Motivational interviewing training for physiotherapy and occupational therapy students: Effect on confidence, knowledge and skills

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Title page

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Abstract

Objective: To examine the effectiveness of a three-day training programme on knowledge, confidence and fidelity to Motivational Interviewing (MI) delivery in an undergraduate occupational therapy and physiotherapy cohort (n=25).

Methods: Training outcomes were assessed pre-training, post-training and following a subsequent clinical placement. The Motivational Interviewing Knowledge and Attitudes Test (MIKAT) and an 8-item survey assessed knowledge, attitudes and confidence respectively. MI fidelity was evaluated by a simulated patient interview rated with the Motivational Interviewing Treatment Integrity scale (MITI). Analysis was by one-way repeated measures ANOVA.

Results: Self-report measurements indicated increased confidence but no effect on knowledge or attitude. MITI analysis showed superior performance in all four global criteria and an increased frequency of MI adherent behaviours post-training. Positive changes were maintained following clinical placement. MITI summary scores indicated an improvement in question to reflection ratio in line with beginner competency.

Conclusion(s): Participation in a three-day MI training programme significantly improved student confidence and MI skilfulness.

Practice Implications: Where feasible, MI training should be embedded within the curriculum. Further research is needed elucidate the best practices to incorporate teaching this skill set within the curriculum in order to best prepare students to counsel clients in behaviour change in their applied settings.

Introduction

The prevalence of chronic disease and its associated burden is rising at unprecedented rates [1]. Many behavioural factors which contribute to the risk of chronic disease development are modifiable [2]. Traditional advice and education-based interventions alone are not sufficiently effective at increasing patient adherence to evidence-based lifestyle modifications [3]. Addressing the multiple issues clients present with over a short consultation requires an innovative approach. Interventions that promote ongoing health behaviour change at an individual level are urgently required to reduce the risk of chronic disease development and improve disease management.

Motivational Interviewing (MI) is a person-centred, goal-orientated, communication style, which aims to elicit and strengthen a person's intrinsic motivation and commitment to change [4]. Originating in substance dependency counselling [5], MI is compatible with a broad spectrum of treatment approaches and has recognised efficacy as an intervention to promote positive health behaviour change and self-management across many domains including smoking cessation [6], physical activity [7] and diet change [8].

While evidence to support the implementation of MI training is growing among public health practitioners [9], limited research exists in allied health professions (AHPs). Through their role as health promoters and rehabilitators, AHPs are ideally positioned to effectively influence health behaviour change [10]. Despite this, proficiency in behaviour change counselling is not a focus of undergraduate AHP education [11]. Examination of the effectiveness of MI training on AHPs specifically at the pre-registration stage is timely. Behaviour change is a growing concept in rehabilitation and pre-registration courses, particularly physiotherapy have been criticised for an over-emphasis on the bio-medical understanding of rehabilitation [12]. Training therefore has the potential to better equip graduating students for the complexity of the rehabilitation they are expected to deliver, and which emerging evidence suggests they should adopt.

To date limited research has examined the feasibility and effectiveness of training AHP students in MI [13]. Existing literature across a range of higher education disciplines including nutrition [14, 15], pharmacy [16-19], dentistry [19-22] and medicine [23-27] has demonstrated the

beneficial effect of training on student confidence and knowledge. While these results are encouraging, the impact of training on behavioural skills is less commonly examined. While some success has been noted, reported improvements are often reliant on self-assessment [13] or modifications of validated scales [25]. As MI becomes more widely promoted and disseminated into non-specialist healthcare settings concerns have been raised regarding the reliability and validity of methods used to ensure treatment is implemented as intended. To ensure treatment fidelity objective assessment of the integrity of MI delivered is strongly recommended however variability in provider performance is rarely a focus of research [28]. Consequently, there is a need to clearly examine both the feasibility of training pre-registration AHP students in MI and the subsequent effect on learners skill set and ability to deliver MI components consistently in practice using validated instruments.

The aim of this research was to assess the impact of a three-day MI training programme on student occupational therapist (OT) and physiotherapist (PT) knowledge, skills and delivery of MI both immediately post-training and following a subsequent clinical placement.

Methods

1.1 Study design

A prospective quasi-experimental design was implemented to assess the impact of a three-day training programme on a convenience sample of second year pre-registration OT and PT students within the same institution in the south of the UK. The pre-registration OT and PT courses are comprised of a three year BSc (hons) programme. Periods of university based study

are interspersed with approximately 30 weeks of full time clinical placement where students gain practical experience across a variety of clinical specialties (e.g. neurology, cardiorespiratory, mental health) in a range of settings (e.g. hospital, community, schools). General attributes of communication which enhance person centred care are core to all placement assessment. The PT programme comprises five placement of six week duration which begin in year two. OT students complete four placements of varying duration (4, 8, 8, 8 weeks) which begin in year one. Following MI training PT and OT students embarked on their second and third placements respectively. Research outcomes were obtained at three time points: pre-training (TP1), immediately post-training (TP2) immediately following completion of student's subsequent placement post-training.

1.2 Training Procedure

The MI training programme was implemented in the second semester of second year. Participants received approximately 18 hours of MI instruction across three days. Training was delivered by a member of the Motivational Interviewing Network of Trainers (MINT) and focused on both the technical components; Open Questions, Affirmation, Reflective listening, and Summarising (abbreviated as OARS), and the relational component, or spirit of MI, which includes; Collaboration, Evocation, Autonomy support, and Acceptance. Training included formal didactic sessions, role and real-play, audio recording of a simulated patient encounter and supplemental online learning materials. The workshop was highly interactive, promoted experiential learning and offered participants multiple practice opportunities to implement newly acquired skills across a variety of exercises. The importance of ongoing self-reflection for sustained skill development was emphasized in training through observation and coding of self and peers using validated instruments to enhance learning. Post-training, students were provided with access to an online learning platform which contained the resources used in

training as well as a self-assessment of competence tool to facilitate ongoing skill development while dispersed on clinical placement. Individual evaluations of student performance were hosted via the online platform and optional skype feedback was offered to all participants. Time spent interacting with the online material was at the discretion of each student.

