Abstract

BACKGROUND: Positive Behavioural Support (PBS) has been shown to be effective in minimising challenging behaviour, and improving the lives of people with intellectual disabilities. Training in PBS is an important factor in achieving good coverage in the use of PBS. The aim of this study was to evaluate the impact of training managers of social care services in PBS. ***METHOD****:* A year-long training programme in PBS was delivered to 50 managers of community-based services for people with challenging behaviour. Data were collected pre and post training, and at 6 month follow-up. A non-randomised control group design was used. ***RESULTS:*** Data demonstrated significant reduction in challenging behaviour. However, there was no change in quality of life for service users. ***CONCLUSION:*** Training in PBS can reduce challenging behaviour in people with intellectual disabilities; demonstrating any impact of PBS training on quality of life remains a challenge.

Key Words: Positive Behavioural Support; challenging behaviour; staff training

Background

Positive Behavioural Support (PBS) is now well-established as an effective framework for supporting people with intellectual disabilities and challenging behaviour. It has been defined and refined in a number of studies over the past 25 years (Horner et al, 1990; Allen et al, 2005; La Vigna & Willis, 2005; Gore et al, 2013; Kincaid et al, 2016), and there is a range of literature reporting on its use (Carr et al, 1999; Hassiotis et al, 2009; Allen et al, 2011; La Vigna & Willis, 2012; Goh & Bambara, 2012; Durand et al, 2013). It has become more widely used in intellectual disability services and is recommended by a range of good practice guidelines (ACEVO, 2015; DOH, 2014), particularly following the Winterbourne View scandal and the development of the Transforming Care agenda in England (NHS England, 2014). Developing a workforce skilled in implementing PBS is therefore a key aim of support services, and effective PBS training is a fundamental element in achieving this. PBS has a role in providing less restrictive alternatives to physical restraint and psychotropic medication, and it may also be an important element in developing effective community-based support to individuals currently living in hospitals. Evaluation of the effectiveness of PBS training is

therefore a major factor in establishing how best to achieve greater use of PBS in support services to people with intellectual disabilities.

A systematic review of staff training in PBS was carried out in 2013 (MacDonald & McGill) and found 14 studies which had reported on the impact of PBS training. Since then a number of additional studies have reported on outcomes from PBS training (Wills et al, 2013; Rose et al, 2014; Wardale et al, 2014a & 2014b; Davies et al, 2015; Stocks & Slater, 2016; Singh et al, 2016), indicating that research on PBS training is becoming more common in the literature. The systematic review found that of the 14 studies, six focused on outcomes for staff only, four focused on outcomes for service users only, and four reported on outcomes for both staff and service users. Staff outcomes included skills, confidence, knowledge, attributions and emotional responses, with little emphasis on changes to staff practice. Service users' outcomes demonstrated reduction in levels of challenging behaviour, but of the 14 studies reported on, only one (Dench, 2005) reported on quality of life outcomes for service users, and it showed no changes.

In the studies published since the systematic review there are similar findings. Wills et al (2013) reported on outcomes from a three-day training course for staff and found that there were significant positive changes in staff knowledge, attributions, levels of optimism, and helpful behaviours. Rose et al (2014) reported on the impact of a one-day PBS training on staff attributions and attitudes and found these had both changed positively. Wardale et al (2014a) reported on training in PBS for six staff within a forensic service. They found that following the three-day training, knowledge increased and the quality of PBS plans was improved, assessed using the Behaviour Support Plan Quality Evaluation Guide (Browning-Wright et al, 2003). A larger study carried out the same year by Wardale and colleagues (2014b) found that for the 234 participants of a four-day training course, there were significant changes in PBS knowledge and attributions; in addition the quality of PBS plans were also found to have improved. Davies et al (2015) also reported on outcomes from PBS training within a forensic service; they measured staff confidence and attributions and found that both were positively affected by the training. Singh et al (2016) reported on the use of a mindfulness-based PBS (MBPBS) training, provided to staff over seven days. They compared a group receiving PBS-only training with a group receiving MBPBS training and found that the MBPBS training resulted in less use of physical

restraint by staff, less staff stress and reduced staff turnover. Stocks & Slater (2016) reported on the impact of a six day training on PBS and found that staff self-efficacy and expectations of positive outcomes increased following training.

The above summary demonstrates similar outcomes to the findings of MacDonald & McGill's systematic review (2013), which is that most studies only report on staff outcomes, and that this is mainly not in relation to practice, but rather focuses on staff characteristics (with the exception of Singh et al, 2016). Although positive changes in staff characteristics such as confidence, knowledge, attributions, and emotional responses would all be expected to be helpful in terms of supporting staff and maintaining a healthy, well-informed and resilient workforce, there is no clear evidence that these have a positive impact on either levels of challenging behaviour, or on the quality of life for individuals with intellectual disabilities.

The literature on PBS training therefore appears to indicate a number of gaps: there is a notable lack of reporting on outcomes for service users, in particular in relation to quality of life and improvements in support. There is also a limited number of studies which demonstrate PBS training having an impact on challenging behaviour, and there are few studies reporting on implementation of training and changes in staff practice, as opposed to changes in staff characteristics. The literature also demonstrates few studies that have used robust designs such as the use of control groups, use of blind assessors, reliability measures for data collection, or treatment integrity (i.e. adherence to training). For example, from the seven studies described above and the 14 found in the 2013 systematic review, only one used a control group (Grey & McClean, 2007) and one a comparison group (Singh et al, 2016). Follow-up data collection is also limited in many of the studies so that it is impossible to evaluate maintenance of training effect; only four studies had follow-up data collection (McClean et al, 2005; McClean & Grey, 2012; McGill et al, 2007; Singh et al, 2016).

The wider training literature within intellectual disability also acknowledges the challenge which arises in translating training into practice, in order to avoid a 'train and hope' approach (Stokes & Baer, 1977), i.e. where staff attending training do not make any generalised changes to their behaviour as a result. Research shows that although staff may find training enjoyable, there is often no evidence of changes to staff practice as a result (Campbell, 2007; Cullen, 1988). The Kirkpatrick model of

evaluating training is helpful to consider (Kirkpatrick, 1996), which describes four levels for evaluating training: reaction, learning, behaviour and results, emphasising the separation between participant reaction to training and any change in day-to-day behaviour. Smidt et al (2009) used this model to assess 12 studies reporting on outcomes from training, and concluded that the majority of studies used no measures to report on changes to staff behaviour within the workplace. The wider literature on implementation science may also useful to consider here in terms of addressing translation gaps from research to practice (Fixen et al, 2005). Implementation science is summarised as the 'study of methods to promote the systematic uptake of clinical research findings and other evidence-based practices into routine practice' (Eccles et al, 2009) and it stresses the role of on-the-job coaching and performance feedback. Van Oorsouw et al (2009), for example, carried out a meta-analysis of training studies and found that on-the-job coaching was an important element to maximise effectiveness. Performance feedback is also a key element, such as that used within the Periodic Service Review (PSR) (La Vigna et al, 1994).

