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Original Study

Effect of Physical Restraint Reduction on Older Patients' Hospital Length of Stay

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A B S T R A C T

Objectives: Physical restraints are often used to prevent falls and to secure medical devices in older people in hospitals. Restraint reduction has been advocated on the grounds that physical restraints have negative psychological effects and are not effective in preventing falls. The potential effect of restraint reduction on length of hospital stay (LOS) has not been investigated. This study was undertaken to compare the average length of stay of older patients in a convalescent medical ward setting before and after a restraint reduction program.
Design: This is a retrospective study.
Setting: A convalescent hospital in Hong Kong.
Participants: This study included 2000 patient episodes.
Measurements: The use of physical restraint, LOS, and clinical outcomes of randomly selected patient episodes in the year before and after the implementation of a restraint reduction program were compared. The clinical outcomes included Modified Functional Ambulatory Categories and modified Barthel index. Subgroup analysis was performed on those with confusion as defined by dementia diagnosis, low abbreviated mental test score, or abnormal mental domain of Norton Score.
Results: A total of 958 and 988 patient episodes admitted to 10 medical wards in a convalescent hospital in 2007 and 2009 were examined. There were no significant differences in the baseline characteristics of patients in the 2 years. With the implementation of the restraint reduction scheme, the rate of physical restraint use declined significantly from 13.3% in 2007 to 4.1% in 2009 for all patients. The average LOS of patients was significantly lower in the year after the implementation of restraint reduction (19.5 ± 20.7 versus 16.8 ± 13.4 days in 2007 and 2009 respectively, $P < .001$). On subgroup analysis, the reduction in LOS was significant in the cognitively impaired patients (23.0 ± 26.5 to 17.8 ± 15.0 days in 2007 and 2009 respectively, $P < .001$), but not in the cognitively normal patients. There were no significant differences between the 2 years in the incidence of fall, mobility, and activities of daily living on discharge.
Conclusion: Physical restraint reduction was associated with significant reduction in average length of stay in convalescent medical wards, especially in the cognitively impaired patients.

Physical restraint refers to any device attached to or adjacent to a person's body that cannot be controlled or easily removed by the person, and deliberately restricts a person's freedom of movement and/or prevents a person's normal access to his or her body. In both hospital and residential care settings, physical restraints are frequently used in the management of older people who have mental illnesses or mobility impairment.[1,2] The common purposes of physically restraining patients are (1) to ensure the safety of patients and staff[3]; (2) to facilitate treatment[4]; and (3) to compensate for understaffing.[5]

The effectiveness of physical restraints in preventing falls and fractures has been questioned.[6] For instance, Capezuti et al[7] found that the use of bedrails did not reduce the likelihood of falls, injuries, or recurrent falls, whereas another group of researchers[8–10] established that the removal of restraints made no change in the rates of falls and injury. In addition, Mohr et al[11] found that patients who had been physically restrained during hospitalization were more likely to

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report nightmares and avoidance responses; most of them were found to continue to experience these negative effects 5 years later. Moreover, with the in-depth interviews of 30 psychiatric inpatients, it was found that half of the participants expressed their feelings of lack of concern and empathy following the use of physical restraints, and more than one-third of the participants complained that they felt powerless, isolated, and uncertain when being physically restrained.[12]

Therefore, restraint-free care has been advocated.[2,13] Much research effort has been made to explore the means by which the physical restraint can be successfully reduced. In some studies, staff training (to change staff attitudes), environmental design modification, and policy changes were recommended methods to reduce the use of restraint in geriatric care settings. Evans et al[14] suggested that the integration of education and expert consultation could safely minimize the restraint use. Evidence further shows that these methods and the resultant reduction in restraint use have effectively changed the attitudes of staff and have improved patients' cognitive performance, and did not increase rates of falls or disorganizational behavior.[14,15] There is, however, lack of data on the effects of physical restraint reduction on clinical outcomes.

In Hong Kong, the use of physical restraint is very common in the care for older people in the hospital and nursing home settings.[16,17] For example, in a survey of nursing staff in medical wards in Hong Kong, Yan et al[16] found that more than two-thirds reported using restraint or force in the past 3 months. The results further revealed that the use of restraint was positively correlated with emotional exhaustion but negatively correlated with coworker emotional support. To reduce the use of restraint, measures such as fostering the sense of social support among nurses and implementing relevant institutional policies were recommended.[16]

In 2008, the Department of Medicine and Geriatrics of a convalescent hospital in Hong Kong successfully implemented a restraint reduction program through an action research project guided by Rogers' diffusion of innovation model.[18] This retrospective study examined the potential effect of restraint reduction on the length of hospital stay (LOS), mobility, and self-care ability of the older patients.

