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ORIGINAL ARTICLE

Factors associated with long-term use of restrictive interventions

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ABSTRACT

Background: Despite agreement that restrictive intervention (RI) should only be used as a last resort and for as long as required, little is known about long-term RI among individuals with a disability. This study examines long-term RI use.

Method: From the Restrictive Intervention Data System dataset from Victoria, Australia, a cohort of 1,414 people reported to be restrained or secluded between July 2008 and June 2010 were identified. The primary outcome was restraint during the follow-up period (July 2013–June 2015). Measures of the secondary outcome, reasons for restraint cessation, were assessed via a self-report survey completed by 54 service providers.

Results: At follow up, 74% of the cohort was still subject to RI. Antipsychotic medication use, a diagnosis of autism, and communication difficulties were associated with the use of restrictive interventions at follow up.

Conclusions: Long-term RI is prevalent, but can be minimised by positive behaviour support.

KEYWORDS

Intellectual disability; restraint; seclusion; challenging behaviour; autism; antipsychotic medications

It is widely accepted that the use of restrictive interventions such as restraint and seclusion on a person with a disability should only be used on a "last resort" basis in order to keep a person with a disability from hurting themselves or others (Matson & Boisjoli, 2009; Sturmey, 2009; Williams & Grossett, 2011). However, once restrictive interventions are commenced, their use often continues for several years even though the type of restrictive intervention may change over time (Taylor, Oliver, & Murphy, 2011; Webber, Major, Condello, & Hancox, 2017).

In Victoria, Australia, the Senior Practitioner in the Department of Health and Human Services maintains the Restrictive Intervention Data System (RIDS) dataset which since 2008, captures all episodes of restrictive interventions occurring in government-funded disability services. Data on the following restrictive interventions are collected: (1) chemical restraint, which refers to any medication that is used to stop behaviours of concern which does not treat an underlying diagnosed mental or health condition; for example, if the person did *not* have a diagnosed anxiety disorder, the administration of an anxiolytic would be considered to be chemical restraint; (2) mechanical restraint, which refers to the use of materials, such as splints and clothing, that prevents a person moving freely and is not required by law, such as seat belt buckle guard; (3) seclusion, which refers to being locked in a room or area alone; (4) physical restraint or the use of hands-on contact to prevent a person moving. Analysis of these data show that the majority of people are restrained using chemical restraint and the majority of this is routine; that is, on a regular basis (e.g., daily).

All service providers who use restrictive interventions must report their use to the Senior Practitioner every month via the RIDS. All reporting from services must be authorised by a manager within the organisation. Organisations are encouraged to monitor their use of restrictive interventions over time and the RIDS allows them to create various monthly reports to assist them to do this. In addition, the Senior Practitioner's team conducts random and targeted service audits. The Senior Practitioner's team can visit service providers and view records and conditions under which restrictive interventions are being used. The results of the audits are shared with the lead of the organisation. As well, those responsible for direct support. Services may be required to change a practice, report a restrictive intervention, or have a restrictive intervention reviewed by a medical or allied health practitioner.

The data show that the majority of people are chemically restrained, 90–95% each year. About 8–12% of people each year are subject to physical, mechanical restraint or seclusion. Most people are subject to one restrictive intervention; however, some people are subjected to more than one (Webber, McVilly, and Chan (2011)).

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The focus of the current study was to find out how long people are restrained in the long term (i.e., greater than three years) and what are the risk factors associated with long-term restraint. Currently little is known about how long people are subject to restrictive interventions. If people are restrained in the long term, it suggests that services need to look at what is not working for that person. Knowing about the risk factors of long-term restraint should assist services to understand the needs of people with certain characteristics. In addition, for those who were no longer restrained but still receiving a disability service, we examined disability support staff views as to the factors that led to the removal of restraint.

