

Research Article

The Use of Body Worn Video Cameras on Mental Health Wards: Results and Implications from a Pilot Study

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ABSTRACT

Background: An early study of the introduction of personal issue body worn video cameras (BWVCs) [1] of police wearing body worn cameras showed that frontline police officers were in favour of them, that complaints were reduced, and some types of crime were also reduced. While some ambulance and A&E security staff have deployed BWVCs, it has, until recently, been unusual for mental health (MH) ward staff to do so. An early review article [2] and feasibility study [3] showed that it was feasible to deploy BWVCs in mental health settings and that they were associated with staff and patients considering them beneficial; a reduction in complaints; and a reduction in serious incidents.

Method: For this study, a camera company supplied 50 BWVCs to be worn by West London Trust (WLT) nursing staff in 7 MH wards, ranging from Voluntary Admissions to Enhanced Medium Secure wards. Pooled camera provision and training were provided for: security nurses; nurses in charge; and response nurses. Incident data for the 7 wards were collected for a 4-month period post BWVC introduction and compared to equivalent data for the same time period in the previous year.

Results: The results indicate that the use of BWVCs was associated with a reduction in the overall seriousness of aggression and violence

in reported incidents, with a marked decline in the use of tranquilising injections during restraint incidents. BWVC use was also associated with a significant reduction in the seriousness of incidents on local services admissions wards. Different ward classifications, and within that, male/female wards, show different patterns of results. These indicate that different expectations, training and evaluation/performance measurements need to be developed for different MH ward contexts.

Conclusion: We have demonstrated that it is feasible to deploy BWVCs in all types of MH ward settings, up to, and including, enhanced medium secure wards, and that their use is acceptable and beneficial to patients, MH staff and MH managers. Further evaluation and research are therefore required to establish whether these benefits also result in less injury, absence and stress for staff. In turn, these factors, plus any associated need to employ agency staff, need to be evaluated in terms of a reduction in delivery costs whilst ensuring improved service.

Keywords: Mental health, Body worn cameras, De-escalation, Conflict and constraint, Local services admissions, Voluntary admissions, Sectioned under MHA 2007, Informal admissions, Low, Medium, Enhanced medium secure wards, Restraint, Tranquilising injections, Violence, Safety.

Key findings

- It is feasible to implement BWVC use across all MH ward settings, up to and including enhanced medium secure wards.
- BWVC use was associated with a significant reduction in the seriousness of incidents on local services admissions wards.
- There was a significant decline in the use of tranquilising injections during restraint incidents.
- BWVCs were associated with a reduction in the overall seriousness of aggression and violence in reported incidents
- Different ward classifications, and within that, male/female wards, show different patterns of results and require different measures of effectiveness.

Approval

The proposal for this pilot project was assessed, and approved, as an evaluation by West London Trust's (WLT) Research & Development department. As such, they did not require a separate submission for NHS ethics approval. The proposed research was, therefore, additionally assessed and approved by the University of Portsmouth's research ethics committee. Prior to the evaluation, the WLT lead for governance within the BWVC project group verified all procedures relating to compliance with data protection and information governance. The BWVC project implementation procedures ensured that poster notices explaining BWVCs were displayed in all clinical areas. These were also shown to service user and carer forums as part of negotiations and agreements for BWVCs in advance of the project commencing. The camera company and WLT (including the communications department) developed the posters, which were also submitted to, and approved by, WLT safety and security steering groups. Full information on BWVC procedures, posters, the proposal and the rationale for the project were also given to service users and staff in written and verbal format prior to commencement of the project. All parties were advised that BWVCs were only for incident-specific use to capture video and audio for incidents/interventions that would normally be the subject of an IR1 or witness statement. Within these processes, it was agreed that footage would be stored on a secure cloud account for 30 days and would then be automatically deleted, unless secured for a specific purpose, including internal investigation, staff reflection and training exercises, and/or for evidence related to a criminal investigation. These storage processes are in line with the Information Commissioner's guidance (2014) and also mirror the associated guidance from the College of Policing that has been in operation since 2014 for all police forces.

Disclosure

The lead author's expenses incurred in attending meetings were reimbursed by the camera company, but the evaluation was carried out, analysed and written up independently as required.

Background and context

This article outlines the results from a pilot evaluation study on measuring the impact of the introduction of 50 Body Worn Video Cameras (BWVCs) in 7 mental health (MH) wards run by West London Trust (WLT). This is, to date, the largest deployment of BWVCs in a ward setting in hospitals worldwide. The overall aim of this first pilot project was to evaluate whether issuing BWVCs to MH ward nurses was associated with a reduction in violence and aggression in recorded incident interventions. We first outline the background and context used in the study, before outlining the profile of the Wards sampled, the evaluation design, and the main findings. The article concludes with a discussion of the implications from the findings.

This study builds on the broader experiences and knowledge of the lead author on the impact of personal issue body worn video cameras [1] and on the only two specific studies of BWVCs we know of in MH wards [2-4]. As Hardy, et al., [4] note: "BWVCs are mobile audio and video capture devices that allow the wearer to record what they see and hear. These devices can be secured to various parts of the body using different types of attachment. The advantages of professionals wearing a camera include transparency, identifying integral problems within the organisation and improving evidence documentation" International Association for Healthcare Security and Safety (IAHSS) Foundation (2015)² [5].