Methods

The convalescent hospital under study was a public funded hospital with 521 beds for convalescence and rehabilitation in Hong Kong. The Department of Medicine & Geriatrics (M&G) has a capacity of 277 beds in 10 wards, providing multidisciplinary care in geriatric rehabilitation. Except for a small number of patients admitted directly from old age homes and geriatric outpatient clinics, the great majority of the patients were transferred from the medical wards of an affiliated acute hospital, which was a teaching hospital with acute admissions via the Accident & Emergency department, after an average length of stay of five days. All medical wards at the convalescent hospital were supervised by trained geriatricians and the average LOS of medical patients was approximately 14 days.

Of about 5000 inpatient episodes admitted to the M&G department and were discharged to the community each year, 1000 patient episodes were randomly selected in 2007 and 2009 respectively, with the aid of the random number generators in the Statistical Package for Social Sciences (SPSS) (SPSS Inc, Chicago, IL). Those who were discharged to other hospitals were excluded. An inpatient episode was defined as an episode of care for a particular patient admitted to and discharged from a hospital ward. The medical records of the selected patients were extracted for the purpose of evaluating the restraint reduction scheme launched in 2008. This study was conducted from July to September 2011. Three research assistants, not related to the hospital, collected the data from medical records.

Data included age, gender, living arrangement, tube feeding during hospital stay, length of hospital stay, and discharge location. Mobility was documented by physiotherapists using the Modified Functional Ambulatory Categories (MFAC) by Holden et al[19] on both admission and discharge. The MFAC has a lowest classification of category 1 (bed bound) and highest of category 7 (independent outdoor walker). Ability in activities of daily living (ADLs) of patients was assessed by occupational therapists using the modified Barthel index (MBI) on both admission and discharge.[20] It comprises ratings on 10 areas of ADLs, including personal hygiene, bathing, feeding, toilet, stair climbing, dressing, bowel control, bladder control, ambulation, and chair/bed transfer. The maximum score of 100 indicates total independence.

Patients' general health status was assessed by Norton scale. The validity of Norton scale in predicting pressure sores was supported in a Hong Kong sample.[21] The scale is made up of 5 subscales: physical condition, mental state, activity, mobility, and incontinence. Each scale has a rating from 1 to 4, with 1 representing the poorest clinical condition and 4 representing the best. Summing up the ratings on the 5 scales yields a possible maximum score of 20. Patients are rated as "at risk" if they receive a score of 14 or below.

Patients' cognitive function was assessed by abbreviated mental test score (AMT).[22] The maximum score is 10. Subjects were regarded as cognitively impaired if having a diagnosis of dementia, a score lower than 6 in the AMT, or a score of 2 or lower in the mental state domain of the Norton scale. The remainders were considered as cognitively normal patients.

In this study, hand holder, safety vest, abdominal belt, seat belt, foot holder, table top, and bilateral bedrails were considered to be physical restraints. It was hospital policy for nurses to record use of any of these restraints on a designated form on a daily basis. The initiation of restraint had to be authorized by a doctor. This study was approved by the joint Chinese University of Hong Kong-New Territories East Cluster clinical research ethics committee.

Data analyses were carried out with SPSS version 15. The patients' characteristics in 2007 and 2009 were compared. To evaluate the restraint reduction program implemented in 2008, the use of physical restraint, LOS, new old age home placement, MFAC, and MBI on discharge among the patients in 2007 and 2009 were compared. Group comparisons were made by independent t or Mann-Whitney *U* tests and chi-square tests for continuous and categorical data respectively. $P < .05$ was set to denote statistical significance. Subgroup analysis of cognitively impaired and cognitively normal patients was made.

Results

Of the 2000 randomly selected patient episodes at the convalescent hospital, medical records were available for 958 patient episodes in 2007 and 988 patient episodes in 2009 respectively. Table 1 compared the characteristics of the patients in 2007 and those in 2009. For the patients in 2007, they were approximately evenly distributed in gender, their mean age was 79.4 years, 29.2% of them were old age home residents, and 12.0 % were on tube-feeding. Their mean scores in MFAC, Norton score, and MBI were 3.6, 15.0, and 52.6 respectively. Similar patterns of baseline characteristics were observed among the patients who were admitted to the hospital in 2009. Independent *t*-tests and chi-square tests showed that there were generally no significant differences between the patients in 2007 and 2009 in demographic and general health status.