Background

Victoria, Australia is the only jurisdiction that we are aware of that has collected population longitudinal data on people over 10 years on a person level. This means that people who are subject to restrictive practices can be monitored over the time they are reported to the Senior Practitioner, which makes it possible to examine persistent, or ongoing restrictive intervention use over time. Examining persistent or long-term restraint use was the focus of this paper. Norway also collects population data about the numbers of people who are reported to be subject to mechanical, physical restraint and seclusion (Søndenaa, Dragsten & Wittington, 2015). The Søndenaa et al. (2015) study does not include chemical restraint, so it is not directly comparable to Victoria because chemical restraint is the most commonly used restraint in Victoria. It is also unclear from the Søndenaa et al. (2015) data if their data is person level data from one year to the next, or a count of people per year.

The majority of research investigating correlates of restrictive intervention is cross-sectional. Results indicate a range of individual-level factors are associated with the use of restrictive interventions including low adaptive functioning, the presence of challenging behaviours, the presence of autism, and the presence of a communication disorder (Gaskin, McVilly, & McGillivray, 2012; Taylor et al., 2011; Webber, et al., 2019; Webber, Richardson, & Lambrick, 2014; Scheirs, Blok, Tolhoek, Aouat, & Glimmerveen, 2012). However, less research attention has been focused on establishing the prevalence of long-term or persistent restraint and the underlying factors.

The research evidence available suggests that for some people with a disability, restrictive interventions can continue for many years (Taylor et al., 2011). Taylor et al. (2011) followed up on a group of 49 people after 18 years who had self-injured in 1983. In 1983, 9 people (18%) had been restrained with a mechanical restraint, and 62% had been with chemical restraints. Eighteen years later, 85% of the group were still regularly restrained. Although there were reductions in the use of mechanical restraint from 9 people to 1, the use of anticonvulsants and antipsychotics had increased from 62% of people at time 1 to 85% at time 2. There were no decreases in either the severity of behaviours of concern or persistence of certain types of self-injury (e.g., all of the people who were banging their heads against hard objects at time 1 were still doing this at time 2).

Similar results were found in a case study by Webber, Major, et al. (2017), although the use of mechanical restraints were eliminated after 20 years of use, the person continued to show the same behaviour of concern at the same level of severity even though a chemical restraint – Naltrexone had been administered for 4 years.

Apart from the research by Taylor et al. (2011), no other longitudinal research could be found on this topic in people with an intellectual disability; however, several studies in nursing home residents reported that long-term use of physical restraint is more closely associated with individuals' personal characteristics than organisational aspects such as number of staff (Huizing, Hamers, de Jonge, Candel, & Berger, 2007; Hofmann & Hahn, 2014). Both an individual's cognitive and physical impairments were found to be associated with the long term use of physical restraint in nursing homes.

A few studies have examined the protective enabling factors that lead to the elimination of restrictive interventions (Gaskin et al., 2013; O'Dwyer, McVilly & Webber, 2017; Webber, Richardson, Lambrick, & Fester, 2012; Williams & Grossett, 2011). Results of these studies suggest that the use of individualised positive behaviour support practices are associated with reductions in the use of restrictive interventions.

Previous analyses of the Victorian data reported to the Restrictive Intervention Data System (RIDS) showed that some people are reported to be subjected to restrictive interventions over years, while some people who are reported at one time are no longer subsequently reported. There are two main reasons people are no longer reported to RIDS: either the client leaves the service or the service provider can provide a service without using restrictive intervention. This latter possibility arises when: (a) the person no longer requires the restrictive intervention; (b) restrictive intervention is no longer classified as a restrictive intervention, because it was incorrectly classified as such previously (e.g., seat belt buckle guard); or (c) because the restrictive intervention is now judged to be treating an underlying medical condition (e.g., the person has received a psychiatric diagnosis and the former chemical restraint is now treating a mental health issue). Understanding both why people continue to be reported and why some people are reported at one

time and not reported at another time is important to determine the type of reduction strategies required and the efficacy of current restraint reduction strategies.