An early study of the introduction of personal issue of police BWVCs by Ellis, et al., [1] showed that: frontline police officers were in favour of them; that complaints were reduced; and that some types of crime also reduced, while expected rises in under reported and under recorded crimes (eg, domestic abuse) also occurred. Since then, there have been many types of studies on the use of police body cameras, including Randomised Control Trials (RCTs), with mixed results and casting some doubt about which variables should be included.

Key research findings on tackling conflict and violence in MH settings

There is not the space here to provide a full review of violence and aggression in mental health settings. However, it is important to contextualise key international evidence on conflict and constraints in MH settings, prior to the introduction of BWVCs onto MH wards in the UK. As Warburton, [6] notes, MH wards represent a potentially violent milieu and they therefore have obligations to provide appropriate physical security to prevent injury to staff and patients alike, whilst also maintaining a treatment and therapeutic environment. While Warburton, [6] is focused only on forensic patients, she notes that there is likely to be a continuing trend of co-morbidity with mental health and (criminal) violence, so that the demands on MH wards are likely to change. We also know that inpatient violence is common worldwide [7] and that psychiatric/mental health nurses suffer the highest incidence of violence [8] with resultant physical, mental and emotional consequences [9].

In the specific UK context, the most relevant, large scale work to assess existing approaches to dealing with and reducing conflict rates on MH wards, is Bowers, et al., [10] work on acute psychiatric wards. Their Safewards model was based on a pragmatic cluster randomised controlled trial (RCT), with 13 psychiatric hospitals and 31 wards as the units of randomisation. The aim of the study was to identify interventions that would reduce the frequency of both conflict and containment. Based on previous research, they identified 10 simple interventions to improve staff relationships with patients. Results showed a 15% reduction in conflict events, plus a 26% reduction in containment events for the experimental intervention compared to the control group.

Bowers, et al., [10] also provide a useful lexicon, in the UK context, for the type of conflict behaviours that are also the target in using BWVCs: relatively low level and more serious aggression toward objects or people; but also attempts to abscond; self-harm; and refusal to eat or drink. Bowers, et al., [10] also define the typical range of constraint methods used by nursing staff to prevent or reduce conflict, including restraint with, or without, tranquilising medication; special observation; and seclusion.

Bowers, et al., [11] project is a large-scale project with a high level of fidelity, and they are critical of the quality of previous studies in this area. They note that there are no previous RCTs on reducing conflict or containment overall, and very few on specific conflict behaviours or types of containment. They recognise that there are many more repeated measures studies, but that these are mostly local and without controls. Finally, they found a number of observational, longitudinal and descriptive studies, along with narrative reviews. However, they also recognise that while the studies provide relatively weak evidence that conflict and containment rates can be influenced by staff behaviour, they were also the foundation on which they built the Safewards Model, which was the basis for the interventions used in their own RCT study.

Since the previous research showed highly variable rates of conflict and containment on different wards, which could not be explained solely by differences in patients admitted [12], the Safewards model helped explain this variation by identifying ‘staff modifiers’ that could impact on the likelihood of conflict or containment incidents. The Safewards model resulted in a list of 10 interventions (see www.safewards.net) to additionally enhance staff modifiers to reduce conflict and containment rates.

Bowers, et al., [11] measured primary outcomes, as rates of total conflict and total containment, using the validated, single-sheet Patient-staff Conflict Checklist (PCC) [13], completed by the senior nurse at the end of each ward shift.

The use of BWVCs on MH wards is in its infancy and to date, there is not enough research evidence to mount a study comparable to Bowers, et al., [11]. While IAHS [5] has discussed some UK uses of BWVCs by security officers that reduced violence in health facilities, Hardy, et al., [3] point out that “there are no published evaluations available to support these claims”. The focus and scale of our pilot study is, therefore, more limited than Bowers et al’s approach. We are effectively at an earlier stage of establishing whether BWVC introduction can result in a reduction in conflicts and containments on MH wards. It seems likely the positive practices introduced with the Safewards model are, to some extent, being used, perhaps differentially, on WLT MH wards already, but there are currently no resources to evaluate the impact of this in relation to BWVC use. However, it is important to note that the introduction of BWVCs is not intended to replace these practices, but to enhance and refine existing good practice.

The available research evidence on BWVC use in MH settings

In contrast to the level of literature available to Bowers et al, there are only two published studies on the use of BWV cameras on MH wards. The first of these is a review article on the uses of different new technologies in the management of risk and violence in forensic settings [2,4]. The first pilot of BWVCs in a UK hospital was carried out at Broadmoor high-security psychiatric hospital [2]. The details on the study are limited, but Tully, et al., [2] note that BWVCs were judged to be useful by staff members who reported a reduction in incidents when BWVCs were present, and that the ‘overwhelming majority of patients supported its continued use’. They note that further qualitative and quantitative data were being collected with a view to future publication.

In the meantime, Hardy, et al., [3] carried out a feasibility study at Berrywood psychiatric facility (Northamptonshire Healthcare NHS Foundation Trust - NHFT). The study used 12 pooled BWVCs across 5 inpatient mental health wards: a male recovery unit; a female recovery unit; a low secure unit; an acute admission unit and an intensive care unit. Camera use was focused on the specialist Prevention and Management of Violence and Aggression (PMVA) team at Berrywood Hospital.