As previous studies have identified cognitive impairment as a risk factor for use of physical restraints,[1,17] we grouped the selected patients into cognitively impaired and cognitively normal. A total of 836 patients (43.0%) were classified as cognitively impaired. The proportions of cognitively impaired patients in 2007 and 2009 were

Table 1
Characteristics of Patients by 2007/2009

Characteristics	Overall (Total = 1946)			Cognitively Impaired Patients			Cognitively Normal Patients		
	2007 (Total = 958)	2009 (Total = 988)	*P* value	2007 (Total = 413)	2009 (Total = 423)	*P* value	2007 (Total = 545)	2009 (Total = 565)	*P* value
	# (% within year) / M (SD)			# (% within year) / M (SD)			# (% within year) / M (SD)		
Baseline characteristics									
Age	79.40 (10.05)	79.58 (10.81)	.71	82.94 (9.01)	84.24 (8.87)	.04	76.72 (9.98)	76.09 (10.82)	.31
Male	469 (49.0%)	492 (49.8%)	.71	144 (34.9%)	154 (36.4%)	.64	325 (59.6%)	338 (59.8%)	.95
Old age home resident	280 (29.2%)	301 (30.5%)	.55	192 (46.5%)	208 (49.2%)	.44	88 (16.1%)	93 (16.5%)	.89
Tube feeding	115 (12.0%)	114 (11.5%)	.80	97 (23.5%)	102 (24.1%)	.80	18 (3.3%)	12 (2.2%)	.24
	(*N* = 955)	(*N* = 977)		(*N* = 411)	(*N* = 419)		(*N* = 544)	(*N* = 558)	
MFAC (max. 7)	3.62 (1.78)	3.61 (3.85)	.95	2.57 (1.51)	2.47 (1.40)	.30	4.41 (1.54)	4.46 (4.77)	.81
	(*N* = 934)	(*N* = 971)		(*N* = 402)	(*N* = 414)		(*N* = 532)	(*N* = 557)	
MBI (max. 100)	52.59 (32.90)	52.43 (31.79)	.92	30.87 (29.15)	31.72 (29.42)	.71	68.23 (25.82)	66.27 (25.10)	.23
	(*N* = 798)	(*N* = 824)		(*N* = 334)	(*N* = 330)		(*N* = 464)	(*N* = 494)	
Norton Score (max. 20)	14.99 (3.52)	14.94 (3.63)	.77	12.49 (3.36)	12.21 (3.53)	.24	16.89 (2.21)	16.99 (1.96)	.43
	(*N* = 949)	(*N* = 983)		(*N* = 411)	(*N* = 422)		(*N* = 538)	(*N* = 561)	

#, corresponding number of patients in subgroup; M, mean value; MBI, modified Barthel Index; MFAC, Modified Functional Ambulatory Categories; N, total number of valid patients.

similar. When compared with their cognitively normal counterparts, the cognitively impaired patients were more likely to be female, an old age home resident, and tube fed. They were also significantly older (average age 83.6 vs 76.4 years), and had significantly lower scores on the Norton scale, MFAC, and MBI.

The use of physical restraints in patients in 2007 and 2009 are compared in Table 2. The overall rate of physical restraint use in 2007 was 13.3% (n = 127). Hand holders, safety vest, and bilateral bed rails were the commonest forms of restraints. The significant factors of physical restraint were cognitive impairment ($P < .0001$, Exp(B) = 5.85), lower Norton scale score ($P = .01$, Exp(B) = 0.86), and male gender ($P = .04$, Exp(B) = 0.61), cognitive impairment being the strongest predictor.

In 2009, 1 year after the implementation of the restraint-reduction scheme, the rate of physical restraint declined significantly to 4.1% (n = 41) with $P < .0001$. The reduction in physical restraint use between 2007 and 2009 was significant in both the cognitively impaired and cognitively normal patients (from 24.5% in 2007 to 9.0% in 2009 among the cognitively impaired; from 4.8% in 2007 to 0.5% in 2009 among the cognitively normal, both $P < .0001$). All types of restraints except foot holders were reduced very significantly, but in about 5% of cognitively impaired patients, hand holders were still applied in 2009.