Currently, only a few studies have examined the use of restrictive interventions in the long term in disability settings. To work towards reduction of restrictive interventions it is necessary to understand the factors that increase (or mitigate) risk of being subjected to prolonged restrictive interventions. The aim of this study was: (1) to examine the prevalence and correlates of persistent (≥ 3 years) restrictive intervention use among individuals living in residential services; and (2) identify any factors that are associated with the cessation of restraint. The focus of this study was to examine the outcomes of a cohort of residential service clients reported to the Senior Practitioner in 2008–10 and examine their outcomes in 2013–15.

Method

Design

Data for the study were extracted from the Restrictive Intervention Data System (RIDS), a database recording all instances of restraint and seclusion reported by disability services in Victoria. With respect to RIDS, service providers in Victoria are obligated to report all instances of restraint and seclusion under the provisions of the Disability Act 2006, which mandates the regular review, evaluation, and research of the use of restrictive interventions and compulsory treatment orders.

The cohort selected for inclusion in the study was 1,414 individuals located within residential services subject to restrictive intervention (within those services) during the two financial years spanning July 1, 2008 to June 30, 2010. Residential services are comprised of group homes located around Victoria, Australia. They usually support five residents with a disability and depending on the complexity of support needs, may be supported by one or more staff with a sleep-over model if support needs are less complex and an active 24 h awake staff profile where residents with higher support needs live.

The primary outcome, persistent restrictive intervention, was defined as being present for an individual if they were:

(1) Subject to any restrictive intervention (chemical, etc.) including all forms of administration (routine, Pro Re Nata, in an emergency) where routine means on a regular basis e.g., every day, Pro re Nata (PRN) means administered when needed and emergency refered to any restrictive interventions that were not included in the person's behaviour support plan and
(2) were living within a residential setting in the two-year follow-up period spanning July 1, 2013 to June 30, 2015.

In sum, the cohort of interest was all people reported to be subject to restrictive interventions in residential services during:

(1) 2 years from 1 Jul 2008–30 June 2010 (this baseline period was 2 years);
(2) The intervening period was 1 Jul 2010 to June 2013, (the intervening period was 3 years); and
(3) The follow up period was 1 July 2013–30 June 2015, thus the follow up period was 2 years.

We wanted to know what happened to the cohort of interest in 2013–2015. Were they still reported to be subject to restrictive interventions or not?

During baseline there were 1,414 individuals in the cohort, 544 were no longer reported for restraint in the follow-up period. Of these, 181 were known to be deceased or to have moved out of disability services. A survey was sent to the 54 services housing the remaining 363 individuals to determine the reason for cessation of restrictive intervention.

Survey

The survey requested disability support staff within specific residential services to indicate the reasons why an individual was no longer reported to the Restrictive Intervention Data System. We did not seek the level of seniority of the person completing the survey, but the survey was sent to a team leader or senior manager who knew the client's history. The survey assessed "person status" at follow-up: person was deceased, person had left the service, person was still using the service. In the case where the last option was selected, providers were asked to indicate the reason(s) for restraint cessation. The survey also requested staff choose a reason why the person was no longer restrained: (a) behaviour support the team had implemented and/or; (b) because the person had been diagnosed with a medical reason for their behaviour/s of concern and was now being treated for this medical condition (e.g., anxiety, depression, etc.). Finally, the staff were asked if there were any other reasons why restraint and/or seclusion was no longer required.

Results

Prevalence of persistent restraint

Descriptive statistics for the 1,414 individuals making up the cohort are shown in Table 1. The majority of the

Table 1. Descriptive statistics for the sample.

	M (SD)
Age	42.5 (13.8)
Instances of restraint in baseline period	49.4 (75.4)
	N (%)
Gender	
Males	894 (63%)
Females	520 (37%)
Disability	
Acquired brain injury	62 (4%)
Autism	416 (29%)
Hearing impairment	444 (31%)
Intellectual disability	1353 (96%)
Neurological impairment	283 (20%)
Physical disability	192 (14%)
Psychiatric condition	321 (23%)
Speech impairment	291 (21%)
Visual impairment	130 (9%)
Individuals reported for type of restraint	
Chemical PRN	430 (30%)
Chemical routine	1248 (88%)
Chemical emergency	471 (33%)
Chemical (all)	1374 (97%)
Mechanical	61 (4%)
Seclusion	86 (6%)

sample had an intellectual disability (96%) and were male (63%). Almost all (97%) were subjected to chemical restraint during the baseline period.