In addition to camera comfort and practicality, Hardy, et al., [3] covered: staff training and support; staff perceptions of BWVC acceptability and usefulness; acceptability to patients; testing and refining information technology; costs; and legal, organisational and training issues, including compliance with the Information Commissioner’s Officer Code of Practice 2014³.

However, most relevant to our approach below, Hardy, et al., [3] used Berrywood’s existing incident recording system to provide a descriptive analysis of changes in overall incident occurrence. They found no significant change between pre- and post-BWVC introduction at Berrywood (153 incidents in the pre-BWVC period and 152 in the post-BWVC period). However, there was an evident shift within the different categories of seriousness, as Figure 1 indicates.

This pattern suggests that the BWVCs were associated with a general shift away from the highest level of intervention, ie, emergency restraint requiring tranquillising injections (from 27% of all incidents to 11%), towards the lowest level of incident, ie, verbal abuse (from only 8% of all incidents to 57%). Hardy, et al., [3] also pointed out that this overall pattern varied considerably across the 5 wards involved in their study. This perhaps echoes Bowers, et al., [11] findings of variation across wards, despite the very different MH setting.

Before outlining our evaluation design, it is important to note that the motive to introduce BWVCs into WLT MH wards came less from research literature and more from policy initiatives and incentives. The Broadmoor study coincided with rising concern about aggression against health workers. The Greater London

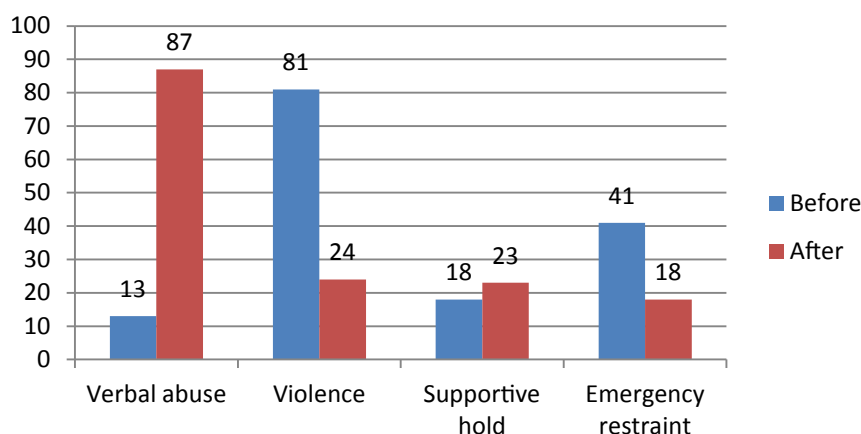


Figure 1: Changes in Berrywood's incident categories pre- and post-BWVC introduction (Adapted from Hardy, et al., [3]).

Authority [14] published Freedom of Information Act (FOI)-derived figures showing there were 12,386 physical assaults on staff working in acute services, including A&E, maternity wards and medical imaging units (but excluding medical factors such as mental ill health or learning disabilities). More recently, Stephenson [15] commented on the 56,435 physical assaults on NHS staff in 2016-17, a 9.7% increase on the 51,447 reported in 2015-16 and closer to 75,000, around 200 per day, if extrapolated to cover all NHS trusts in England. In the original report [16] it was noted that 'Most assaults have a clinical cause, hence most attacks taking place in mental health settings.'

Speaking in 2014, Dr Peter Carter (Royal College of Nursing Chief Executive & General Secretary) stated: "With physical violence against employees estimated to cost the NHS £60.5 million a year, it is high time Trusts step up and look to invest more in prevention and protecting their staff from assaults in the first place [17]." All of these factors, along with promising results from Hardy, et al., [3] feasibly study suggested that WLT should pilot the use of BWVCs in MH settings.

Introducing such new technologies must take account of human factors [1] if they are to be of value in any setting. This is an important issue in any new arena into which BWVCs are introduced. Indeed, Big Brother Watch's [18] evaluation of local authority BWVC use criticised the lack of a clear rationale or evidence for their purchase and introduction. However, BWVC use in MH wards had a clearer purpose. Based on prior research, and policy concerns, we were able to establish a clear aim: to evaluate whether issuing BWVCs to mental health ward nurses was associated with a reduction in the incidence and seriousness of conflict and constraints. However, there are currently no established impact methods and measures of desired outcomes, which our pilot evaluation was designed to address.

Evaluation design

Evaluators often face the perennial problem of being called in when many of the parameters have been decided, resources are limited, and it is not possible to interfere with established operational and managerial decisions [1]. In this case, WLT's

decision to introduce cameras to MH wards had already been taken by WLT. Operational exigencies, resource levels, and lack of specific research evidence, also ensured that RCT methods were neither appropriate nor possible. We therefore incorporated, as far as possible, a utilization-focused evaluation approach [19] with the central tenets of utility; relevance; practicality and; crucially, meeting the information needs of decision-makers. In particular, we were mindful of NHS Improvement's [20] drive to promote good mental health through developing and establishing local outcome measures that might ultimately be used to support 'outcomes-based payment for mental health services in local areas' (p.9) and is consistent with a framework approach that allows 'local areas to tailor quality and outcomes measures.... [for] use as an improvement tool.' (p.4). The approach taken here is therefore likely to be of increasing relevance for individual MH trusts, and those that hold them to account, in monitoring and assessing the effective and efficient use of BWVCs.