In 2007, the average LOS of patients was 19.5 days. In 2009, 1 year after the implementation of the restraint-reduction scheme, the average LOS was significantly shorter at 16.8 days ($P < .0001$) (Table 3). As expected, cognitively impaired patients had longer LOS than cognitively normal patients in both years ($P < .05$). Among the cognitively impaired patients, the average LOS decreased significantly (from 23.0 days in 2007 to 17.8 days in 2009, $P < .001$). The decrease in average LOS among the cognitively normal patients was, however, not significant (16.8 days in 2007 to 16.0 days in 2009).

In both cognitively impaired and cognitively normal patients, the rates of falls and death did not change significantly between 2007 and 2009. The changes in MFAC and MBI scores on discharge were significantly more positive in 2009 than in 2007. The improvement was, however, confined to the cognitively normal patients. The patients with missing data on MFAC or MBI on discharge were more likely to be old age home residents and tube fed on admission. The patients with missing MBI data were also significantly older and had a lower Norton score on admission.

Discussion

This study confirmed that the restraint-reduction program was effective in reducing physical restraint in a convalescent ward setting in Hong Kong. More importantly, this study was the first to show that physical restraint reduction was associated with a significant reduction in length of hospital stay, especially in the cognitively impaired patients. This lends support to the notion that physical restraint reduction improves the quality of care of frail older patients.

Table 2
Comparison of Use of Physical Restraints in 2007 and 2009

Characteristics	All (Total = 1946)			Cognitively Impaired			Cognitively Normal		
	2007 (Total = 958)	2009 (Total = 988)	*P* value	2007 (Total = 413)	2009 (Total = 423)	*P* value	2007 (Total = 545)	2009 (Total = 565)	*P* value
	# (% within year) / # (prevalence)			# (% within year) / # (prevalence)			# (% within year) / # (prevalence)		
Physical Restraint Use									
Use of physical restraint									
Yes	127 (13.3%)	41 (4.1%)	<.0001	101 (24.5%)	38 (9.0%)	<.0001	26 (4.8%)	3 (0.5%)	<.0001
No	831 (86.7%)	947 (95.9%)		312 (75.5%)	385 (91.0%)		519 (95.2%)	562 (99.5%)	
	(*N* = 958)	(*N* = 988)		(*N* = 413)	(*N* = 423)		(*N* = 545)	(*N* = 565)	
Types of restrainer									
Hand holder	65 (6.8%)	21 (2.1%)	<.0001	48 (11.6)	20 (4.7%)	.0003	17 (3.1%)	1 (0.2%)	.0001
Safety vest	48 (5.0%)	8 (0.8%)	<.0001	41 (9.9%)	8 (1.9%)	<.0001	7 (1.3%)	0 (0%)	.007
Bedrails	38 (4.0%)	0 (0%)	<.0001	31 (7.5%)	0 (0%)	<.0001	26 (4.8%)	3 (0.5%)	<.0001
Abdominal belt	32 (3.3%)	15 (1.5%)	.009	26 (6.3%)	13 (3.1%)	.03	6 (1.1%)	2 (0.4%)	.14
Table top	18 (1.9%)	1 (0.1%)	<.0001	13 (3.1%)	1 (0.2%)	.001	5 (0.9%)	0 (0%)	.02
Seat belt	7 (0.7%)	0 (0%)	.007	4 (1.0%)	0 (0%)	.04	3 (0.6%)	0 (0%)	.08
Foot holder	1 (0.1%)	1 (0.1%)	.98	0 (0%)	1 (0.2%)	.32	1 (0.2%)	0 (0%)	.31
More than one	53 (5.5%)	5 (0.5%)	<.0001	42 (10.2%)	5 (1.2%)	<.0001	11 (2.0%)	0 (0%)	.0007

#, corresponding number of patients in subgroup; N, total number of valid patients.