Of the 1,414 individuals, 234 were either deceased or no longer residing at a Victorian residential service at follow-up. Of the remaining 1,180, 870 (74%) were still subject to restraint (see Figure 1). This suggests that most individuals receiving restraint within residential services are likely to be restrained long term.

Of the 870 individuals subject to restrictive intervention at follow-up, the average number of instances of restraint within the 2-year period was 64.5 (SD = 68.3, min = 1, max = 1,237). A total of 816 of the 870 (94%) were reported for 10 or more instances (this could refer to 10 months or 10 days). Thus, it appears that individuals still subjected to restrictive intervention in the follow-up period tended to be frequently restrained.

Of the 310 individuals still living within a residential service but not subject to restraint, the most commonly cited reason for cessation of restraint was the implementation of more effective means of addressing behaviours of concern (see Table 2). In just under a third of the cases, it was reported that the individual was no longer restrained as the medication was treating a psychiatric condition. In approximately 16% of cases, the specific cause of cessation was unknown to staff responding to the survey.

Correlates of persistent restraint

Logistic regression was used to investigate the associations between restraint during follow-up and the predictor variables of client disability, age, gender and restraint during the baseline period among individuals who remained in residential services. The results are detailed in Table 3 below.

The results show that individuals who were subjected to routine chemical restraint during the baseline period were 1.88 times more likely to be restrained in the follow-up period. None of the other restraint types (chemical PRN, chemical emergency, mechanical and seclusion) predicted follow-up restraint.[1] In addition to the type of restraint, two other features of the baseline restraint were positively associated with follow-up restraint: instances of baseline restraint and baseline use of antipsychotic medication. Findings showed that

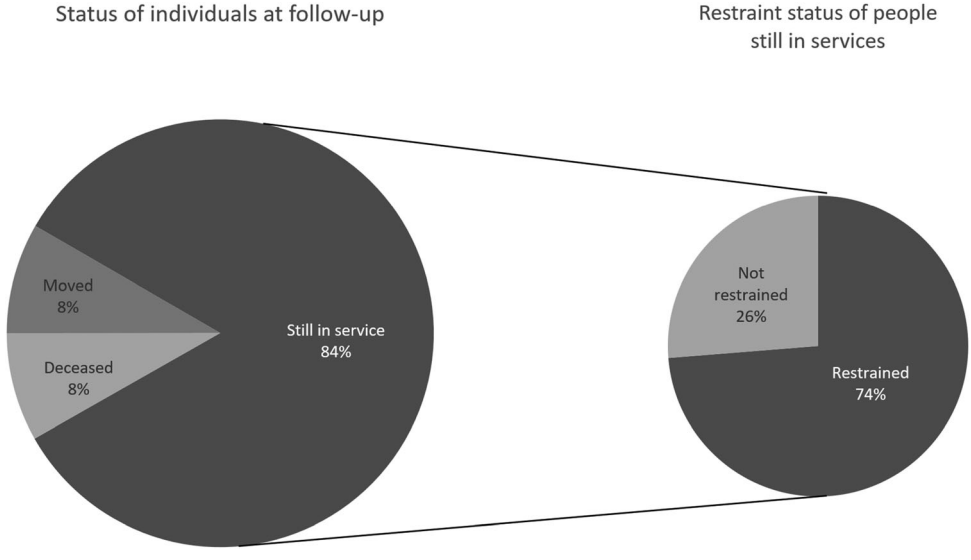

Figure 1. The status of individuals at follow-up.

Table 2. Reasons for restraint cessation.