Informal meetings with WLT MH staff established that their overall view, before the commencement of the study, was that BWVCs would improve conditions for staff and service users through a reduction in conflicts and the need for constraints, which was consistent with Bowers, et al., [11] findings for the Safewards approach.

Prior to setting up this evaluation and as part of their BWVC implementation programme, WLT issued a pre-pilot questionnaire to their MH ward staff. Fifteen of the 63 staff (Figure 2) who would eventually use BWVCs in the pilot responded. Most of them were very positive about the benefits of utilising BWC, which triangulates with the views of the ward staff wearing them in Broadmoor [2,4], at Berrywood [3] and with Ellis, et al., [1] survey of the first police implementation of personal issue BWVCs.

The findings from WLT staff questionnaires were as follows:

- 80% thought that BWVCs would have a positive impact
- 86% thought that BWVCs would help reassure both staff and patients

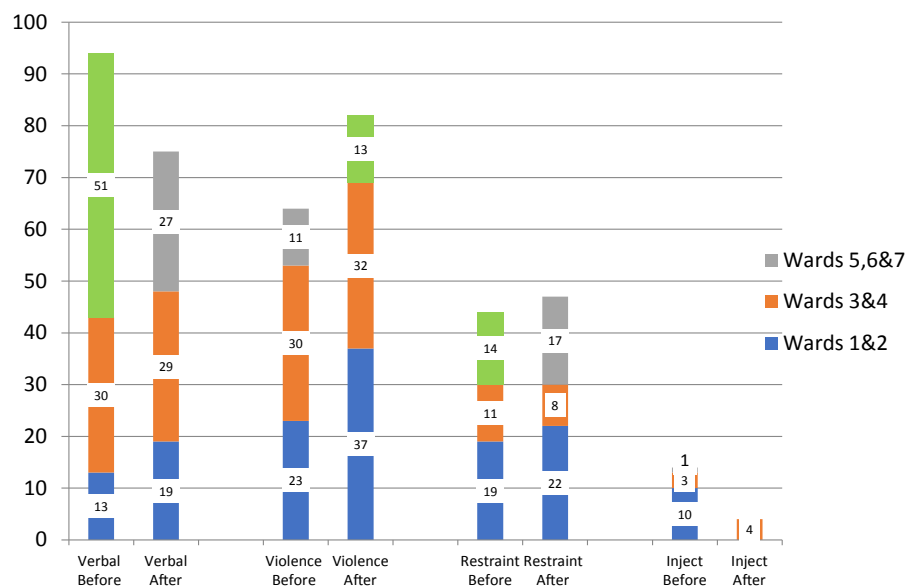


Figure 2: Changes in the number and seriousness of incidents occurring in each of the 4 categories, by ward, pre- and post-BWVC introduction in WLT.

- 100% of staff had encountered instances of verbal or physical aggression at least once a week
- 87% spent a ‘considerable portion of their time dealing with aggressive behaviour’
- 80% said that dealing with aggressive behaviour ‘often gets in the way of doing the job they ought/want to be doing’
- 80% said that if BWVCs could help reduce aggressive behaviour or the time spent dealing with it, ‘it would have a positive impact on their day-to-day job’.
- 60% could recall a work incident ‘where they wished they’d had a body camera’

The specific reasons for the need to introduce BWVCs, mentioned in initial meetings with WLT staff, were to counter false allegations; to reduce incidents of aggression and provide evidence if they occurred; and to improve safety of everyone in the clinical area.

Sampling

WLT was supplied with 50 pooled BWVCs by prior agreement with the camera company. Eventually, these were deployed across 7 MH wards with associated staff training similar to Berrywood. As Table 1 shows, the range of WLT MH wards was broader than in both Hardy, et al., [3] and Tully, et al., [2,4] studies.

Design

In a similar, though thinner, vein to Bowers, et al., [11] findings, the reviewed BWVC-specific research [2-4] tended to be qualitative and focused on the detailed ways in which BWVCs were introduced, managed, levels of satisfaction, etc. We also had evidence from informal interviews collected by the camera company [21,22] with Berrywood MH ward staff,

to suggest that the BWVCs have helped in de-escalating more serious incidents into ‘verbal aggression only’ on in-patient wards, by increasing patient self-awareness. However, we were effectively tasked with assessing whether it was possible to find indications, using existing, routinely collected data, that the positive, qualitative findings could be matched by quantitative evidence on lowering the seriousness of conflict and constraints on WLT MH wards.

To do this, we, therefore, applied an initial ‘black box’ [23] approach, ie, measuring outcomes based on existing recorded data systems. These findings should help to triangulate, or not, other ongoing work that focused on qualitative processes. We therefore ensured that our analysis focused on overall changes in the number of incidents; changes within the categories of incident seriousness; and changes within ward groupings.