The current study attempted to address some of these areas, through the use of a more robust design and via consideration of a range of outcome measures for both staff and service users. The study focused on the PBS training of first level managers in social care, and studied the impact of this training on them, on the staff teams that they managed, and on the service users who these teams supported. The aim was to investigate a cascade approach to implementing PBS, that is, whether training first level managers resulted in skilled teams who provided better support. The theory of change was that managers who received training in PBS would pass this on to their staff teams in a number of ways. Firstly, the managers would be supported to write PBS plans as part of the training course; implementing these plans would impact how the staff carried out their support role. Managers would also be taught how to undertake a practice leadership role, i.e., to observe their staff's practice of PBS and to provide feedback, as well as to guide staff performance via a number of management inputs, such as regular team meetings and supervision. Implementation of all of these changes would be monitored via the use of a Periodic Service Review (La Vigna et al, 1994), which would provide regular performance feedback to staff. Following these changes in how staff carried out their support role, and the introduction of PBS plans, it was expected that there would be changes in the support

provided to service users, and consequently changes in both their behavioural presentation and quality of life. If this training programme achieved this expected change, this would be a cost effective approach to help address issues of coverage and achieve skilled local staff teams, as recommended in the Mansell Report (DOH, 2007), and would also help address issues of high turnover in social care services through having a skilled manager to provide continuity of PBS, even when direct support staff moved on.

The study attempted to answer the following questions (listed in order of priority for the study). Can training first level managers in PBS impact on

a) Service users' quality of life and levels of challenging behaviour
b) Characteristics and performance of staff: use of active support, levels of assistance and positive contact provided to services users, PBS knowledge, and attributions about challenging behaviour
c) Characteristics and performance of manager: use of practice leadership, PBS knowledge and attributions about challenging behaviour

The study also addressed whether any changes are maintained at follow-up.

Method

Design

The study was a non-randomised control group study with both between-group and within-group comparisons. Data were collected prior to training in PBS, a year later after training was complete, and at follow-up six-months later (for the experimental group only).

Group Size

Previous experience of running the training indicated a 20% dropout, therefore it was decided that 50 participants in the experimental group was sufficient, as this would leave 40 managers after dropout. Achieving identical numbers in the control group was difficult, due to the perceived burden and lack of benefit; a group of half the size was judged to be acceptable, a starting group of 22, expected to reduce to 18 following dropout. Required sample size was calculated using data from previous studies

on challenging behaviour using the Aberrant Behaviour Checklist (Aman & Singh, 1986), as this was the primary dependent variable. In a randomized controlled trial of the impact of PBS on challenging behaviour, Hassiotis et al (2009) estimated an effect size of 0.8. Effect size was therefore set at 0.8. With power set at 0.8 and $p<0.05$ (one tailed) a group size of 58 (40 in experimental group and 18 in control group) was sufficient.

Participants

Participants in this study were 72 (experimental group n=50; control group n=22) first level managers in a community-based social care provider; the staff managed by these managers; and 72 individuals with intellectual disabilities, supported by these managers. The experimental group for this study was recruited from managers enrolled on a PBS training course provided within the social care organisation in which they worked. Managers in the control group worked within the same organisation and were eligible for attending the training, but had not been prioritised for training. Staff teams were recruited on the basis that their manager had agreed to be part of the study, and service users were chosen by the managers as the 'focus person' for the work of the course. Tables 1 and 2 show the characteristics for managers and service users for both experimental and control groups; staff demographic data were not collected as the staff team were considered as a group, the make-up of which may change over the period of the study.

Ethical Approval and Consent

Ethical approval was sought and obtained from the Scotland A Research Ethics Committee. Most of the service users had severe intellectual disabilities and did not have capacity to give informed consent. For these individuals, the principles of the Adults with Incapacity Act Scotland (2000) (AWI) (Scottish Government, 2000) were considered. Participation was voluntary for all participants, and formal consent was obtained for all participants. Guidelines were developed to ensure that observations were stopped if any service user demonstrated distress or indicated withdrawal of consent.

Intervention

The training was delivered in two cohorts (*n*=25), each training course lasting a year, and consisting of a two-day introduction, followed by eight one-day workshops, six weeks apart. Training groups were small, with high trainer-to-participant ratio; on average two trainers for five participants. The training was delivered by members of the organisation's PBS team and content was based on La Vigna & Willis' multi-element model of PBS (2005), as this was felt to be an accessible model suitable for use in social care practice. Trainers had been in their role for an average of 27 months. They all used PBS in their daily practice and they had all attended a 4-day training course in multi-element PBS delivered by Gary La Vigna from the Institute of Applied Behavior Analysis; they also received regular practice-based PBS guidance from the first author.

Table 3 shows an overview of the training provided to the managers. The training was practice-based, and supported participants to develop a function-based PBS plan and then to lead their staff team in implementing this. The training was accredited by a local university and was assessed via a portfolio of work which provided evidence of implementation and monitoring of PBS throughout the year that the course lasted, a presentation which described the learning gained for the manager through undertaking the course, and an essay, detailing the impact of the implementation of PBS for the focus person. Specific objectives of the training were for managers to be able to:

- Identify the function of behaviour for the focus person
- Develop and implement a PBS plan for that person
- Manage and review staff practice with regard to implementing this plan
- Monitor the impact of the PBS plan

PBS plans were based on the La Vigna multi-element model of PBS (La Vigna & Willis, 2005; La Vigna et al, 1989) and all contained at least four function-based proactive strategies and at least one reactive strategy, with the proactive strategies including at least one strategy in each of the following categories: ecological interpersonal; ecological activity; positive programming, either functionally equivalent or coping and tolerance; focused support, either reinforcement protocol or antecedent

control strategy . The quality of the PBS plans developed and implemented by the participants were monitored by the PBS team who provided the training; however these plans were not externally evaluated. In order to try and ensure consistency of approach by the different trainers, all trainers used the same training pack, met monthly for preparation sessions before each workshop, and delivered training in pairs. However, there were no checks for procedural validity of the training itself.