Reason	N (%)
Used to treat medical condition	89 (30.5%)
Provision of effective behaviour support	186 (63.7%)
Unknown	46 (15.8%)
Data missing due to survey non-response	18 (-)

*Note: Respondants could select more than one reason so percentages will not add to 100.

for every 10 reported instances of restraint at baseline, individuals were 20% more likely to be restrained during follow-up. Individuals restrained using antipsychotic medication were twice as likely to be restrained during follow-up compared to individuals not restrained using antipsychotic medication at baseline.

After controlling for characteristics of baseline restraint, three disability types emerged as significant predictors of follow-up restraint: autism, speech impairment and psychiatric condition. Both autism (1.61 times more likely) and speech impairment (1.69 times more likely) were positively associated with restraint during follow-up. This suggests that not only do communication difficulties predict initial instance of restraint, they are also associated with lower rates of cessation of restraint. In contrast, the presence of a psychiatric condition was negatively associated with restraint during follow-up. Individuals with a psychiatric condition were only half as likely as those without a psychiatric condition to be restrained.

One limitation of the current dataset is that disability was not necessarily measured at baseline. An individual's disability status in the data set can be updated by service providers as information comes to light. Given that, rather than indicating that psychiatric conditions are protective against long-term restraint, this finding is possibly indicating that some of the individuals being reported for chemical restraint at baseline were receiving the medication to treat an undiagnosed psychiatric condition at the time. This condition was subsequently diagnosed, at which point the medication was no longer reported as a restraint. Somewhat consistent with this, there was a positive association between having a psychiatric diagnosis and having restraint ceased following a diagnosis among individuals no longer restrained at follow-up ($r = 0.13$, $t = 2.20$, $p < 0.05$).

Table 3. Summary of logistic regression analysis for variables predicting persistent restraint.

Predictor	B*	SE B	e^B
Age	0.000	0.006	1.00
Gender	−0.181	0.158	0.83
Acquired brain injury	0.135	0.364	1.14
Autism	0.476*	0.191	1.61
Hearing impairment	−0.077	0.170	0.93
Neurological impairment	0.004	0.200	1.00
Physical disability	−0.371	0.223	0.69
Psychiatric condition	−0.663*	0.182	0.52
Speech impairment	0.524*	0.206	1.69
Baseline chemical restraint (PRN)	0.367	0.191	1.44
Baseline chemical restraint (routine)	0.630*	0.254	1.88
Baseline chemical restraint (emergency)	0.263	0.170	1.30
Baseline mechanical restraint	0.619	0.450	1.86
Baseline seclusion	0.141	0.370	1.15
Instances of baseline restraint	0.019	0.003	1.02
Baseline use of antipsychotic medication	0.681*	0.172	1.98

*$p < 0.05$.

Note: table columns: B = coefficient, SE B = standard error of the coefficient, e^B = odds ratio (odds ratios represent the change in odds of being restrained during follow-up for each level of the variable).

Decision tree analysis

The logistic regression reported above was not able to explore interactions among predictor variables; that is, effects where the effect of one variable depends on the value of another (e.g., antipsychotic medication at baseline may increase the risk of restraint at follow-up but only for males). To investigate interactive effects in logistic regression, explicit interaction terms must be included in the model. Given the large number of predictor variables, there are too many possible interaction terms to include. Instead, to explore the possibility of interactive effects, a decision tree model was used.[2] A decision tree model is an alternative way to explore associations between a set of variables and an outcome that does not require the explicit inclusion of interaction terms. The results of the decision tree analysis for this study are shown below in Figure 2.

Similar to the logistic regression, the results indicate that most of the predictor variables were not useful for differentiating the chances of an individual of being restrained at baseline. Specifically, only two variables were useful for differentiating individuals: the number of instances of restraint reported at baseline and whether the individual was restrained using an antipsychotic medication at baseline. The results suggest that those who were reported to be restrained for 18 or more times during the baseline period, were much more likely to be restrained during follow-up (84% compared to 47%). Being restrained using antipsychotic medication at baseline was a further risk factor but only for those not restrained 18 times or more at baseline. That is, among those restrained less than 18 times at baseline, those who were restrained using antipsychotic medication were more likely to be restrained at follow-up compared to those who were not (59% compared to 34%).