Unfortunately, it was not feasible to use Bowers, et al., [13] conflict checklist (PCC) at this stage of the project as it would have required additional resources, so we started from the Berrywood feasibility study in relation to the need for the development of existing NHS systems’ data collection requirements. We recognise the need to improve the completeness and accuracy of these data [2,7] which will be a focus of future work, but they are recognised and understood by the MH staff and managers involved and are, to a certain extent, readily available. However, the linking of data from different NHS databases, and indeed, to the separate camera metrics data, will be fully developed in a separate study. Previous BWVC research findings show that this is an under-researched area that needs urgent attention [1] and crucial to the development of meaningful local outcome measures [20].

Our overall approach, therefore, was a quasi-experimental, repeated measures design [24] using data collected in tailored format from the incident recording system⁴ to measure the

Table 1: Outline of wards included in the WLT BWVC evaluation.

Ward No.	Type of patients	Sex of patient	Ward patient capacity	No. of Ward staff with cameras (all shifts)	No. of additional ward staff (without cameras) able to intervene
Ward 1	Local services admissions (Sectioned under MHA 2007 and informal admissions)	Female	15	3 Security nurses 3 Nurses in Charge 3 Response nurses	2 Security nurses 2 Nurses in Charge 1 Response nurse + 3 response nurses from other wards
Ward 2	Local services admissions (Sectioned under MHA 2007 and informal admissions)	Male	19	3 Security nurses 3 Nurses in Charge 3 Response nurses	2 Security nurses 2 Nurses in Charge 1 Response nurse + 3 response nurses from other wards
Ward 3	Local services psychiatric intensive care unit – admission under section	Male	12	3 Security nurses 3 Nurses in Charge 3 Response nurses	3 Security nurses 3 Nurses in Charge 1 Response nurse + 3 response nurses from other wards
Ward 4	Forensic service low secure admission under section	Male	18	3 Security nurses 3 Nurses in Charge 3 Response nurses	2 Security nurses 2 Nurses in Charge 1 Response nurse + 5 response nurses from other wards
Ward 5	Medium Secure - admission under section	Female	10	3 Security nurses 3 Nurses in Charge 3 Response nurses	2 Security nurses 2 Nurses in Charge 1 Response nurse + 5 response nurses from other wards
Ward 6	Enhanced Medium Secure - admission under section	Female	10	3 Security nurses 3 Nurses in Charge 3 Response nurses	2 Security nurses 2 Nurses in Charge 1 Response nurse + 5 response nurses from other wards
Ward 7	Enhanced Medium Secure - admission under section	Female	10	3 Security nurses 3 Nurses in Charge 3 Response nurses	2 Security nurses 2 Nurses in Charge 1 Response nurse + 5 response nurses from other wards

volume and seriousness of incidents requiring MH staff intervention. Tables 2a and 2b below outline the matched time periods for the repeated measures design. This ensures seasonality is accounted for. Since BWVCs were introduced on a rolling basis, ward-by-ward, Tables 2a and 2b show the 3 distinct 4-month periods that were matched depending on the date of introduction of cameras onto each ward.

The only quantitative element used by Hardy, et al., [3], as reviewed above, related to conflict and containment, using the incident reporting system. We sorted and filtered the data in a similar way so that incidents involving violence and/or aggression were categorised according to levels of seriousness. While this required us to create bespoke data sets to be derived from existing NHS incident data sets, a legacy of this approach is that it will provide the template for this type of data collection to be routinised for continuous, real time, joint evaluation and management information systems.

Since all recording systems are subject to effects of subjectivity; reporting; and recording variations [7], we decided to use an adapted version of Hardy, et al., [3] 4 ‘levels of containment seriousness’ categories:

1. Verbal aggression
2. Violence not requiring restraint
3. Restraint not including those where tranquilising injection was required
4. Restraint resulting in tranquilising injection.

The reasoning here is that we wanted to create the most conservative measures of change. At the most serious level (4), the need for tranquilising injections is extremely unlikely to be underreported or under recorded, due to the stringent post administration requirements. These include a mandatory investigation, making this a very robust measure of incident

Table 2a: Time periods for data collection in the 'before' non-camera period.

Ward name BEFORE PERIOD	Data collection start date	Data collection end date
Ward 1	6/3/17	5/7/17
Ward 2	6/3/17	5/7/17
Ward 3	1/5/17	2/9/17
Ward 4	5/6/17	4/10/17
Ward 5	5/6/17	4/10/17
Ward 6	5/6/17	4/10/17
Ward 7	5/6/17	4/10/17

Table 2b: Time periods for data collection in the 'after' non-camera period.

Ward name AFTER PERIOD	Data collection start date	Data collection end date
Ward 1	5/3/18	4/7/18
Ward 2	5/3/18	4/7/18
Ward 3	30/4/18	1/9/18
Ward 4	4/6/18	3/10/18
Ward 5	2/4/18	3/10/18
Ward 6	2/4/18	3/10/18
Ward 7	2/4/18	3/10/18

seriousness, along with any changes in it, at the highest level of conflict and containment. Use of restraint (3) would also be less likely to be underreported and under recorded for similar reasons. Indeed, neither of these most serious interventions has any subcategories. Any type of restraint is always a difficult task, carrying a potential risk of injury to patients and staff. In addition to the risk, the time and resources, including post-incident, represent substantial costs.