1.3 Materials

1.3.1 Outcome Measures

Knowledge of MI was assessed using the 29 item Motivational Interviewing Knowledge and Attitudes Test (MIKAT) [29]. The MIKAT has shown sensitivity to detect change in MI consistent and inconsistent behaviour as a result of training [29-31]. Acceptable internal consistency of the MIKAT (Cronbach's $\alpha > 0.70$) has been documented [30, 32]. Confidence in MI skills was measured using an eight-item confidence survey [23]. Student competence in MI was assessed through audio-recorded mock patient interviews with another peer learner. Interviews were structured using clinical vignettes [33] and rated by an independent, blinded evaluator using the Motivational Interviewing Treatment Integrity scoring tool (MITI 4.2) which is considered the benchmark for assessing MI treatment integrity [34]. The MITI is continuously revised and improved in line with developments in MI research and theory. Each previous version of the MITI instrument has been shown to be valid and reliable [35]. The most recent iteration (the MITI 4.2) has shown initial psychometric support in a substance abuse [34] and forensic population [36]. Inter-rater reliability in the good to excellent ranges (ICC >0.60) has been reported [34, 36].

The MITI is rated in global scores and behaviour counts. Four global scores (cultivating change talk, softening sustain talk, partnership, empathy) are rated on a five-point scale and capture the rater's overall impression or judgement of the interaction. Behaviour counts are a tally of each occurrence of eight MI consistent behaviours: questions, simple reflections, complex reflections, giving information, affirmation, seeking collaboration, emphasise autonomy and persuade with permission and two MI non-consistent behaviours: persuade and confront. Finally MITI summary scores were generated from MITI global scores and behavioural counts. These include relational global (average of empathy and partnership), technical global (average of cultivating change talk and softening sustain talk), reflection to question ratio, percent complex reflections (out of total reflections), total MI adherent behaviour (MIAB: sum of seeking collaboration, affirmation and emphasise autonomy) and total MI non-adherent behaviour (MINAB: sum of confront and persuade). Each summary score has a recommended threshold level for beginner proficiency or competency. Trainee skilfulness can subsequently be evaluated against established proficiency thresholds to assess if basic competence and proficiency in MI delivery has been achieved. Although regularly employed, it should be noted these thresholds are based on expert opinion and currently lack validity data to support them [34].

1.3.2 Statistical Analysis

Data Analysis was performed using SPSS IBM (version 24). One-way repeated measures ANOVA was conducted to determine whether there was a statistically significant difference in MIKAT, confidence and MITI scores measured at TP1, TP2, TP3. Post-hoc tests were completed using the Bonferroni correction. A significance level of $p \leq 0.05$ was applied.

2 Results

2.1 Participant Characteristics

Participants were 25 undergraduate OT (n = 15, 60%) and PT students (n = 10, 40%) aged 19 – 46 years (M = 25.7, SD = 7.2). Eighty-eight percent of participants were female. Participants had completed an average of 2.9 years in higher education (Range 1- 6 years, M = 2.9, SD = 1).

2.2 Confidence Survey and MIKAT Results

Questionnaire results are shown in Table 1. A significant improvement in confidence across time points was observed. Confidence score at TP3 remained significantly elevated compared to baseline. The training intervention did not elicit statistically significant changes in MIKAT score over time.

2.3 MITI Results

2.3.1 MITI Behaviour Counts

A majority of behaviour counts changed in the desired direction appropriate to MI (Figure 1; **Error! Reference source not found.**). Notable increases were demonstrated from TP1 to TP2 including significantly more simple and complex reflections, affirmations and increased attempts at seeking collaboration. Post-training significantly fewer questions and decreased rates of information giving without permission were noted. No significant differences were demonstrated for persuade, persuade with permission, confront or emphasising autonomy. Positive changes in MI behavioural skills were maintained at TP3.

2.3.2 MITI Global Scores

Significant gains were observed in all four global scores (cultivating change talk, softening sustain talk, partnership and empathy) from TP1 to TP2 (Figure 2; **Error! Reference source not found.**). Scores remained significantly different to baseline following a subsequent clinical placement.

2.3.3 MITI Competence

Summary scores and corresponding MITI thresholds for basic competency are displayed in (Figure 3;**Error! Reference source not found.**). Significant improvements were demonstrated for technical global, relational global and reflection to question ratio from TP1 to TP2. Scores remained elevated at TP3. No significant changes were demonstrated for MIAB, MINAB or percent complex reflection. Student competence reached beginner proficiency threshold for

the question to reflection ratio only. According to the MITI 4.2 guidelines a ratio of 1:1 indicates the equal use of questions and reflections. Lower scores than the MITI novice standards were found the remaining techniques (i.e., technical global < 3; relational global <3.5 and percent complex reflections. >40%).