Measures, Data Collection and Reliability

Table 4 shows the measures used in this study, when they were completed, by whom, and the reliability checks. Staff measures were completed by all available staff in each managers' team and then scores were averaged to give a score for that team at each data collection point; managers' and service users' scores were scored individually.

The *Aberrant Behaviour Checklist* (ABC) (Aman & Singh, 1986) is an informant-based scale designed to assess challenging behaviour in people with intellectual disabilities. It has demonstrated reliability and validity and is well-used within the literature, including other studies in relation to PBS, (Allen et al, 2011; Hassiotis et al, 2009; McGill et al, in press).

The *Active Support Measure* (ASM) (Mansell et al, 2005) is an observer-completed rating scale which scores the level of staff implementation of active support. In this study it is regarded as a measure of the quality of staff support to service users. Each area can be scored on a 4-point scale and increased scores indicate increasing evidence of positive staff practice.

The *Adaptive Behaviour Scale* (ABS) (Nihira et al, 1993) is a widely used assessment tool for people with intellectual disabilities and allows description and classification for comparison purposes. It is divided into two parts: part one is to assess skills and functioning; part two is to assess challenging behaviour. Only part one was used in this study.

Behaviours Recording Forms (BRF) were ABC forms which are a commonly used observational method of recording behaviour (Emerson & Einfeld, 2012). Data from these were collected in a 4-week period at each time point, before the training, immediately after the training, and at 6-month follow-up. They were completed by staff after any incident of challenging behaviour and provided

data with regard to frequency of behaviour. Reliability checks consisted of the manager checking staff daily notes to ensure that no incidents of behaviour were referred to that were not recorded on BRF, and at the team meeting following the four-week data collection period the manager checked the number of incidents described by staff matched the number of completed BRF.

The *Challenging Behaviour Attribution Scale* (CHABA) (Hastings, 1997) assesses staff beliefs about reasons for challenging behaviour. It consists of 33 statements which give possible reasons for behaviour, and each statement is related to a causal model. It is reported to have moderate to good levels of reliability.

The *Guernsey Community Participation and Leisure Assessment* (GCPLA) (Baker, 2000) is a quality of life measure and is used to assess level and quality of involvement in the community and leisure activities. There are 49 items within six categories of community access (services; public transport; indoor leisure; leisure, sport and recreation; social; facilities/amenities). Each of these is operationally defined and scored for frequency of access and support while accessing. Only the frequency aspect of the GCPLA was used as it was judged to be more relevant to the client group (whose support from staff was on the whole unlikely to change to any great degree). For the elements of the GCPLA used in the current study it has been reported to have acceptable inter-rater reliability (0.83 for range and 0.84 for busy); acceptable test-retest reliability (0.83 for range and 0.84 for busy); and internal reliability of 0.93 Cronbach's alpha for frequency of contact.

Momentary Time Sampling (MTS) (Mansell et al, 2003) was carried out to measure both the quality of staff support and engagement for service users, which was regarded as a quality of life measure. A 20s interval was used and both staff and service users' behaviours were recorded during a two-hour video at each data collection period, with different codes used for staff and service user behaviours, as outlined below. In any interval only one code could be recorded for each participant, therefore if two behaviours were seen to be happening at the same time, observers had to make a judgement about which was the primary behaviour; guidance was developed to clarify how to judge the primary behaviour and this was used during training and practice. The codes used were adapted from Jones et al (1999).

The members of the PBS team were all trained by the first author to code using MTS. A full definition of the codes was written up, with detailed definitions and examples of each. A series of team training sessions took place where team members practiced coding via video, and then checked for agreement in their scores. Any discrepancies were discussed, and then further coding practice took place. This process continued until the group achieved at least a 90% agreement on all codes. This group coding was repeated periodically throughout the life of the study, in order to ensure ongoing reliability.

MTS coding was checked for reliability by a blind second observer re-coding a random 20% of the videos. The level of agreement was calculated for each behaviour in each re-coded video for occurrence and non-occurrence using the formulae in Murphy (1987, p.228) and then an average level of agreement for each behaviour's overall occurrence and non-occurrence was calculated. Cohen's Kappa was also calculated for each behaviour. Reliability data for MTS is shown in Table 5. As the study progressed, it became clear that some of the observation data were noticeably different from comparative literature, particularly service user engagement and staff assistance, which were both markedly higher. It was therefore agreed as an additional check that the first author would re-code a 5% sample of the videos (n=8), from a random sample from each time point and from both experimental and control groups. The re-coding focused on the two areas of concern, service user engagement and staff assistance; Table 6 shows the percentages for each. Tests found a significant positive correlation between original coding and re-coding scores for assistance ($r=0.996$; $p<0.001$) and engagement ($r=0.998$; $p<0.001$).

The *knowledge test* was 10 multiple choice questions, based on a test within a training pack developed by the Institute of Applied Behavioral Analysis (La Vigna & Willis, 2009); this was an unstandardized test. Internal reliability was tested at T1 and Kuder-Richardson value was found to be acceptable at 0.61. It was marked blind.

The *Periodic Service Review* (PSR) (La Vigna et al, 1994) is a management tool which allows measurement of the extent to which PBS plans are being implemented and other recommendations are being carried out. There are no reported reliability data. As the PSR was developed as part of the training, no PSR was in place for the control group. The process for drawing up the PSR was that each area of the PBS plan was clearly defined as a standard that could be scored as occurring or not, for

example, *a review of records and a visual check of the communication board show that the person's interpersonal behaviour support plan has been carried out as described every day in the past week*. Standards were set both for all elements of the PBS plan and also for management support, including team meetings, monitoring staff performance via direct observations, and giving staff feedback. For every standard met, a point was scored and if a standard was not met, then no point was scored. Following the check of the PSR, the score was converted into a percentage and displayed on a graph in the staff area of the service, so that all staff members received visual feedback of how the service was progressing. La Vigna et al (1994) describe a score of 85% as being likely to indicate consistent implementation of behavioural recommendations (p. 9).

A *Practice Leadership Questionnaire* was developed based on the Staff Experiences and Satisfaction Questionnaire (SESQ) (Beadle-Brown et al, 2005). Only a small part of the SESQ was used, Question 11 from Section B, which is about practice leadership and focuses on staff's experience of three main areas; supervision, team meetings, and observation by manager. Items are scored one point if they meet specific criteria, for example:

- If supervision includes discussion of service user engagement in activity
- If the main focus of team meetings is service user engagement in activity
- If the manager observes staff practice at least monthly

There are ten items, two with two parts, giving a total score of 12 which was then converted to a percentage.