At the lower end of the scale, for verbal aggression (1) and for relatively minor outbreaks of violence that do not escalate to restraint (2), underreporting is potentially more likely without BWVCs (ie, in the before period), due to the greater time and effort involved in filing the incident, and in justifying it, without the clear evidence that BWVC footage would provide. Conversely, once BWVCs are issued (ie, in the after period), as Ellis, et al., [1] note in the policing environment, relatively trivial incidents are more likely to be reported due to stronger evidence and confidence in an uncontested conviction. This was difficult to control for in the pilot across the 2 time periods, but essentially, if reductions or increases are found in levels of incident seriousness, our approach should have ensured that these have to be relatively robust to register a significant change.

However, as Szabo, et al., [7] have noted, systematic reviews have shown the prevalence of violence varies from study to study and between institutions and Bowers, et al., [11] note that this is also likely to vary by ward. This has been attributed to a number of factors, including: the variety of incident reporting practices; lack of clear definitions of violence and aggression;

and lack of standard measurement instruments. In WLT's case, this is also likely to be affected by the greater variation in ward categories, (up to and including an Enhanced Medium secure wards) than those included in previous studies [2-4,11].

Results

Overall, the number of incidents across all 4 incident categories and all 7 wards in the period after BWVC introduction fell from 216 to 208. This is not a large or significant reduction (-5%) and is consistent with Hardy, et al., [3] findings from Berrywood. It is important to note, however, that the changes in types of incident seriousness have a different emphasis to Hardy, et al., [3] previous findings. Consistent with Hardy, et al., [3] findings, there was an overall reduction in WLT MH wards in the most serious incidents (restraint requiring injection), from 14 to 4. In contrast, however, there was also a reduction in the least serious incidents (verbal aggression) from 94 to 75. In our study, the (smaller) overall increases were recorded most strongly in violence not requiring restraint (from 64 to 82) and there was a small increase in restraint not requiring injection (from 44 to 47).

As in Hardy, et al., [3] study, and consistent with Bowers' findings, these overall shifts varied by ward and these are represented in Figure 2.

A key difference between Hardy, et al., [3] and Tully, et al., [2,4] studies, and our WLT study, is the different mix of ward categories. In discussing a visual presentation of the results with WLT managerial staff, it was clear that they expected the cameras to have had different impacts on different types of wards. The contextual points were therefore considered in the analysis of the results. The WLT staff grouped the 7 wards into 3 categories based on what they saw as the most similar and most different demands in terms of conflict and constraint. These 3 groupings were used in the analysis as follows:

- Wards 1&2: local services admissions (for those sectioned under MHA 2007 and informal admissions)
- Wards 3 & 4 are both for admissions 'under section' and are respectively a local services psychiatric intensive care unit, and a forensic service low secure unit admission
- Wards 5,6 & 7 were for admissions 'under section' and are medium and enhanced medium secure units (see Figure 2 above for fuller details).

Using t tests, we then analysed the patterns of change across the 3 ward groupings and across the 4 types of recorded incidents to ascertain whether any of the changes were significant in the pilot stage. In this pilot study, therefore, we have employed a ranked scale of seriousness from 1 (least serious, verbal aggression) to 4 (most serious, restraint requiring tranquilising injection). These are used to measure changes in seriousness between the before period (no BWVCs) and the after period (with BWVCs).

Given the number of wards and the limited number of cases in the pilot phase, it is unsurprising that we did not identify significant changes for either increases or decreases of any level of incident overall, or, for the most part, at ward level.

However, wards 1 & 2 did show an important significant result. As Figure 4 shows, while the overall number of incidents in these 2 wards increased by 13, from 65 to 78, this was almost entirely due to increases in verbal and low-level violence without restraint, ie the least serious ranked categories. Importantly though, in the highest ranked category, restraint necessitating tranquilising injections, the number of incidents dropped from 10 in the before period, to none in the after period. Wards 1 and 2 are the most comparable wards to the 5 wards in the Hardy, et al., [3] study in their pattern of reduction, with apparent displacement from more serious to least serious incidents. In our study, this reduction in seriousness was significant between the before period ($M=2.4$, $SD=.918$) and the after period ($M=2.04$, $SD=.083$); $t(115.994) = 2.459$, $p = 0.015$.

Figure 4 also shows that there was little evidence of BWVC camera impact on the 2, male only, wards 3 & 4. When setting up the data collection process, WLT staff had commented that: 'Given the nature of the patients in Ward 3 and Ward 4, they are more unsettled and likely to present the greatest challenges. The lack of discernible BWVC impact overall (a reduction from 74 to 73 incidents), and for the 4 categories of incidents (changes were limited to between 1 and 3 incidents) is perhaps also related to this view, which references these wards' function as de facto reception and assessment wards for all new admissions, before they are allocated to specialist wards.

The final ward grouping (wards 5, 6 & 7, Medium and Enhanced Medium Secure) were all female wards. As Figure 4 shows, there were negligible changes in all categories of incidents (changes were limited to between 1 and 3 incidents), except for the least serious category of verbal abuse. Here, there was a very promising large reduction from 51 in the before period, to 27 in the after period. However, due to being the lowest ranked type of incident in terms of seriousness, this change was not significant in our analysis.