Table 3
Comparison of Clinical Outcomes On Discharge in 2007 and 2009

Characteristics	Overall (Total = 1946)			Cognitively Impaired Patients			Cognitively Normal Patients		
	2007 (Total = 958)	2009 (Total = 988)	*P* value	2007 (Total = 413)	2009 (Total = 423)	*P* value	2007 (Total = 545)	2009 (Total = 565)	*P* value
	# (% within year) / M (IQR)			# (% within year) / M (IQR)			# (% within year) / M (IQR)		
Length of hospital stay, days	15 (10–23) (N = 958)	13 (8–21) (N = 988)	<.001	17 (11–27) (N = 413)	14 (9–22) (N = 423)	<.001	14 (9–20) (N = 545)	13 (8–20) (N = 565)	.21
Fall incident	9 (0.9%) (N = 958)	10 (1%) (N = 988)	.87	4 (1%) (N = 413)	2 (0.5%) (N = 423)	.40	5 (0.9%) (N = 545)	8 (1.4%) (N = 565)	.44
Mortality	71 (7.4%) (N = 958)	75 (7.6%) (N = 988)	.88	51 (12.3%) (N = 413)	56 (13.2%) (N = 423)	.70	20 (3.7%) (N = 545)	19 (3.4%) (N = 565)	.78
Change in MFAC	0.00 (0.00–1.00) (N = 740)	0.00 (0.00–1.00) (N = 683)	.02	0.00 (0.00–1.00) (N = 323)	0.00 (0.00–1.00) (N = 288)	.37	1.00 (0.00–1.00) (N = 417)	1.00 (0.00–1.00) (N = 395)	.02
Change in MBI	5.00 (0.00–13.00) (N = 605)	6.00 (0.00–17.00) (N = 562)	.01	3.00 (0.00–13.00) (N = 247)	3.00 (0.00–10.00) (N = 219)	.50	6.00 (0.00–13.25) (N = 358)	9.00 (2.00–19.00) (N = 343)	<.001

#, corresponding number of patients in subgroup; IQR, interquartile range (lower to upper); M, mean value; MBI, modified Barthel Index; MFAC, Modified Functional Ambulatory Categories; N, total number of valid patients.

Physical restraints are commonly used in hospitals and old age homes in Hong Kong. In a survey of 14 old age homes using the Minimum Data Set–Residential Assessment Instrument, more than half of the cognitively impaired and physically dependent residents had physical restraints on a daily basis.[17] The rate of physical restraint in the medical wards in this study was much lower, even before the restraint-reduction program started. Nevertheless, a previous attempt to reduce physical restraint by providing pressure monitors in 2 of these wards in the same hospital was not successful.[23] On this occasion, the program was led by the nurse in charge of the department and supported by the geriatricians and the hospital chief executive. The senior management also provided extra resources in providing electrical high low beds, pressure sensors, and shortened bed rails, which facilitated transfer. The nursing station was moved from the entrance to the center of the ward to improve supervision of the patients.

A core element of the restraint reduction program was the engagement of nurses in the action planning instead of simply a top-down and directive approach from hospital management. This had probably helped to allay some of the worries and perceived difficulties by nurses. Furthermore, training and continual support to the front-line staff was provided by a small group of senior nurses in the department. Previous studies on nurses' practice have found that knowledge and experience of staff and staff's attitudes toward restraints were associated with the frequency of restraint use.[24] As the frontline staffs observed the benefits of restraint reduction, such as improved relationship between nurses and patients as well as families, and improved mood of patients, the nursing staffs gradually accepted the stress of not using physical restraint, and embraced the concept of restraint reduction.

LOS in hospitals has often been used as a reliable measurement of efficiency of inpatient care, bed use, and treatment outcome.[25,26] Moreover, shorter LOS has been suggested to be an indication of better quality of care,[27] and there is no evidence to suggest that shorter LOS leads to adverse patient outcomes.[28,29] On the other hand, not only is longer LOS not cost effective,[30] it may also be attributed to medical injuries during hospitalization.[31] So far, very limited research effort has been made to examine whether nursing practices, such as use of physical restraints, have any effect on hospital LOS.

Patient factors, such as age, sex, diagnosis, health status, and cognitive function,[25,26] are important determinants of LOS. There were no major policy changes in the transfer of patients between the acute and convalescent hospitals during that time period. Not unexpectedly therefore, the characteristics of patients in 2007 and 2009 were very similar.

The shorter LOS associated with physical restraint reduction observed in this study is consistent with the findings of cross-sectional studies in medical wards.[14] The interpretation of these studies was limited by the bias by indication, the restrained patients having a poorer prognosis and therefore longer LOS.

Physical restraints were clearly much more frequently applied to the cognitively impaired patients in our hospital wards. This is consistent with studies elsewhere.[2] The more significant reduction in LOS in the cognitively impaired patients in 2009, as compared with the cognitively normal patients, suggested that the shortened LOS was attributable to physical restraint reduction, rather than a general improvement in the quality of care or a change in discharge policy in the medical department.