Missing Data

An intention to treat approach (Hollis & Campbell, 1999) was taken to missing data at T1 and T2. In order to take a conservative approach to data analysis, any missing data that was linked to a service user's challenging behaviour (for example breakdown of a service due to challenging behaviour), were imputed using the worst score that had occurred in the group for that measure. Any other missing data not related to levels of challenging behaviour (for example the service user dying or a manager leaving the organisation), were imputed using group average; this was felt to be the most

appropriate (rather than last score carried forward), as it takes into account the expected change in scores and therefore imputes data in the same direction as the rest of the group. At T3 data were not imputed due to the substantial loss of participants.

Data Analysis

Data were tested for their suitability for parametric analysis using Kolmogorov-Smirnov tests for normally distributed data, and Levene's test to check for homogeneity of variance. Where data were found to not meet parametric requirements, non-parametric tests were carried out; otherwise parametric tests were used with outliers and extreme scores removed. In calculating difference between T1-T2 for both the experimental and control group, a mixed-factorial ANOVA was conducted with the two groups as the between-subjects factor and the two time points as the within-subjects factor in the analysis. When ANOVA was not possible due to non-parametric data, then the change in each participant's score from T1-T2 was calculated, and then these data were tested to see if they met parametric requirements. If they did, then a parametric test (unrelated t-test) was used; if not, a non-parametric test for unrelated data (Mann-Whitney U) was used. This approach of using the change in scores also compensated to some extent for the significant differences occurring for some measures between control and experimental groups at T1 and T2; it was therefore also done in addition to ANOVA as part of the sensitivity analysis (Thabane et al, 2013) for any measure where experimental and control groups were significantly different at T1. In relation to follow-up data, control group data were only collected up to T2, so any tests involving T3 data, were only for the experimental group. Analysis was therefore more straightforward and related tests were used, either parametric or non-parametric as appropriate according to the data. T3 data were only used to assess maintenance of effect from T2 and therefore T3 tests were only done for measures that had shown significant change at T2. SPSS version 22 was used throughout.

The primary analysis was intention to treat, that is, based on the full data set, with all participants included whether they completed the training or not, and including data imputed as described above. Sensitivity analysis was carried out in addition to the primary analysis in order to explore any difference in results based on different methods of analysis. This included intention to treat analysis,

which included imputed data, with outliers included and then also with them removed; and per protocol analysis, where no imputed data were included, also done with outliers included and then with them removed. Only results that are significant regardless of method of analysis are reported as significant.

As the training was carried out over two cohorts, tests (t-test or Mann-Whitney U) for all measures were carried out to establish if the two cohorts were significantly different. No significant differences were found so the two cohorts were regarded as one for all further analysis.

Due to repeat comparisons on the same measures, Bonferroni adjustment was made to the significance level, in order to avoid a possible Type 1 error. This was calculated by using p=0.05 and dividing this by the number of comparisons made. For correlations, due to the number of comparisons being done, p=0.01 was used for all correlations. Two-tailed tests were used throughout.

In order to look at individual change and not just change within the group as a whole, the change in ABC was calculated for each participant in the experimental group to look at difference from T1-T2. This was only carried out on the ABC as that was the primary measure. A reliable change score was used to provide statistical reliability of individual change for each participant, rather than just for the group as a whole. The formula used for reliable change was based on Jacobson & Truax (1991). A reliable change score of greater than 1.96 would be unlikely to occur without actual change (Remington et al, 2007), therefore a score of more than 1.96 demonstrates that the change is likely to be reliable.

Results

Missing Data

Two service users died in the course of the study, and four left the organisation; three of these due to breakdown of their service following challenging behaviours, and one for unrelated reasons. Three managers left the training and three left the organisation before T2; all of these were in the experimental group. By T3, a further 16 managers had left either the organisation or the service, (some were moved to manage other services, due to their newly acquired skills in PBS). This left 22

per protocol participants in the experimental group (44%); analysis at T3 is therefore only for this smaller group.

Service Users

Table 7 illustrates the results for service users' ABC total and severe; BRF; GCPLA busy and range; MTS challenging behaviour, total engagement (the total of social and non-social engagement), and disengagement.

Challenging behaviour: significant reductions were found in frequency and severity of service users' challenging behaviour following training, as reflected by the ABC, the main outcome measure. Figure 1 shows the individual and reliable change which was calculated for ABC total scores from T1-T2; 84% of service users experienced reduced ABC scores. Using the reliable change formula, and the fact that a score of at least 1.96 is required in order to indicate that a reliable change has taken place, it was calculated that the difference between T1 and T2 had to be at least 27.36 in order for this to be judged a reliable change; 21 participants had a positive reliable change, and two service users had a negative reliable change. As the training was delivered by different trainers, a one-way ANOVA was carried out on the change in ABC total scores from T1-T2 in order to check for any differences between trainers; this found that there was no significant interaction between trainer and change in ABC total score ($F=1.07$; $p=0.990$). Table 10 illustrates correlations; ABC total was significantly negatively correlated with practice leadership, PSR, ASM, managers' knowledge, engagement, and GCPLA range.

Results from the BRF also show that frequency of incidents of challenging behaviour decreased significantly following training. Challenging behaviour was also analysed via MTS; however due to the low level of occurrence during video observation and the high number of outliers and extreme scores, this was not judged to be a reliable assessment of challenging behaviours.

Quality of life: results from MTS show there was increase in total engagement although this was not significant, and there was no significant change in GCPLA for either range or busy scores

Staff

Table 8 illustrates the results for staff active support, attributions, MTS (positive contact, assistance, no contact), and PBS knowledge. There were no significant changes in any of the measures from T1-T2.

Managers

Table 9 illustrates the results for managers' attributions, PBS knowledge, practice leadership, and for the PSR. The only significant change was an increase in PBS knowledge for the experimental group. Practice leadership was significantly positively correlated with GCPLA, PSR scores and with ASM, for the experimental group only. PSR scores were significantly positively correlated with GCPLA range and busy scores.

Follow-up

All follow-up results are based only on the 22 participants who were consistent across the timeframe of the study. The managers' mean score for PBS knowledge increased non-significantly, and PSR scores for the 22 participants increased slightly. ABC total and severity scores increased at T3, but not significantly. BRF frequency reduced further, but not significantly. There were some changes within MTS scores at T3 (positive contact, assistance and total engagement increased further, and disengagement decreased further), and ASM also increased at T3, but as these did not significantly change at T2, no further tests were done.