The decision tree did not completely replicate the results of the logistic regression. The disability predictors of autism, speech impairment and psychiatric condition did not meaningfully differentiate individuals in terms of the outcome.

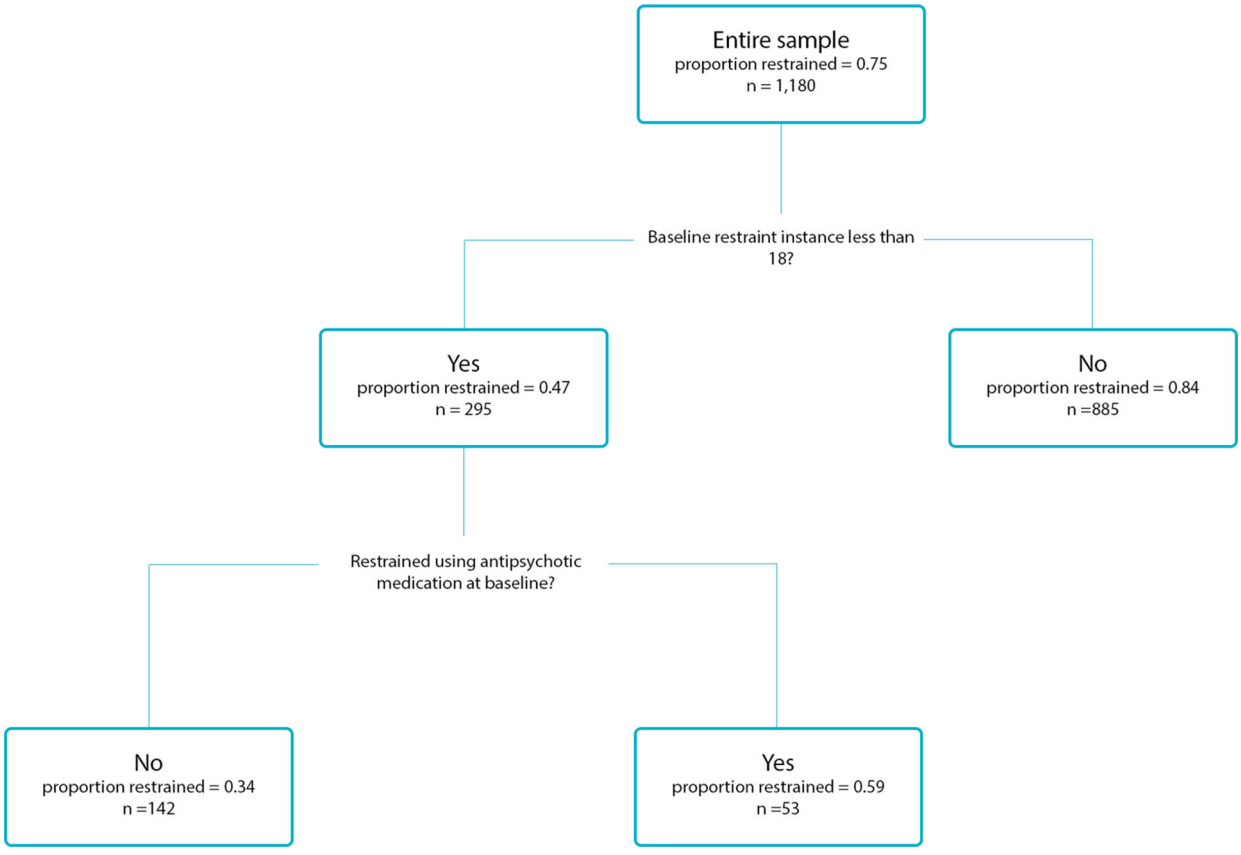

Figure 2. Decision tree model predicting restraint at follow-up.