3 Discussion and Conclusion

3.1 Discussion

This study explored the effectiveness of MI training on undergraduate AHP knowledge, confidence and skills across multiple time points. In contrast to existing research in student populations, MI knowledge remained unchanged following training implementation. Baseline MIKAT scores in the present cohort were comparatively higher than scores observed in higher education and professional cohorts [24, 37] leading to a potential ceiling effect. Furthermore, existing studies that demonstrate improved knowledge post-training have utilised self-designed multiple-choice questionnaires limiting comparability with the present cohort [23, 38]. Consistent with previous research a positive effect of training on confidence was observed [17, 19, 23, 24, 27, 39, 40]. Confidence in counselling skills is a significant predictor of future utilisation [41], however these findings should be interpreted cautiously as disparities often exist between clinician self-rated skill and the quality of observed practice [42-47]. A further danger of enhanced confidence at this formative stage is that learners may perceive themselves as competent following initial training, limiting skill progression [14]. Methodological difficulties with self-report measures emphasise the value of direct evaluation of MI fidelity to determine if dissemination efforts of training are effective and ensure quality of treatment delivered.

Consistent with previous research, increases in all four global scores and positive directional changes in a majority of behavioural counts and summary scores were observed immediately post-workshop [13, 15, 17, 20, 22, 25, 48-50]. While these findings are encouraging, a key aspect of treatment fidelity and positive clinical outcomes is the quality of MI delivered. In the present study the reflection to question ratio improved in line with proficiency standards suggesting that reflective listening represents an accessible skill for students to learn [17, 51]. Beginner proficiency was not achieved for any other item. Research examining proficiency in student cohorts is mixed. While increases in skilfulness in line with beginner competency have been demonstrated [13, 16, 17] others have failed to meet proficiency thresholds [20] or reached basic competency in certain criteria only [15, 51]. Modifications to the MITI [25], alternative measures of competence [19, 27, 50] or failure to report proficiency standards [22] limit conclusion regarding the efficacy of training. The workshop format and duration utilised in the present study aligns with the accepted standard for clinical trainees and has demonstrated success for developing basic competency in these cohorts [52]. From a pedagogical standpoint, these findings postulate that students assimilate the simpler aspects of the spirit and principles of MI in the initial stages of training. It may be surmised that a three-day course is sufficient to provide a foundational exposure to MI and assists basic skill development, but insufficient to produce proficient practitioners in line with the currently established thresholds. This is likely to be the result of the training not being delivered in practice contexts or supported with mentoring within an environment commensurate to self-reflection and ongoing skill development.

For clinicians, ongoing training supported by coaching and feedback represents the most effective method to achieve proficiency [53] with many individual competencies requiring upwards of a year to acquire [54, 55]. Similarly in higher education research, programmes with a strong practice component [17] or which incorporate MI training throughout the undergraduate programme [51] demonstrate the greatest skill increases compared to those with minimal post-training input [20]. Embedding MI in the curriculum would allow students time and space to develop their expertise within the safety of the learning environment ensuring a solid foundation prior to clinical exposure and future practice. Research is required to determine if more complex MI skills can be reasonably taught to accepted standards or whether reinforcement and refinement of basic techniques and skills is a more meaningful goal at undergraduate level. Furthermore establishment of the most efficacious way to measure improvement in MI proficiency in student cohorts is warranted. While proficiency standards are widely cited within the literature, fidelity to technique has limited association with treatment outcomes [9, 56]. A broader consideration of these thresholds in combination with other measures may be needed to gain a holistic perspective of student ability.

Longitudinal MI research which assesses the durability of training on MI skill retention are uncommon within student populations [27, 39]. In spite of its theoretical simplicity, clinical training studies demonstrate that MI skills are difficult to retain and demonstrate decay over time [57]. Conversely, newly acquired skills in the present study were generally maintained over the follow-up period without additional formal training demonstrating the durability of the

training on skill retention. While it is positive that no significant decay in skill level occurred during a subsequent clinical placement signs of erosion were present as rates of MIAB trended toward baseline. Of greater concern, MINAB trended towards an increase post-placement on baseline levels highlighting the need to reinforce a client-centred approach during clinical exposure to prevent trained students regressing to more traditional directive counselling approaches.

Maintaining MI skills throughout clinical practice is associated with enhanced patient health outcomes [3]. Previous research demonstrates a uniformly positive effect of post-workshop supervision or coaching on skill retention over workshop attendance alone [45, 54, 58-60]. Additional training and practice opportunities are likely to positively enhance skill retention and sustain commitment to the use of MI strategies in practice. Fostering skills in newly trained MI practitioners is challenging. Due to disparate geographical placement locations and differing course timetables, no additional ongoing training was implemented in the present study. While optional feedback was offered via skype during the student's clinical placement median uptake was zero rendering deeper consideration of sustainable supervision strategies to achieve effective individual feedback necessary.

Several limitation warrant mention including the lack of an equivalent control group, small convenience sample and single study location, which limit generalisability. Peer role-play scored with a standardized evaluation is a recognised evaluation method for MI skill development [16, 61]. In the present study variability in student performance and difficulty emulating the clinical

vignettes resulted in interactions that were un-representative of a realistic patient and which lacked transferability to clinical practice. Development of context bound vignettes that align with the clinical circumstance of the trainees will build upon clinical knowledge and facilitate refinement of new skill while assisting in increasing awareness of the greater applicability of MI techniques beyond the addiction field.

Future research evaluating the effectiveness of MI training should include a control comparison group and encourage assessment of student skills longitudinally to ascertain if practitioners continue to deliver treatment as intended in client interactions when they transition from undergraduate education into the clinical setting. This research was conducted in a single institution in the UK. Collaboration with other allied health programmes will enhance the generalisability of the results and allow comparison between professional cohorts. Annual collection and pooling of data across multiple cohorts should be considered to enhance sample size and power. Finally, as improved client outcomes are the ultimate goal of enhanced communication training examination of the relationship between student MI training and subsequent changes in client health behaviour outcomes is warranted.