Discussion

In considering the findings from this study, it is useful to return to the initial research questions, that is, whether training managers in PBS can impact on outcomes for service users, staff, and for the managers themselves.

Service users

Challenging behaviour from service users as measured by the ABC reduced significantly over the course of the study, however there were no changes to quality of life. As an indicator of service users' quality of life, social and non-social engagement (i.e. engagement in activity) were measured via MTS, but showed no significant changes. However, it must be noted that levels of engagement in this study were very high, at T1, so this may be a factor for the lack of change. Within the literature engagement levels are substantially lower, for example, Hatton & Emerson's (1996) review of 47 studies found an average engagement of 48%; Mansell & Beadle-Brown (2012) reviewed the literature and found average engagement of 39% (range 17%-70%) across 24 studies (p.48). Other studies report engagement of 20%, 42% and 17% at baseline (Beadle-Brown et al, 2012; Stancliffe et al, 2007; Bradshaw et al, 2004, respectively). All of these studies saw increases in engagement following active support training (to 41%, 50%, and 26% respectively), although still not to the level of engagement recorded in the current study. The size of the settings in which service users in this study lived may be a factor in the high levels of engagement; there is some research to show that smaller sized living units are associated with better outcomes for service users (Stancliffe, 1997), particularly when the units are very small sized (Tossebro, 1995). Felce et al (1991) observed engagement in a range of different settings and found that in every case, larger staff and service user groups were associated with lower service user activity. There was a noticeable difference in the size of the settings in the current study to those in comparison studies. Over 70% of the service users in this study lived alone, and on average there were 1.1 service users per setting in the experimental group. This is very different from the settings in most studies in the literature, which are based on group homes, with numbers of service users per setting ranging from 3-6 (Beadle-Brown et al, 2015; Mansell et al, 2002). Staffing ratios also differs substantially from studies in the literature, with an average whole-time equivalent staff to service user ratio of 3:1 for the experimental group,

substantially higher than in most comparative studies, which range from 1.22:1 to 1.8:1 (Mansell et al, 2013; Mansell et al, 2008; Stancliffe et al, 2007; Felce et al, 2003).

Staff

There were no changes in any staff measures throughout this study. However, as with engagement, assistance levels in the current study were also markedly higher than in comparison studies (Jones et al 1999; Stancliffe et al 2007; Mansell et al, 2008; Beadle-Brown et al, 2014), and this may be due to the factors noted above, as staff assistance and service user engagement are likely to be linked. As with engagement, a potential explanation for the lack of change in assistance is that levels started high and therefore had little opportunity to increase further. However given it was only a mean of 35%, it appears at least theoretically possible that it could have increased further, particularly considering that 96% of the experimental group were supported on at least a 1:1 basis during observation, and 70% had no other service users living with them. As there are no studies reporting such a high assistance at T1, it is difficult to make any useful conclusions in this respect. Another potential reason for the lack of change in assistance however, may be the lack of hands-on training within the training programme. The active support literature has evidenced that lack of the hands-on training or coaching has a substantial impact on training's effectiveness (Jones et al, 2001). Other studies have also shown that a combination of classroom based training and on-the-job coaching is the most effective format of staff training (van Oorsouw et al, 2009), and it may be that this is the element which this particular training programme lacked in order to effect a change for staff assistance to service users.

Although this study did not provide training in active support, it used the ASM to evaluate the quality of support provided to service users. The ASM did not increase significantly from T1 to T2, but did increase to 80% for the reduced-size group at T3, which would generally be regarded as a high level of active support (Mansell & Beadle-Brown, 2012, chapter 3). It was also negatively correlated with ABC scores. One potential explanation may be that as staff experienced less challenges from service users over a period of time, that this increased the likelihood of their providing active support, perhaps due to an increase in confidence as challenges were reduced. Or, it may be that staff felt more positive towards service users because they were experiencing less challenging behaviour, and therefore were

more likely to support them to participate; there is a range of literature linking challenging behaviour with reduced staff contact (Jones et al, 2013; Hastings & Remington, 1994). In this sense, the increased active support may potentially be seen as a *result* of reduced challenging behaviour, not a *cause* of reduced challenging behaviour.

Managers

The current study found no significant change in practice leadership or attributions for managers from pre to post training; however there were a number of interesting findings in relation to practice leadership. Practice leadership was negatively correlated with ABC scores, and positively correlated with ASM scores and with GCPLA range scores. Although association does not indicate causation, it is likely that this provides support to the view that good practice leadership is a factor in achieving better outcomes for service users, including decreased challenging behaviour, better levels of active support and increased participation in community and leisure activities. This reflects other studies which have seen practice leadership associated with better service users' outcomes, for example Beadle-Brown et al (2014) examined the effect of practice leadership on the implementation of active support and found it to be significantly associated with increased implementation of active support. This study also contributes to findings in relation to use of the PSR, a tool used to measure implementation of the PBS plan. The PSR was significantly positively correlated with GCPLA range and busy scores, and negatively correlated with ABC scores, thus indicating a relationship between greater implementation of PBS and improved quality of life for service users, and also between good implementation of PBS and reduced challenging behaviour for service users.

Theory of Change

To return to the theory of change on which this study is based, it appears that managers did pass the PBS training on to their staff in a number of ways. PBS plans were written containing all specified components of multi-element PBS and these were implemented by staff, as evidenced by the PSR. The PSR also included standards for management monitoring and feedback to staff, so the PSR score of 66% at T2 appears to indicate that PBS strategies were being implemented and that management

support for implementation was being carried out, at least to a reasonable degree. Due to the lack of research on the PSR, it is difficult to be clear about the impact that a score of 66% would be expected to have on service user outcomes,

The changes in service users' challenging behaviour are difficult to account for given the limited changes in staff measures; the high levels of challenging behaviour for the experimental group may be a factor making it difficult to specify effects. It may also be that staff knowledge and attributions are less important in leading to change in challenging behaviour than has been previously thought; perhaps as long as staff implement function-based multi-element PBS plans, even to a limited degree, then behaviour change for service users will follow.