Discussion

The purpose of this pilot study is not to make recommendations for the adoption of BWVCs in MH wards. Indeed, WLT had already introduced the cameras to the wards and had worked with MH staff to implement them. Instead, the evaluation was designed to provide to provide a 'black box' evaluation [23] to establish potential measures of effectiveness that could be used on a wider basis and to analyse those data. The findings have already been added to WLT's available information and the use of BWVCs has been continued.

The changes after BWVC introduction across all 7 of the WLT MH wards in this pilot study are encouraging. The number of the most serious incidents, ie, those requiring constraint by use of tranquilising injections, was significantly reduced.

Further, there were no significant increases in any category of incidents.

It is possible, of course, that there has been displacement from tranquilising injections, to both restraint without injections (which shows a very modest rise), or to violence without the need for restraint (which shows the largest rise). There is also the suggestion that there could be displacement from the least serious verbal incident category (which decreased markedly) to the more serious violence not requiring restraint.

Possible explanations for these proposed displacements could be investigated in future work. However, before doing this, it will be more resource effective to gather data for a longer period of analysis to establish whether the patterns of change established in the pilot hold true. This work is already planned, but within the context of improving the existing data capture processes in order to analyse a number of other relevant factors or variables.

We have identified that analysis by ward designation is important if BWVCs are to be used most effectively. This also involves managing expectations so that BWVCs are not seen as a magic bullet, but as technology that can be used well within different contexts, with different measures of success. The impact of gender between wards also needs to be considered further. In our study, the 3 wards at Medium secure-and-above designations were female wards, so the profile of impact in equivalent male wards is potentially different. We will also need to consider the overall number of patients on each of the wards involved in the measurement periods along with patients' diagnosis categories, along with a number of other factors included above.

In addition to these factors, we are also now collecting data on the number of patients involved in incidents, and the frequency of involvement of individual patients across all incidents. Finally, as in many BWVC studies to date [25], while it has been possible to measure outcome differences between staff having access to BWVCs and those who did not, it has not yet been possible to establish the extent to which cameras were actually used in specific incidents. Indeed, it is currently a resource intensive task to link camera metrics/meta data to NHS outcome databases, although a legacy of this study will establish a workable way to do this. In a recent police study, Ellis, et al., [26] found that despite all patrol officers in a force area having personal issue BWVCs, they were only activated in around a third of domestic use incidents attended, which, in turn, resulted in significantly different outcomes for prosecutions and sentencing. It is therefore vital to be able to link camera activation metrics to existing NHS databases⁵ [27,28].

Conclusion

This pilot study on a range of WLT wards supports the conclusion of Hardy, et al., [3]: that it is feasible to employ body worn cameras in MH wards. We have also extended this utilisability to a wider range of MH ward settings than the 2

previous studies [2-4]. We found that the use of BWVCs was associated with different effects depending on ward designation. Most importantly, we found that on local service wards (sectioned under MHA 2007 and informal admissions), BWVC use was associated with a significant reduction in the most serious incident category, the use of restraint requiring tranquilising injections. However, in Medium Secure and Enhanced Medium Secure Wards (all female wards in our study), we found that BWVCs were associated with a large, but not significant, reduction in the least serious incident category: verbal aggression. BWVCs also appeared to have little impact on the intensive care unit, or on the forensic low secure wards, for sectioned patients [29-31].

The next stages of the evaluation will explore the impact on staff (including complaints against them) and allow for incident data to be collected and analysed over a longer period. To some extent, this will allow us to identify limitations and add additional variables, such: as the extent to which staff practices include Safewards practices [10]; the effects of differences between informal and detained patients; relative proportions of male and female staff and patients; career length of staff; patient diagnoses and treatment; etc. This will allow us to open the 'black box' [24] and examine other mechanisms, including the human factors or human/camera interactions that were found in the previous policing study by Ellis, et al., [1]. Beyond this, we plan to examine the impact on costs and savings to WLT. Importantly, a major legacy of this project will be the development of a template for the collection of data from across existing databases that, if used, will provide routine evaluative and more effective management information.

Footnotes

¹Prior to November 2018, the name of the West London Trust (WLT) was West London Mental Health Trust (WLMHT).

²It is important to be aware that the BWVCs developed for non-enforcement use (ie, in hospital wards) by Calla are much smaller and less intrusive following the Berrywood feasibility study – they can be seen, along with opinions of users at: Calla (n.d. b) One year on with Calla body cameras at Northamptonshire Healthcare NHS Foundation Trust <https://www.youtube.com/watch?v=SmY4uAG24TQ&feature=youtu.be>

³Unlike police use of BWVCs, which has national guidance issued through the College of Policing, there is no equivalent in healthcare, which requires each hospital or department to develop their own guidance. This can be shared across trusts, but must still be compliant with data protection legislation (IAHSS Foundation 2015)

⁴WLT uses the IR1 system (Incident Reporting System 1)

⁵This is an under-researched area. Over half of all Ellis et al's (2015 pp.53-54) recommendations for effective deployment and evaluation of police BWVCs related to data linkage.