3.2 Conclusions

Proficiency in patient centred communication strategies is a vital skill for future AHP practitioners. Our findings demonstrate sustained skill improvement in a range of MI behaviours following a brief three-day training programme which is promising given the evidence for the beneficial impact on MI consistent therapist behaviour on health behaviour

outcomes. Additional work is required to reinforce the utility of MI in allied health interactions and encourage the implementation of behavioural change counselling education at undergraduate level.

3.3 Practice Implications

This study highlights the educational benefits of MI training for allied health care students and the durability of a brief training period on MI skill retention. Inclusion of MI within the educational curriculum should occur in OT and PT programs where feasible. For future clinicians to achieve proficiency in MI, focused instruction using context specific educational materials and sufficient opportunities for practice are essential.

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Author Contributions

JF, JB, MN, GE and TF were involved in study idea, design and implementation. JB designed the educational intervention and delivered it to the students. JF, MN, GE and TF supported the active curriculum delivery and data collection. JF and JB analysed the data. JF, JB and MN prepared the manuscript, JF, JB, MN, GE and TF contributed to drafts of the paper and approved the final draft. JF finalised the paper for submission to the journal. All authors read and approved the final manuscript.

Ethics

Ethical approval was granted for the study by the Department of Clinical Sciences, College of Health and Life Sciences Research and Ethics Committee at Brunel University London (3701-A-May/2017- 7222-1). All participants provided written informed consent.

Declarations of interest:

None.

References

[1] B.W. Ward, J.S. Schiller, R.A. Goodman, Multiple chronic conditions among US adults: a 2012 update, Preventing chronic disease 11 (2014) E62.

[2] M. Ezzati, A.D. Lopez, A. Rodgers, S. Vander Hoorn, C.J. Murray, Selected major risk factors and global and regional burden of disease, Lancet (London, England) 360(9343) (2002) 1347-60.

[3] S. Rubak, A. Sandbæk, T. Lauritzen, B. Christensen, Motivational interviewing: a systematic review and meta-analysis, The British Journal of General Practice 55(513) (2005) 305-312.

[4] W.R. Miller, S. Rollnick, Ten Things that Motivational Interviewing Is Not, Behavioural and Cognitive Psychotherapy 37(2) (2009) 129-140.

[5] G. Smedslund, R.C. Berg, K.T. Hammerstrøm, A. Steiro, K.A. Leiknes, H.M. Dahl, K. Karlsen, Motivational interviewing for substance abuse, Cochrane Database of Systematic Reviews (5) (2011).

[6] C.J. Heckman, B.L. Egleston, M.T. Hofmann, Efficacy of motivational interviewing for smoking cessation: a systematic review and meta-analysis, Tobacco control 19(5) (2010) 410-6.

[7] P.D. O'Halloran, F. Blackstock, N. Shields, A. Holland, R. Iles, M. Kingsley, J. Bernhardt, N. Lannin, M.E. Morris, N.F. Taylor, Motivational interviewing to increase physical activity in people with chronic health conditions: a systematic review and meta-analysis, Clinical rehabilitation 28(12) (2014) 1159-71.

[8] M.J. Armstrong, T.A. Mottershead, P.E. Ronksley, R.J. Sigal, T.S. Campbell, B.R. Hemmelgarn, Motivational interviewing to improve weight loss in overweight and/or obese patients: a systematic review and meta-analysis of randomized controlled trials, Obesity reviews : an official journal of the International Association for the Study of Obesity 12(9) (2011) 709-23.

[9] B. Lundahl, T. Moleni, B.L. Burke, R. Butters, D. Tollefson, C. Butler, S. Rollnick, Motivational interviewing in medical care settings: a systematic review and meta-analysis of randomized controlled trials, Patient education and counseling 93(2) (2013) 157-68.

[10] N. McGrane, R. Galvin, T. Cusack, E. Stokes, Addition of motivational interventions to exercise and traditional physiotherapy: a review and meta-analysis, Physiotherapy 101(1) (2015) 1-12.