Limitations of the Study

There are a number of limitations to the study. Firstly, given this was an internal evaluation, there was a potential for bias. A number of measures were put in place to address this, for example, blind rating of MTS and ASM, blind inter-reliability checks for observation data, and double-scoring of 5% of all evaluation questionnaires. Another limitation was lack of procedural validity in terms of the training delivered, as there was no assessment of the consistency and accuracy of implementation of the training by the range of trainers involved. Thirdly, the lack of a randomised control group was a limitation; non-randomisation was due to operational necessity, however it resulted in a number of significant differences between the experimental and control groups at T1, although these were to some extent compensated for by carrying out additional analysis based on the change in scores from T1-T2. Fourthly, there were limitations in how changes in challenging behaviour were assessed, in that neither the ABC nor the BRF was completed blind, although the BRF did have a number of reliability checks in place. The MTS measurement of challenging behaviour was scored blind, but its use was limited due to the low occurrence. Finally, the number of participants dropping out from the study can be regarded as a limitation. Both managers and service users left the study for a range of reasons and resulting in only 22 participants by T3 (44%).

Conclusion

This study has demonstrated that PBS training to first level managers resulted in significant changes in challenging behaviour which were maintained over time for the reduced-size group at follow-up. This demonstrates that PBS can be successfully implemented via a cascade approach to training, and this may be a useful model to achieve greater coverage in workforce development, particularly across social care, where numbers of staff are so large and turnover is so high.

However, the study also showed that impact of PBS training on quality of life was limited. This is perhaps especially surprising given that PBS has such a focus on quality of life and indeed regards quality of life changes as equally, if not more important than changes in behaviour; a better life for people with intellectual disabilities and challenging behaviour is the fundamental premise of PBS.

It is true that there was substantial turnover in the managers within this study, meaning that less than half the group had ongoing support from a manager who had completed the PBS training and it is possible that the lack of more substantial change in quality of life is related to this factor. However, high turnover is a likely to remain a factor in care settings, and therefore PBS training has to address this, and needs to be effective even where there is substantial management turnover. It may be that in order to ensure the success of PBS training, organisations need to also invest in strategies to address management turnover, particularly of first level managers who are often the key practice leaders. This may imply that a 'whole organisational' approach to implementing PBS is necessary, rather than a mere focus on individuals' challenging behaviour.

The lack of changes noted in quality of life may also have been a result of insufficiently sensitive measures, or measures which are not adequately capturing quality of life changes for this client group. This has been a feature of previous research in PBS (Dench, 20005) and may imply that a different approach to measuring quality of life is required in future PBS research.

Long-term maintenance of improvements in challenging behaviour remain a challenge for the sector, and so it would be useful to see longer-term follow-up of PBS interventions. The current study followed up a reduced size group 20 months after baseline and at that point the improvements in behaviour were already beginning to reduce; it would have been useful to have a fourth data collection point another six months later, but time constraints did not allow for this.

The vast majority of people with intellectual disabilities in the UK now live in the community, most of them supported by social care service providers, and all government policy and good practice guidance indicates that this move from health settings to social care settings is likely to continue. Research focusing particularly on this area would therefore be a useful contribution to the field. PBS is developing as a field and currently within the UK has a high profile, being recognised as the most ethical and appropriate approach to supporting people with intellectual disabilities and challenging behaviour. It therefore appears to be a very prescient time for further PBS research in order to build the body of evidence and to create further momentum in achieving national sustainable changes in the lives of people with intellectual disabilities and behaviour support needs.

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List of Tables and Figures

Table 1: Managers' Characteristics at T1

	Experimental (*n*=50) Mean (Range)	**Control (*n*=22) Mean (Range)**
Age	40 (25-55)	42 (25-57)
Gender	Male 8 (16%) Female 42 (84%)	Male 5 (23%) Female 17 (77%)
Length of Time as Manager (in years)	4 (1-14)	3 (1-10)
Number of Service Users Supported	5.26 (1-22)	7.82 (1-25)
Number of Staff Managed	11.46 (3-24)	13.55 (4-25)
Number of Hours of Support Managed (per week)	322 (105-585)	391 (165-685)

Table 2: Service Users' Characteristics at T1

	Experimental (*n*=50) Mean (Range)	**Control (*n*=22) Mean (Range)**
Age	41 (18-63)	39 (19-61)
Gender	Male 35 (70%) Female 15 (30%)	Male 13 (59%) Female 9 (41%)
Autism Diagnosis	Yes 23 (46%) No 27 (54%)	Yes 10 (45%) No 12 (56%)
ABS Scores	133 (35-262)	148 (52-248)
ABC Total Scores	57 (13-99)	35 (5-104)
ABC Number of Severe Behaviours	6 (0-21)	3 (0-25)
Staff to Service User Ratio (whole-time equivalent)	3.00:1 (0.5:1-6:1)	2.19:1 (0.79:1-4:1)
Staff to Service User Ratio (during observation)	1.08:1 (0.5-2)	0.94:1 (0.5-1)
Number of Service Users per Setting	1.1 (1-4)	1.36 (1-4)

Table 3: Overview of Training

Training Sessions	**Content of Session**	**Course Work Outwith Session**
Two-Day Introduction	Introduction to PBS	Hold initial team meeting to introduce the work of the course and present an overview of PBS
Workshop 1(each workshop lasted a full day)	Functional Assessment: Defining and Recording Behaviour	Carry out initial information-sharing with team around functions of behaviour
Workshop 2	Functional Assessment: Functions of Behaviour	Share findings of functional assessment with team; discuss implications for changes in support; begin work on behaviour support plan
Workshop 3	Behaviour Support Planning: Activity & PSR	Implement activity-based protocol; hold team meeting to share protocol with team, using role-play and observation; implement protocol running notes; carry out direct observations of protocol implementation and give feedback
Workshop 4	Behaviour Support Planning: Interpersonal	As above, for interpersonal protocol; plus development of any additional communication resources, e.g. visual aids
Workshop 5	Behaviour Support Planning: New Skills	As above, for new skills protocol
Workshop 6	Behaviour Support Planning: Focused Support	As above, for focused support protocol
Workshop 7	Behaviour Support Planning: Reactive	As above, for reactive protocol; direct observations could not be planned so were done via role play
Workshop 8	Assessed Presentations	