References

1. Ellis T, Jenkins C, Smith P. Evaluation of the introduction of personal issue body worn video cameras (Operation Hyperion) on the Isle of Wight: Final report to Hampshire Constabulary. 2015.
2. Tully J, Fahy T, Larkin F. New technologies in the management of risk and violence in forensic settings. *CNS Spectrums*. 2015; 20: 287-294.
3. Hardy S, Bennett L, Rosen P, Carroll S, White P, et al. The feasibility of using body worn cameras in an inpatient mental health setting. *Ment Health Fam Med*. 2017; 13: 393-400.
4. Tully J, Fahy T, Larkin F. New technologies in the management of risk and violence in forensic settings. In K. Warburton and S. Stahl (Eds) *Violence in Psychiatry*. Cambridge: Cambridge University Press. 2016; 314-322.
5. International Association for Healthcare Security and Safety (IAHSS) Foundation (2015). *Body Worn Camera Use in Health Care Facilities*. 2015. <https://iahsf.org/best-practices/body-worn-camera-use-in-health-care-facilities/3/>
6. Warburton KD. The new mission of forensic mental health systems: managing violence as a medical syndrome in an environment that balances treatment and safety. 2014. 19: 368-373.
7. Szabo KA, White CL, Cummings SE, Wang RS, Quanbeck CD. Inpatient aggression in community hospitals. In K. Warburton and S. Stahl (Eds) *Violence in Psychiatry*. Cambridge: Cambridge University Press. 2016; 39-48.
8. Soliman AE, Reza H. Risk factors and correlates of violence among acutely ill psychiatric patients. *Psychiatr Serv*. 2001; 52: 75-80.
9. Michele Raja M, Azzoni A. Hostility and violence of acute psychiatric inpatients. *Clin Pract Epidemiol Ment Health*. 2005; 1: 11.
10. Bowers L, James K, Quirk A, Simpson A, SUGAR, et al. Reducing conflict and containment rates on acute psychiatric wards: The Safewards cluster randomised controlled trial. *Int J Nurs Stud*. 2015; 52: 1412-1422.
11. Bowers L. Safewards: a new model of conflict and containment on psychiatric wards. *J Psychiatr Ment Health Nurs*. 2014; 21: 499-508.
12. Bowers L. Association between staff factors and levels of conflict and containment on acute psychiatric wards in England. *Psychiatr Serv*. 2009; 60: 231-239.
13. Bowers L, Douzenis A, Galeazzi GM, Forghieri M, Tsopelas C, et al. Disruptive and dangerous behaviour by patients on acute psychiatric wards in three European centres. *Soc Psychiatry Psychiatr Epidemiol*. 2005; 40: 822-828.
14. Greater London Authority. *Risky Business: Protecting Frontline Workers from Attack Whilst on Duty*. London: Roger Evans London Assembly. 2014.
15. Stephenson J. Sharp spike in number of physical assaults on NHS staff. *Nursing Times*. 2018.
16. HSJ and Unison. *Violence against NHS staff: a special report*. 2017. <https://guides.hsj.co.uk/5713.guide>
17. Body Worn Video Steering Group. *Risky Business: Body Worn Video to Protect Front-line Workers?* 2014.

18. Big Brother Watch. Smile you are on Body Worn Camera, Part 1 – Local Authorities: How councils are using body worn cameras. A Big Brother Watch Report. 2017.
19. Patton MQ. Utilization-focused evaluation: The new century text (3rd ed.) Thousand Oaks, CA: Sage. 1997.
20. NHS England & NHS Improvement. Delivering the Five-Year Forward view for Mental Health: Developing quality and outcomes measures (NHSE&I). London: NHS Improvement. 2016. <https://www.england.nhs.uk/mentalhealth/wp-content/uploads/sites/29/2016/02/mh-quality-outcome.pdf>
21. Calla (n.d a) CALLA in an inpatient mental health setting <https://www.youtube.com/watch?v=UehThbSrtxQ&feature=youtu.be>
22. Calla (n.d. b) One year on with Calla body cameras at Northamptonshire Healthcare NHS Foundation Trust <https://www.youtube.com/watch?v=SmY4uAG24TQ&feature=youtu.be>
23. Pawson R, Tilley N. Realistic Evaluation. London: Sage. 1997.
24. Robson C. Real World Research. Oxford: Blackwell. 2002.
25. Owens C, Mann D, Mckenna R. The Essex Body Worn Video Trial: The impact of Body Worn Video on criminal justice outcomes of domestic abuse incidents. London: College of Policing. 2014. http://college.pressofficeadmin.com/repository/files/BWV_Report.pdf
26. Ellis T, Kapend R, Smith P, Ribbers E, Ciobotaru S, et al. (forthcoming). An examination of the impact of Body Worn Video Cameras on domestic abuse cases.
27. Hillingdon Hospitals NHS Foundation Trust. New body cameras for Trust security. 2011.
28. Joyce E. Cognitive function in schizophrenia: insights from intelligence research. *Br J Psychiatry*. 2013; 203: 161-162.
29. McDermott BE, Holoyda BJ. Assessment of aggression in inpatient settings. In K. Warburton and S. Stahl (Eds) *Violence in Psychiatry*. Cambridge: Cambridge University Press. 2016; 25-31.
30. Miller L, Toliver J. Implementing a Body-Worn Camera Program: Recommendations and Lessons Learned. United States of America: U.S. Department of Justice's Office of Community Oriented Policing. 2014.
31. In K. Warburton and S. Stahl (Eds) *Violence in Psychiatry*. Cambridge: Cambridge University Press. 2016; 10-16.

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