Discussion

The aim of this study was to investigate the prevalence of persistent restraint and its predictors among individuals with a disability accessing residential services in Victoria. Results show that three quarters of individuals who were subject to restrictive interventions in residential services, were still restrained in the long-term (at least 3 or more years). This finding is consistent with Taylor et al. (2011) in showing that restraint is persistent for a large percentage of people with a disability.

Approximately two-thirds of restraint cessation are explained by effective behaviour support and alternative means of addressing behaviours of concern. This finding is consistent with the work by O'Dwyer et al. (2017) who found that staff who understood the main components of positive behaviour support and reported using these in behaviour support plans were less likely to use restrictive interventions than staff who had not been provided this training. It is also consistent with the findings of Webber, Major, et al. (2017) who found that once the staff understood the triggers and function of the person's behaviour and were vigilant in providing support early to prevent an escalation of behaviour, restraint was no longer needed even though the person with a disability still showed behaviours of concern and had few ways to communicate his needs or distress.

The current study found that one-third of cessation is explained by medical diagnoses (where the medication is actually being used to treat rather than restrain). This finding is not surprising given the known difficulty and unpreparedness of medical practitioners in the public health system in Australia to assess mental illness in people with an intellectual disability (Weise & Trollor, 2018). Weise and Trollor (2018) found that public mental health practitioners they surveyed reported low confidence in key clinical areas and insufficient training in the area of intellectual disability.

Predictors of persistent restraint were examined using both logistic regression and decision tree analysis. Taken as a whole, the findings from both analyses suggest that greater instance of restraint as well as the use of antipsychotic medication are important correlates of persistent restraint. Other individual characteristics, in particular a diagnosis of autism and the presence of a speech impairment, are also likely predictors of on-going restraint.

There are several limitations that should be taken into account when interpreting these data. First, it should be

noted that the findings are self-reported by services. The original data is self-reported from services and responses to the survey were self-reported. The data system that is used is able to detect some kinds of anomalies in data reporting and services are educated about reporting, but it is still possible that what is reported contains reporting errors. Future research could look more closely at other outcome measures; for example, treatment sheets and audits of clients' quality of life.

Second, it is difficult to work out the degree to which different factors account for reductions in restrictive interventions. We know from other work that reductions in restrictive interventions are due to a combination of several factors such as staff understanding individual needs including medical, physical and emotional needs and staff having skills and knowledge in how to support someone using positive behaviour support and supportive staff who will work together (Webber, Major, et al., 2017).

Another caveat should be taken into consideration when applying these results to new cohorts and that is that the initial cohort was defined by reporting of restraint in 2008–2010. In the years since, the practice has changed considerably; reporting is more accurate and the quality of behaviour support planning has improved. For these reasons, it is possible that the prevalence of persistent restraint will have changed for subsequent cohorts and that different variables will predict persistent restraint.

These findings are consistent with the findings of previous work in nursing homes by Hofmann and Hahn (2014) and Huizing, Hamers, de Jonge, Candel, and Berger (2007) in showing that some people with a disability were more likely to be restrained in the long term than other people based on their individual characteristics. These results add to this literature suggesting that people with an intellectual disability are at risk of being subject to restrictive interventions based on individual characteristics.

Our past work has suggested that disabilities associated with communication difficulties (e.g., autism, hearing and speech impairment) tend to be associated with greater instances of restraint (Webber et al., 2014; Webber, et al., 2019). The analysis extends what is known by addressing the related question of which client characteristics are associated with persistent restraint among individuals who remain in residential services.

Notes

1. It is worth noting that the effect size for baseline mechanical restraint was similar to that for baseline chemical routine restraint; that is, individuals who were mechanically restrained at baseline were 1.86 times more likely. However, given there were far fewer individuals mechanically restrained at baseline, there was less statistical power available to detect the effect. Thus, the current results should not be interpreted as conclusively showing that mechanical restraint is not predictive of persistent restraint.
2. For an overview of decision tree modelling and its application: https://www.researchgate.net/profile/Vili_Podgorelec/publication/11205595_Decision_Trees_An_Overview_and_Their_Use_in_Medicine/links/0912f506e77f1e9d1d000000.pdf

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