[11] R.H. Parry, K. Brown, Teaching and learning communication skills in physiotherapy: what is done and how should it be done?, Physiotherapy 95(4) (2009) 294-301.
[12] S. Mudge, C. Stretton, N. Kayes, Are physiotherapists comfortable with person-centred practice? An autoethnographic insight, Disability and rehabilitation 36(6) (2014) 457-63.
[13] L.S. Schoo AM, Rudnik E and Litt JC, Teaching health science students foundation motivational interviewing skills: use of motivational interviewing treatment integrity and self-reflection to approach transformative learning, BMC medical education 15 (2015) 228.
[14] T.N. Simper, J.D. Breckon, K. Kilner, Effectiveness of training final-year undergraduate nutritionists in motivational interviewing, Patient education and counseling 100(10) (2017) 1898-1902.
[15] H. Smart, D. Clifford, M.N. Morris, Nutrition students gain skills from motivational interviewing curriculum, Journal of the Academy of Nutrition and Dietetics 114(11) (2014) 1712-7.
[16] R. Widder-Prewett, J.A. Draime, G. Cameron, D. Anderson, M. Pinkerton, A.M.H. Chen, Impact of Student vs Faculty Facilitators on Motivational Interviewing Student Outcomes, American journal of pharmaceutical education 81(6) (2017) 107.
[17] L. Bailey, R. Curington, B. Brown, M. Hegener, M. Espel, Motivational interviewing education: Creation and assessment of a learning module implemented among advanced pharmacy practice students, Currents in pharmacy teaching & learning 9(5) (2017) 786-793.
[18] A.M. Lupu, A.L. Stewart, C. O'Neil, Comparison of active-learning strategies for motivational interviewing skills, knowledge, and confidence in first-year pharmacy students, American journal of pharmaceutical education 76(2) (2012) 28.
[19] K. Goggin, S.M. Hawes, E.R. Duval, C.D. Spresser, D.A. Martinez, I. Lynam, A. Barnes, A.M. Hinton-Dampf, M.E. Murphy, P.A. Marken, D. Catley, A motivational interviewing course for pharmacy students, American journal of pharmaceutical education 74(4) (2010) 70.
[20] J.P. Woelber, N. Spann-Aloge, G. Hanna, G. Fabry, K. Frick, R. Brueck, A. Jahne, K. Vach, P. Ratka-Kruger, Training of Dental Professionals in Motivational Interviewing can Heighten Interdental Cleaning Self-Efficacy in Periodontal Patients, Frontiers in psychology 7 (2016) 254.
[21] J.G. Hinz, Teaching dental students motivational interviewing techniques: analysis of a third-year class assignment, Journal of dental education 74(12) (2010) 1351-6.
[22] C. Croffoot, K. Krust Bray, M.A. Black, A. Koerber, Evaluating the effects of coaching to improve motivational interviewing skills of dental hygiene students, Journal of dental hygiene : JDH 84(2) (2010) 57-64.
[23] M.K. Poirier, M.M. Clark, J.H. Cerhan, S. Pruthi, Y.E. Geda, L.C. Dale, Teaching motivational interviewing to first-year medical students to improve counseling skills in health behavior change, Mayo Clinic proceedings 79(3) (2004) 327-31.
[24] M. Gecht-Silver, D. Lee, L. Ehrlich-Jones, M. Bristow, Evaluation of a Motivational Interviewing Training for Third-Year Medical Students, Family medicine 48(2) (2016) 132-5.
[25] S. Kaltman, V. WinklerPrins, A. Serrano, N. Talisman, Enhancing motivational interviewing training in a family medicine clerkship, Teaching and learning in medicine 27(1) (2015) 80-4.
[26] F. Haeseler, A.H.t. Fortin, C. Pfeiffer, C. Walters, S. Martino, Assessment of a motivational interviewing curriculum for year 3 medical students using a standardized patient case, Patient education and counseling 84(1) (2011) 27-30.
[27] K. Bell, B.A. Cole, Improving medical students' success in promoting health behavior change: a curriculum evaluation, Journal of general internal medicine 23(9) (2008) 1503-6.
[28] M.B. Madson, T.C. Campbell, Measures of fidelity in motivational enhancement: a systematic review, Journal of substance abuse treatment 31(1) (2006) 67-73.
[29] T.R. Leffingwell, Motivational Interviewing Knowledge and Attitudes Test (MIKAT) for evaluation of training outcomes, MINUET 13 (2006) 10-11.

[30] N. Doran, M. Hohman, I. Koutsenok, Motivational interviewing training in juvenile corrections: A comparison of outside experts and internal trainers, Legal and Criminological Psychology 18(2) (2011) 262-273.
[31] M. Hohman, N. Doran, I. Koutsenok, Motivational Interviewing Training for Juvenile Correctional Staff in California: One Year Initial Outcomes, Journal of Offender Rehabilitation 48(7) (2009) 635-648.
[32] M.B. Madson, J.A. Schumacher, J.J. Noble, M.A. Bonnell, Teaching Motivational Interviewing to Undergraduates: Evaluation of Three Approaches, Teaching of Psychology 40(3) (2013) 242-245.
[33] C.R. McKenzie KJ, Pierce D, & Durban K., Involving actors in training, Motivational Interviewing Network of Trainers Forum, San Diego, 2010.
[34] T.B. Moyers, L.N. Rowell, J.K. Manuel, D. Ernst, J.M. Houck, The Motivational Interviewing Treatment Integrity Code (MITI 4): Rationale, Preliminary Reliability and Validity, Journal of substance abuse treatment 65 (2016) 36-42.
[35] L. Forsberg, A.H. Berman, H. Källmén, U. Hermansson, A.R. Helgason, A Test of the Validity of the Motivational Interviewing Treatment Integrity Code, Cognitive behaviour therapy 37(3) (2008) 183-191.
[36] M.D. Owens, L.N. Rowell, T. Moyers, Psychometric properties of the Motivational Interviewing Treatment Integrity coding system 4.2 with jail inmates, Addictive behaviors 73 (2017) 48-52.
[37] E.J. Edwards, P. Stapleton, K. Williams, L. Ball, Building skills, knowledge and confidence in eating and exercise behavior change: brief motivational interviewing training for healthcare providers, Patient education and counseling 98(5) (2015) 674-6.
[38] J.J. Spollen, C.R. Thrush, D.V. Mui, M.B. Woods, S.G. Tariq, E. Hicks, A randomized controlled trial of behavior change counseling education for medical students, Medical teacher 32(4) (2010) e170-7.
[39] S. Martino, F. Haeseler, R. Belitsky, M. Pantalon, A.H.t. Fortin, Teaching brief motivational interviewing to Year three medical students, Medical education 41(2) (2007) 160-7.
[40] A. Mills, W.E. Kerschbaum, P.S. Richards, G.A. Czarnecki, J.S. Kinney, A.E. Gwozdek, Dental Hygiene Students' Perceptions of Importance and Confidence in Applying Motivational Interviewing During Patient Care, Journal of dental hygiene : JDH 91(1) (2017) 15-23.
[41] G. Ekong, J. Kavookjian, A. Hutchison, Predisposition for Empathy, Intercultural Sensitivity, and Intentions for Using Motivational Interviewing in First Year Pharmacy Students, American journal of pharmaceutical education 81(8) (2017) 5989.
[42] W.R. Miller, K.A. Mount, A small study of training in motivational interviewing: Does one workshop change clinician and client behavior?, Behavioural and Cognitive Psychotherapy 29(4) (2001) 457-471.
[43] F.R. Levin, P. Owen, R. Stinchfield, E. Rabinowitz, N. Pace, Use of standardized patients to evaluate the physicians in residence program: a substance abuse training approach, Journal of addictive diseases 18(2) (1999) 39-50.
[44] S. Martino, S. Ball, C. Nich, T.L. Frankforter, K.M. Carroll, Correspondence of motivational enhancement treatment integrity ratings among therapists, supervisors, and observers, Psychotherapy Research 19(2) (2009) 181-193.
[45] W.R. Miller, C.E. Yahne, T.B. Moyers, J. Martinez, M. Pirritano, A randomized trial of methods to help clinicians learn motivational interviewing, Journal of consulting and clinical psychology 72(6) (2004) 1050-62.
[46] R.M. Wain, B.A. Kutner, J.L. Smith, K.M. Carpenter, M.-C. Hu, P.C. Amrhein, E.V. Nunes, Self-Report After Randomly Assigned Supervision Does not Predict Ability to Practice Motivational Interviewing, Journal of substance abuse treatment 57 (2015) 96-101.
[47] L. Brosan, S. Reynolds, R.G. Moore, Self-Evaluation of Cognitive Therapy Performance: Do Therapists Know How Competent They Are?, Behavioural and Cognitive Psychotherapy 36(5) (2008) 581-587.
[48] M. Evangeli, S.K. Engelbrecht, L. Swartz, K. Turner, L. Forsberg, N. Soka, An evaluation of a brief motivational interviewing training course for HIV/AIDS counsellors in Western Cape Province, South Africa, AIDS care 21(2) (2009) 189-96.