Table 4: Measures Used for Each Participant Group

Measures	**When**	**Completed by**	**Other Details**	**Reliability Checks**	**Used to Evaluate**
Managers					
Demographic information	T1 only	Manager	-	NA	-
Challenging Behaviour Attribution Scale	All time points	Manager	-	5% of scoring & data input checked at each time point	Managers' attributions about challenging behaviour
PBS knowledge test	All time points	Manager	Multiple choice	5% of scoring & data input checked at each time point	Managers' PBS knowledge
Periodic Service Review	T2 and T3 only, experimental group only	PBS team member	Scored while visiting the service	5% of scoring & data input checked at each time point	Implementation of the PBS plan
Practice Leadership questionnaire	All time points	Staff directly managed by the manager	-	5% of scoring & data input checked at each time point	Managers' use of practice leadership
Staff					
Active Support Measure	All time points	PBS team member, who was blind to whether experimental/control and pre/post	Based on 2-hour video of support	20% of all videos re-coded by another member of the team, also blind	Staff use of active support
Challenging Behaviour Attribution Scale	All time points	Staff	-	5% of scoring & data input checked at each time point	Staff attributions about challenging behaviour
Momentary Time	All time points	PBS team member, who was blind to	Based on 2-hour	20% of all videos re-	Staff assistance and positive

Sampling		whether experimental/control and pre/post	video of support	coded by another member of the team, also blind	contact with service users
PBS knowledge test	All time points	Staff	Multiple choice	5% of scoring & data input checked at each time point	Staff's PBS knowledge
Service Users					
Aberrant Behaviour Checklist	All time points	Manager	Based on the previous month	5% of scoring & data input checked at each time point	Service users' challenging behaviour
Adaptive Behaviour Scale	T1 only	Staff	Part one only used	5% of scoring & data input checked at each time point	Service users' functioning
Behaviour recording forms	All time points	Staff	Completed following any incident of the specified behaviour	Managers' checks of daily notes, and at team meetings	Service users' challenging behaviour
Demographic information	T1 only	Staff supporting the service user, or family members	-	NA	-
Guernsey Community Participation and Leisure Assessment	All time points	Manager	Based on the previous 3 months	5% of scoring & data input checked at each time point	Service users' quality of life
Momentary Time Sampling	All time points	PBS team member, who was blind to whether experimental/control and pre/post	Based on 2-hour video of support	20% of all videos re-coded by another member of the team, also blind	Service users' engagement as an indicator of quality of life; challenging behaviour

Table 5: Inter-observer Reliability Data for MTS Behaviours

Behaviours	**% Occurrence**	**% Non-occurrence**	**Kappa**
Positive Contact	75.71	91.13	0.789
Assistance	87.06	85.87	0.868
No Contact	89.25	90.71	0.884
Social Engagement	89.25	97.62	0.903
Non-social Engagement	78.44	92.64	0.738
Disengagement	88.79	77.64	0.773
Challenging Behaviour	92.5	99.25	0.751

Table 6: Engagement and Assessment in Re-coding of Videos 6

Video	**Assistance % Main Coder**	**Assistance % First Author**	**Engagement % Main Coder**	**Engagement % First Author**
1	35	33	95	96
2	64	62	71	73
3	24	23	72	73
4	23	20	66	64
5	11	11	95	96
6	48	45	59	60
7	29	31	99	97
8	6	5	21	19

Table 7: Service Users' Results

	Experimental *n*=50		**Control** *n*=22		**Group Comparison** *n*=72	**Experimental Per Protocol Only** *n*=22	
Measure	**T1**	**T2**	**T1**	**T2**	**T1-T2**	**T2**	**T2-T3**
	Mean (SD) *n*=50	**Mean (SD)** *n*=50	**Mean (SD)** *n*=22	**Mean (SD)** *n*=22	*n*=72	**Mean (SD)** *n*=22	*n*=22
ABC Total	57.44 (22.46)	33.38 (24.31)	35.23 (25.70)	32.64 (23.89)	F=16.837 p<0.001*	35.55 (19.99)	t=1.786 p=0.089
ABC Severity	6.04 (5.73)	1.78 (3.22)	3.09 (6.36)	2.77 (4.80)	U=271 p=0.001*	2.00 (2.83)	Z=1.854 p=0.064
Behaviour Recording Forms	10.40 (8.92)	5.20 (6.62)	7.36 (9.72)	6.82 (9.96)	t=4.851 p<0.001*	3.18 (5.39)	Z=0.379 p=0.704
GCPLA Range	20.00 (7.79)	20.08 (8.47)	20.09 (9.01)	20.23 (8.38)	F=0.116 p=0.735	21.32 (8.05)	
GCPLA Busy	12.34 (5.32)	12.36 (5.04)	12.00 (5.31)	12.82 (5.58)	F=0.365 p=0.548	14.14 (4.49)	
MTS Challenging Behaviour	3.16% (6.60)	2.86% (6.36)	0.68% (1.55)	0.18% (0.50)	U=537 p=0.862	0.48% (1.36)	
MTS Total Engagement (social + non-social)	70.52% (24.93)	76.02% (26.561)	86.38% (22.90)	81.50% (28.76)	U=426 p=0.129	81.37% (23.37)	
MTS Social Engagement	26.76% (20.72)	27.46% (19.08)	28.49% (21.68)	26.07% (25.96)	U=467 p=0.310	16.24% (16.86)	
MTS Non-social Engagement	43.76% (17.22)	48.56% (16.14)	57.89% (20.46)	55.43% (22.11)	F=0.921 p=0.341	60.12% (18.75)	
MTS Disengagement	26.32% (24.81)	21.11% (24.73)	12.95% (22.47)	18.32% (28.79)	U=416 p=0.101	18.82% (23.01)	

* Significant

Table 8: Staff's Results

	Experimental *n*=50		**Control** *n*=22		**Group Comparison** *n*=72	**Experimental Per Protocol Only** *n*=22
Measure	**T1**	**T2**	**T1**	**T2**	**T1-T2**	**T3**
	Mean (SD)	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**		**Mean (SD)**
Active Support Measure	59% (21.35)	64% (21.76)	69% (18.87)	68% (18.24)	U=460 p=0.270	80% (14.26)
CHABA LP	1.04 (0.67)	0.93 (0.64)	0.92 (0.69)	0.78 (0.60)	F=0.294 p=0.590	0.70 (0.61)
CHABA LN	0.92 (0.58)	0.70 (0.62)	0.95 (0.64)	0.83 (0.48)	F=0.030 p=0.863	0.77 (0.65)
CHABA BM	0.39 (0.58)	0.25 (0.49)	0.46 (0.42)	0.27 (0.55)	F=0.184 p=0.669	0.37 (0.76)
CHABA ST	0.32 (0.66)	0.33 (0.66)	0.38 (0.53)	0.31 (0.65)	F=0.426 p=0.516	0.22 (0.65)
CHABA EM	1.03 (0.56)	0.93 (0.57)	1.04 (0.42)	1.04 (0.45)	F=0.480 p=0.491	0.77 (0.72)
CHABA PE	0.27 (0.66)	0.30 (0.62)	0.46 (0.49)	0.40 (0.66)	F=0.471 p=0.495	0.39 (0.56)
MTS Positive Contact (includes assistance)	53.97% (27.21)	56.93% (26.60)	75.15% (28.64)	64.83% (33.00)	F=3.469 p=0.067	61.27% (18.65)
MTS Assistance	35.53% (24.69)	35.83% (24.59)	52.55% (29.00)	43.46% (26.94)	F=0.985 p=0.324	43.65% (16.42)
MTS No Contact	39.10% (28.51)	39.03% (27.96)	24.15% (28.68)	29.99% (32.62)	F=0.687 p=0.410	38.11% (17.81)
PBS Knowledge	55.53% (11.56)	61.17% (12.57)	54.43% (11.08)	61.12 (10.92)	F=0.202 p=0.655	58.33% (16.59)