It is important to ascertain how physical restraint reduction led to shorter LOS. Physical restraints have been shown to lead to delirium, agitated behaviors, nightmares, and feelings of powerlessness.[12,32] These negative psychological effects outcomes may interfere with treatment progress,[33] and therefore prolong LOS. Unfortunately, we did not have longitudinal data on cognitive function, delirium, or mood to support the notion that restraint reduction can prevent or shorten the duration of delirium that is associated with poor clinical outcomes.[34]

Physical restraints may lead to physical de-conditioning.[35] Unfortunately, interpretation of our data on mobility and ADLs was hampered by the significant number of missing data in the medical records. It was common practice for our therapists to record MFAC and MBI in patients at weekly intervals, but in those who were medically unstable or frail, some therapists might have missed out on the documentation of these parameters.

Within the limitation of the available data, it was interesting to observe that there were significant improvements in the changes in mobility and ADL in 2009 among the cognitively normal patients, but not in the cognitively impaired patients. The apparent improvement in mobility and ADL gain was unlikely to be directly attributable to physical restraint reduction, as only a minority of the cognitively normal were restrained even before the restraint-reduction program. However, it is possible that the general improvement in the quality of nursing care associated with the physical restraint reduction program has facilitated rehabilitation.

Although the available data did not suggest an improvement in mobility and ADLs with physical restraint reduction in the cognitively impaired, it remains possible that the more disabled cognitively impaired patients could regain their premorbid mobility and ADL function more quickly with restraint reduction, thus explaining the associated shorter LOS.

A major reason for physical restraint is the concern about fall risk. Much of the interventions in this restraint-reduction program were focused on fall prevention by alternative means. Consistent with

other prospective studies, we did not observe a significant change in the incidence of falls.[8–10]

Nearly half of the restrained patients had hand restraints and 5% of the cognitively impaired patients were still given hand holders after the restraint-reduction program. The major reason for hand restraint is to secure medical devices (eg, nasogastric tube, urinary catheter, intravenous line). In our medical convalescent ward setting, nasogastric tube feeding was prevalent. Unfortunately, those who required tube feeding were much more likely to be cognitively impaired as well. It is challenging to maintain tube feeding in cognitively impaired patients without physical restraint. Our nurses managed by replacing hand restraints with hand mittens, which were regarded as less restrictive to these patients. It is not possible to measure this change in practice, as use of hand mittens was not regarded as restraint, and hence not documented. In retrospect, hand mittens should also be regarded as a form of physical restraints, as they were used to restrict freedom of movement.

To reduce hand restraint of any kind, we should avoid using tube feeding or urinary catheters, especially in those with dementia in the first instance. Much of the urinary retention in the convalescent ward setting is self-limiting and does not require indwelling urinary catheterization.[36] More assistance in toileting, clearing of bowels, and judicial use of intermittent urinary catheterization can limit the use of indwelling urinary catheters and therefore the need for hand restraint.

Observational studies in older people tube fed for dysphagia have shown higher rather than lower mortality.[37] Careful hand feeding should be persevered as much as possible.[38] In Hong Kong, there is strong family caregiver support for tube feeding in advanced dementia even when seriously ill.[39] Nevertheless, in the past few years, our department developed palliative care for noncancer patients, including people with advanced dementia. Under this mode of care, oral feeding in individuals with dementia with a feeding problem was promoted. Enteral feeding, if deemed necessary, can be made more tolerable by using a fine-bore nasogastric tube or percutaneous endoscopic gastrostromy.[40]

The strengths of this study were its quasi-experimental design and the successful implementation of physical restraint reduction in an environment where restraints were prevalent. There were, however, notable limitations. First, the documentation of physical restraints depended on nursing staff and was not performed by independent observers. There might have been variations in the understanding of the definition of physical restraint (eg, bed rails might not have been regarded as restraint by some nurses). Second, the lack of information on the use of hand mittens meant that one could not fully assess the possible change in the management of tube-fed patients with the restraint-reduction program. Third, as mentioned, the incomplete data on mobility and ADL scores, and the lack of longitudinal data on cognitive function and mood did not allow adequate examination of the potential clinical benefits of restraint reduction. Finally, common to all observational studies, we could not infer causal relationship between physical restraint reduction and LOS.

Based on the findings of this study, we suggest that future prospective evaluation of physical restraint–reduction programs should be more focused on delirium, neuropsychiatric symptoms, and medical complications (eg, pneumonia, urinary retention) in the cognitively impaired hospital patients or nursing home residents.

Conclusion

The physical restraint reduction scheme launched in 2008 at the Department of Medicine and Geriatrics of a convalescent hospital in Hong Kong was effective in reducing the use of physical restraints and this was associated with a significant reduction in average length of hospital stay, especially in the cognitively impaired patients.

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