[49] J.S. Baer, D.B. Rosengren, C.W. Dunn, E.A. Wells, R.L. Ogle, B. Hartzler, An evaluation of workshop training in motivational interviewing for addiction and mental health clinicians, Drug and alcohol dependence 73(1) (2004) 99-106.
[50] B.J. Nesbitt, D.A. Murray, A.R. Mensink, Teaching motivational interviewing to nurse practitioner students: a pilot study, Journal of the American Association of Nurse Practitioners 26(3) (2014) 131-5.
[51] L.L. White, J.D. Gazewood, A.L. Mounsey, Teaching students behavior change skills: description and assessment of a new Motivational interviewing curriculum, Medical teacher 29(4) (2007) e67-71.
[52] Y. de Roten, G. Zimmermann, D. Ortega, J.N. Despland, Meta-analysis of the effects of MI training on clinicians' behavior, Journal of substance abuse treatment 45(2) (2013) 155-62.
[53] K. Hall, P.K. Staiger, A. Simpson, D. Best, D.I. Lubman, After 30 years of dissemination, have we achieved sustained practice change in motivational interviewing?, Addiction (Abingdon, England) 111(7) (2016) 1144-50.
[54] L. Forsberg, L.G. Forsberg, H. Lindqvist, A.R. Helgason, Clinician acquisition and retention of Motivational Interviewing skills: a two-and-a-half-year exploratory study, Substance Abuse Treatment, Prevention, and Policy 5(1) (2010) 8.
[55] Y. Doherty, D. Hall, P.T. James, S.H. Roberts, J. Simpson, Change counselling in diabetes: the development of a training programme for the diabetes team, Patient education and counseling 40(3) (2000) 263-78.
[56] P.F. Cook, S.J. Schmiege, S.L. Mansberger, C. Sheppler, J. Kammer, T. Fitzgerald, M.Y. Kahook, Motivational interviewing or reminders for glaucoma medication adherence: Results of a multi-site randomised controlled trial, Psychology & health 32(2) (2017) 145-165.
[57] C.S. Schwalbe, H.Y. Oh, A. Zweben, Sustaining motivational interviewing: a meta-analysis of training studies, Addiction (Abingdon, England) 109(8) (2014) 1287-94.
[58] M.B. Madson, A.C. Loignon, C. Lane, Training in motivational interviewing: a systematic review, Journal of substance abuse treatment 36(1) (2009) 101-9.
[59] L.L. Soderlund, M.B. Madson, S. Rubak, P. Nilsen, A systematic review of motivational interviewing training for general health care practitioners, Patient education and counseling 84(1) (2011) 16-26.
[60] J.L. Smith, P.C. Amrhein, A.C. Brooks, K.M. Carpenter, D. Levin, E.A. Schreiber, L.A. Travaglini, E.V. Nunes, Providing live supervision via teleconferencing improves acquisition of motivational interviewing skills after workshop attendance, The American journal of drug and alcohol abuse 33(1) (2007) 163-8.
[61] A.L. Mounsey, V. Bovbjerg, L. White, J. Gazewood, Do students develop better motivational interviewing skills through role-play with standardised patients or with student colleagues?, Medical education 40(8) (2006) 775-80.