LP Learned Positive; LN Learned Negative; BM Biomedical; ST Stimulations; EM Emotional; PE Physical Environment * Significant

Table 9: Managers' Results

	Experimental *n*=50		**Control** *n*=22		**Group Comparison** *n*=72	**Experimental Per Protocol Only** *n*=22	
Measure	**T1**	**T2**	**T1**	**T2**	**T1-T2**	**T3**	**T2-T3**
	Mean (SD)	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**		**Mean (SD)**	
CHABA LP	1.01 (0.72)	0.94 (0.83)	0.10 (0.74)	0.94 (0.68)	F=0.624 p=0.432	1.04 (0.69)	
CHABA LN	0.91 (0.69)	0.83 (0.75)	0.83 (0.71)	0.87 (0.74)	F=0.301 p=0.585	0.81 (0.78)	
CHABA BM	0.45 (0.57)	0.43 (0.72)	0.33 (0.48)	0.41 (0.53)	F=1.626 p=0.207	0.44 (0.87)	
CHABA ST	0.60 (0.66)	0.64 (0.79)	0.37 (0.73)	0.52 (0.73)	F=0.497 p=0.483	0.40 (0.96)	
CHABA EM	0.98 (0.53)	0.88 (0.64)	1.07 (0.37)	0.99 (0.68)	F=0.600 p=0.441	0.79 (0.85)	
CHABA PE	0.46 (0.65)	0.53 (0.69)	0.50 (0.57)	0.51 (0.62)	F=0.174 p=0.678	0.41 (0.92)	
PBS Knowledge	71% (13.45)	83% (14.53)	60% (15.70)	67% (17.56)	F=4.767 p=0.033*	88% (9.34)	t=0.179 p=0.860
PSR	-	66% (21.22)	-	-	-	67 (21.12)	
Practice Leadership	63.41% (14.90)	69.94% (17.88)	58.25% (16.13)	61.78% (15.89)	F=1.030 p=0.314	74.34% (9.16)	

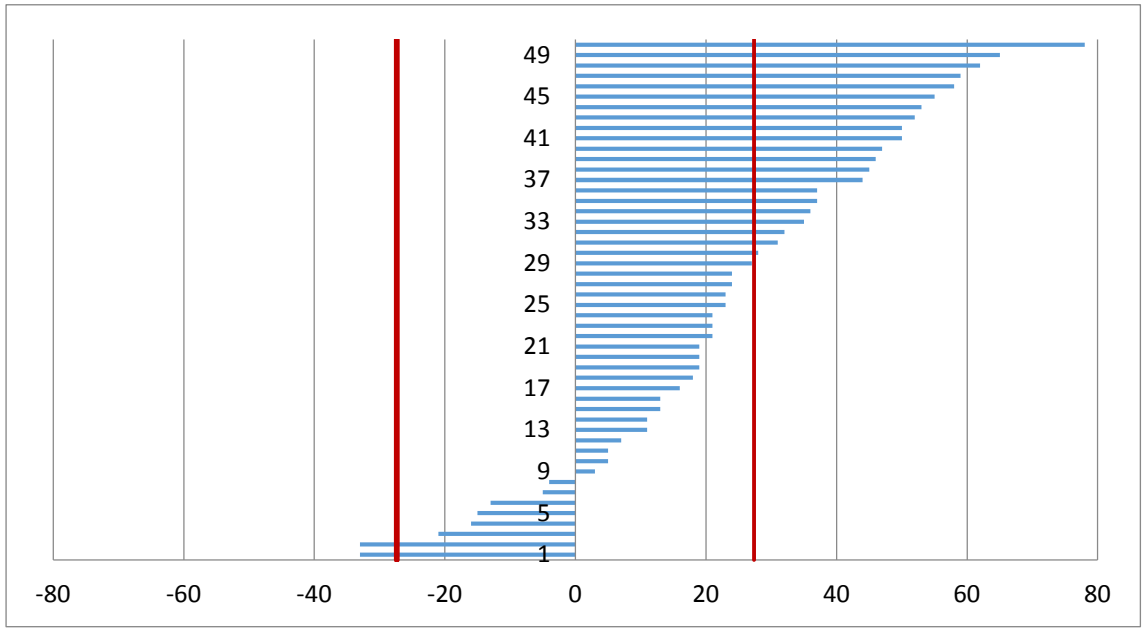
* Significant

Table 10: Correlations at T2

	Experimental *n*=50		**Control** *n*=20	
	r	**p**	**r**	**p**
ABC/Practice Leadership	-0.567	p<0.001*	-0.020	0.931
ABC/PSR	-0.474	p<0.001*	-	-
ABC/Assistance	-0.315	0.026	-0.025	0.913
ABC/ASM	-0.497	p<0.001*	-0.316	0.152
ABC/Managers' Knowledge	-0.471	0.001*	-0.206	0.358
ABC/GCPLA Range	-0.382	0.006*	-0.405	0.061
ABC/Engagement	-0.497	p<0.001*	0.027	0.906
Practice Leadership/PSR	0.555	p<0.001*	-	-
Practice Leadership/Assistance	0.261	0.067	0.000	0.999
Practice Leadership/ASM	0.501	p<0.001*	0.122	0.590
Practice Leadership/Engagement	0.282	0.047	0.221	0.322
Practice Leadership/ GCPLA Range	0.423	0.002*	0.443	0.039
PSR/ GCPLA Range	0.450	0.001*	-	-
PSR/GCPLA Busy	0.478	p<0.001*	-	-

* Significant

Figure 1: Individual & Reliable Change T1-T2 (*n*=50)



* Vertical line indicates the score of 27.36 or -27.36, for reliable change to have occurred positively or negatively