should be continued at least Q4H.

Observation Frequency																					
Date																					
Time																					
Mental status	**O** - Orientated; **D** - Disorientated; **R** - Restless; **A** - Aggressive																				
	Unassessable: **UA** - Asleep; **UI** - Intubated																				
Respiration	Normal																				
	Dyspnoea																				
		L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R
Upper Limb — **Circulation of restrained limbs**	Warm / Pink																				
	Cold / Pale																				
	Cyanosis																				
	Oedema / Swollen																				
	Capillary refill > 2 seconds																				
Upper Limb — **Skin Integrity over restrained sites**	Intact																				
	Erythema																				
	Abraded																				
	Lacerated																				
	Bruise																				
Upper Limb — **Sensation of restrained limbs**	Normal																				
	Numbness																				
	Painful																				
		L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R
Lower Limb — **Circulation of restrained limbs**	Warm / Pink																				
	Cold / Pale																				
	Cyanosis																				
	Oedema / Swollen																				
	Capillary refill > 2 seconds																				
Lower Limb — **Skin Integrity over restrained sites**	Intact																				
	Erythema																				
	Abraded																				
	Lacerated																				
	Bruise																				
Lower Limb — **Sensation of restrained limbs**	Normal																				
	Numbness																				
	Painful																				
Body movement and ROM of restrained part(s) is maintained																					
Restraint device(s)	**in Proper Position**																				
	in Good Condition (i.e., without soiled / broken)																				
Sign by Assessor																					

USE OF PHYSICAL RESTRAINT OBSERVATION RECORD FORM

09/01 (Rev. 10/25) MR/NSD/0104A

縛得安心 • 解得放心

Protection You Can Trust • Freedom You Can Feel

Conclusion

- The cluster randomized controlled trial provided further evidence that structured assessment instrument demonstrated promise in reducing overall prevalence of physical restraint, hence, supporting safer and more ethical clinical practices in general adult ward settings.
- The results provided valuable insights into alternative strategies for managing patient behavior and reducing the reliance on physical restraint, ultimately improving patient outcomes and healthcare practices.
- Broader implementation and ongoing refinement could further minimize unnecessary restraint, uphold patient safety and better for patient outcomes.

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Thank you