Figures

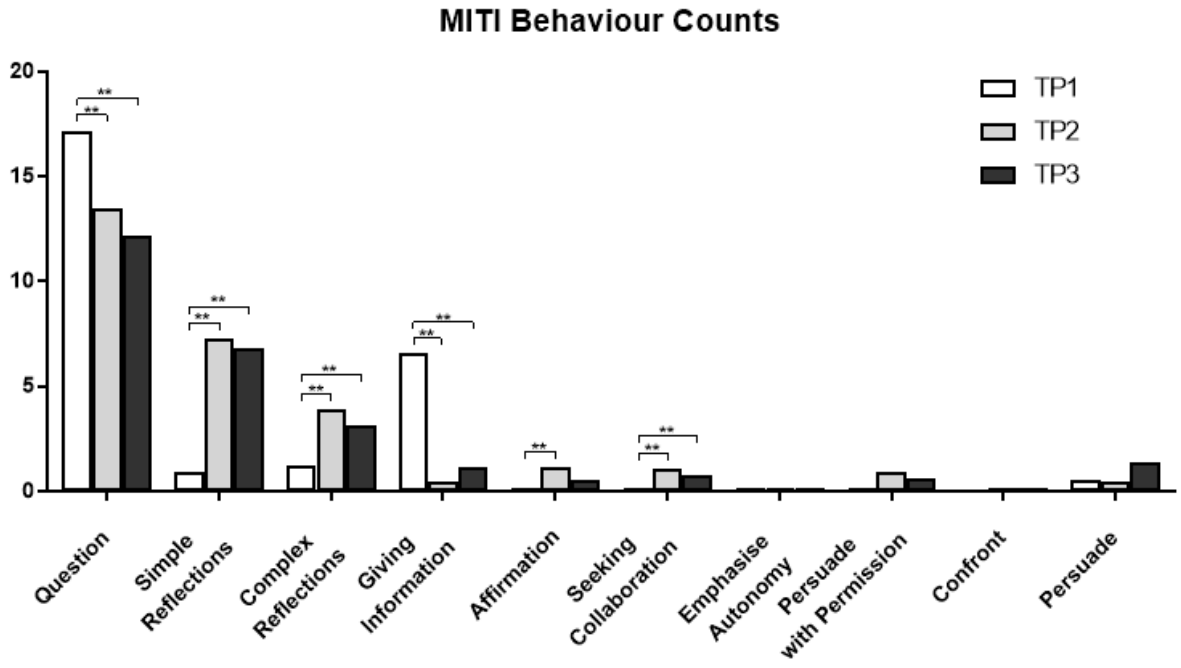
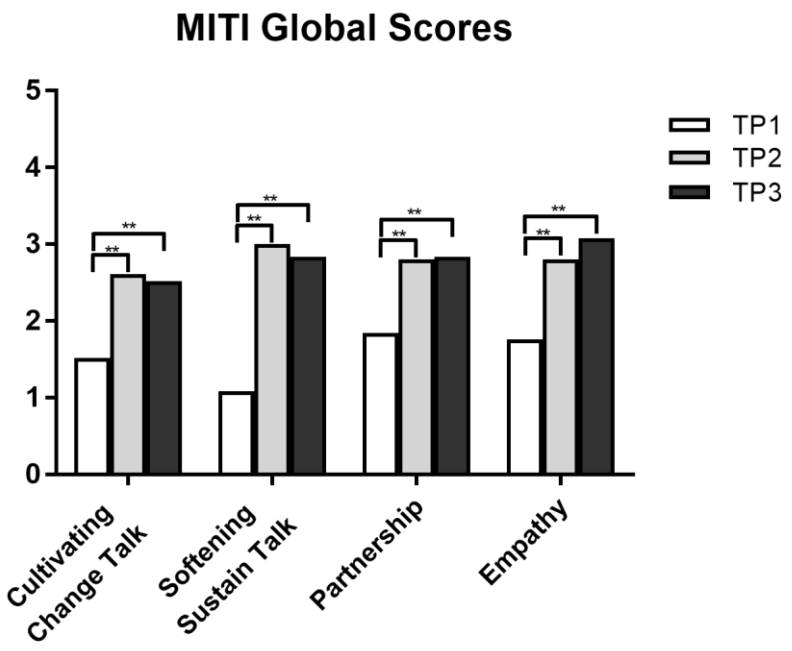


Figure 1 Mean Motivational Interviewing Treatment Integrity behaviour count frequencies pre-training, post-training and post-placement. **$p < .01$.



512

513 **Figure 2: Mean Motivational Interviewing Treatment Integrity Global Scores pre-training, post-training, and**

514 **post-placement. **$p < .01$**

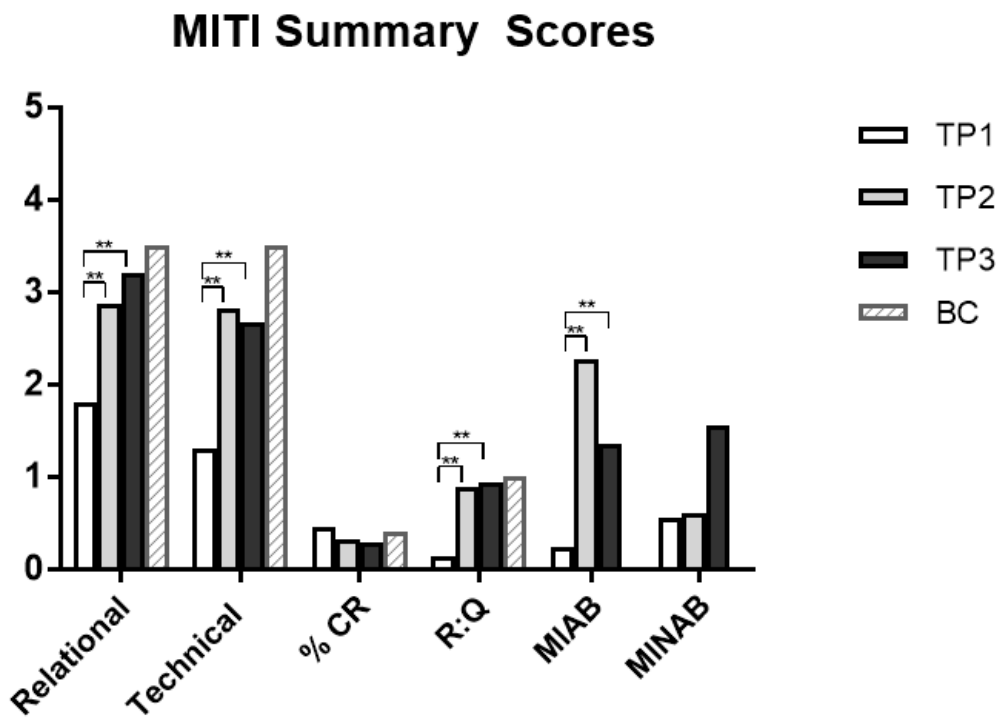


Figure 3 Motivational Interviewing Treatment Integrity summary scores pre-training, post-training and post-placement and recommended basic competency values for MI proficiency. BC: basic competency score threshold; % CR: percent complex reflections; R:Q: reflection to question ratio; MIAB: MI adherent behaviour; MINAB: MI non-adherent behaviour. **p < .01

Tables

Table 1 *Mean, Standard Deviation and One-way Analysis of Variance of Confidence and Motivation Interviewing related knowledge and attitudes (MIKAT) scores pre-training, post-training and post-placement*

	TP1	TP2	TP3			*Pairwise comparisons*		
	Mean (SD)	Mean (SD)	Mean (SD)	*F*	*p*	TP1 v TP2	TP1 v TP3	TP2 v TP3

MI confidence (0–40)	22.36 (2.75)	33.20 (2.58)	32.04 (3.44)	167.77	.000	0.000	0.000	0.303
MIKAT (0–19)	13.48 (2.74)	13.24 (1.50)	12.92 (1.25)	0.93	.360	-	-	-

525

Table 2 *Mean, Standard Deviation and One-way Analysis of Variance of Motivational Interviewing Global Scores and Behavioural Frequencies pre-training, post-training and post-placement*

	Desired direction	TP1 Mean (SD)	TP2 Mean (SD)	TP3 Mean (SD)	*F*	*p*	*Pairwise comparisons* TP1 v TP2	TP1 vs
Global ratings (1 to 5)								
Cultivating CT [a]	+	1.52 (0.65)	2.60 (0.72)	2.51 (0.87)	23.12	.000	.000	.0
Softening ST [b]	+	1.08 (0.27)	3.00 (0.75)	2.86 (0.71)	57.94	.000	.000	.0
Partnership	+	1.84 (0.68)	2.80 (0.70)	2.84 (0.89)	17.00	.000	.000	.0
Empathy	+	1.76 (0.60)	2.80 (1.12)	3.08 (0.99)	21.92	.000	.000	.0
Behaviour counts								
Questions	-	17.16 (5.25)	13.44 (5.45)	12.20 (4.75)	8.10	.001	.011	.0
Simple reflections	+	0.92 (1.32)	7.24 (4.01)	6.80 (2.69)	39.87	.000	.000	.0
Complex reflections	+	1.20 (1.58)	3.88 (3.23)	3.16 (2.95)	10.13	.000	.002	.0
Giving information	-	6.56 (3.66)	0.48 (0.59)	1.16 (1.43)	49.49	.000	.000	.0
Affirmation	+	0.12 (0.44)	1.12 (0.93)	0.56 (0.76)	10.99	.000	.000	.0
Seeking collaboration	+	0.04 (0.20)	1.08 (1.11)	0.76 (1.01)	10.27	.000	.001	.0
Emphasising autonomy	+	0.08 (0.27)	0.08 (0.27)	0.04 (0.20)	0.19	.825	-	-
Persuade with permission	+	0.08 (0.27)	0.92 (2.04)	0.60 (0.86)	2.75	.074	-	-
Confront	-	0.00 (0.00)	0.16 (0.47)	0.16 (0.62)	1.00	.375	-	-
Persuade	-	0.56 (0.87)	0.44 (0.71)	1.40 (1.93)	4.90	.021	1.000	.1

Desired Direction: desired direction of change scores. [a] n = 23, [b] n = 22.

Table 3 *One-way Analysis of Variance of Motivational Interviewing Treatment Integrity 4.2 summary scores and score thresholds of undergraduate OT and PT student pre-training, post-training and post placement*

Summary Score	BC	TP 1 Mean (SD)	TP2 Mean (SD)	TP 3 Mean (SD)	*F*	*p*	Pairwise comparisons TP1 v TP2	TP1 vs TP3	TP2 vs TP3
MIAB	-	0.24 (0.52)	2.28 (1.48)	1.36 (1.22)	20.70	.000	.000	.002	.056
MINAB	-	0.56 (0.86)	0.60 (0.91)	1.56 (2.12)	4.50	.016	1.000	.070	.119
TG	3	1.31 (0.42)	2.82 (0.64)	2.72 (0.70)	55.01	.000	.000	.000	1.000
RG	3.5	1.83 (0.54)	2.88 (0.72)	2.96 (0.88)	29.63	.000	.000	.000	1.000
% CR	.40	0.45 (0.46)	0.32 (0.23)	0.29 (0.19)	1.97	.167	-	-	-

R:Q	1:1	0.14 (0.15)	0.90 (0.47)	0.92 (0.47)	42.13	.000	.000	.000	1.000
		1:8.1[a]	1:1.2[a]	1:1.24[a]					

BC: Basic Competency score threshold, MIAB: MI Adherent Behaviour, MINAB: MI Non-Adherent Behaviour, TG: Technical Global (n=22), RG: Relational Global, % CR: Percent Complex Reflections, R:Q: Reflection to Question ratio, [a] ratio of questions to reflections

532