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Arts on referral interventions: a mixed-methods study investigating factors associated with differential changes in mental well-being

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ABSTRACT

Background Art interventions may provide a cost-effective approach to improving mental well-being. Most evaluations concentrate on intervention characteristics and little is known about other factors which might contribute to successful outcomes.

Methods This pre-and-post intervention mixed-methods study explored influences on differential changes in measured well-being among participants of an Arts on Referral (AoR) scheme in the UK. Measured well-being scores of 44 volunteers and findings from six semi-structured interviews were triangulated.

Results Mean well-being scores improved by 8.0 (95% CI 4.8–11.3, $P < 0.0001$); the number of sessions attended and baseline scores were positively associated with outcome score. Participants from Black and Minority Ethnic (BME) groups and females appeared to show greater improvement in well-being scores than White British or male participants. Qualitative interviews supported and further explained these findings and suggested differential impacts of AoR may, in part, be explained by the importance of sharing experiences, reduced social isolation and external stressors.

Conclusion This study supports the use of AoR interventions for improving well-being among those facing short- and long-term mental health challenges. However, given the reduced sample size and the pre-post design results should be interpreted with caution and potential differences between ethnic groups and genders should be further explored.

Keywords art, health promotion, mental health, public health

Background

Depression is the largest cause of disability globally and within the UK.[1,2] The costs of poor mental health in England were recently estimated to be £105 billion.[3] Effective early interventions are required and evidence suggests arts participation may improve mental well-being. Arts for health programmes seem to improve depression, anxiety, self-esteem and social integration.[4–9] Additionally government endorsement of arts initiatives to promote well-being has endured successive governments;[10–12] the 'No health without mental health' strategy for England supports mental health promotion through encouraging participation in '*meaningful activities, such as arts*'.[2]

Arts-on-referral (AoR) schemes, where individuals are referred to regular art groups, may improve self-confidence, social networks[4,9,13,14] and reduce healthcare costs among participants.[15] Whilst improved social support likely mediates poor mental health,[16] art-specific aspects of such programmes are less well understood; some suggest opportunities for self-expression may protect against poor mental health.[6,13,17]

Studies of AoR schemes are scarce; a recent review noted a gap in understanding associations between outcomes and

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other variables or pre-conditions.[18] Exploration of the impact of these complex interventions and participants' process of change is key, with studies combining quantitative and qualitative components considered the best way to achieve this.[6,7,19–23] In order to address this gap we conducted a pilot pre-post mixed-methods study evaluating change in well-being among participants of an AoR scheme in the UK. The aim was to assess mean change in Warwick Edinburgh Mental Well-being Scale (WEMWBS) scores following participation in AoR and then qualitatively explore associations found between individual and contextual factors with differential changes in well-being.

Methods

People with mild-to-moderate mental health problems were referred to one of four artist-facilitated groups, held in inner-city GP practices or community centres. All participants were exposed to a range of activities over the 20-week intervention period including, but not exclusively, painting, textiles, music, photography and film. One group was provided for mothers with infants; the other groups were open to all. The scheme aimed to improve participants' well-being and social capital[24] through collective engagement in creative arts, increased social contact and community engagement. Further details of the scheme can be found in a previous report.[25] A mixed-methods approach was used in this pre–post intervention pilot study; results from each study component were triangulated using a mixed-methods matrix.[26] See Table 1 for inclusion and exclusion criteria.

Quantitative component

Well-being was measured using WEMWBS: a validated fourteen-item scale (range 14–70).[27–29] Baseline, interim and outcome WEMWBS scores were captured. The mean change in baseline to outcome score was analysed using two-tailed paired *t*-tests.[30] Associations between gender, ethnicity, baseline WEMWBS score, number of sessions attended and follow-up WEMWBS scores were modelled using a random-effects multi-level model to account for multiple repeated measures within individuals.[31] Analyses were performed on Stata 12.1.

Qualitative component

A pilot sample of 6 out of 36 was purposively selected to obtain maximum variation of measured change in WEMWBS scores, and a mix of gender and ethnicity. The AoR Project Manager initially contacted selected participants and provided an information sheet; upon consent the researcher followed-up to arrange an interview.

A topic guide was developed to explore participants' process of change and experiences of the group activities. Information was collected on individuals' perceptions of their well-being and if/how AoR benefitted them. We also explored areas commonly associated with mental health challenges (including social support and financial concerns)[32] and topics emerging from a previous evaluation of the scheme[25] (including artist facilitation and pride in artwork).

After obtaining written consent interviews were held in participants' homes, except one which was in an office by request of the participant; a private room was used to reduce acquiescence bias. Confidentiality was highlighted to participants.

Interviews were audio recorded and transcribed verbatim; identifiable information was anonymized. Transcripts were coded and analysed using qualitative software (NVivo 9). Thematic analysis was used in conjunction with grounded theory principles such as deductive and inductive coding; within and between subject comparisons and consideration of divergent findings.[33] Whilst the small sample size limited our ability to reach complete data saturation, transcripts were quite comprehensive and included thick descriptions with most interviews lasting at least an hour. Quotes have been selected for illustration of key themes and divergent findings. Interview transcripts were returned to participants to help validate findings.

Table 1 Inclusion and exclusion criteria

	Quantitative	*Qualitative*
Inclusion criteria	Participated in the programme from 1 September 2010 to 31 July 2012 Linked baseline and follow-up WEMWBS scores available	Consent given at referral for follow-up contact by the AoR scheme Linked baseline and follow-up WEMWBS scores available Accepted to be contacted by researcher
Exclusion criteria	Re-referral People with learning disabilities[a]	No consent given at referral for follow-up contact People with learning disabilities[a]

[a]WEMWBS not validated for people with learning disabilities.

Table 2 Change in WEMWBS scores

Variable	n	*Mean baseline WEMWBS*	*Mean outcome WEMWBS*	*Mean change (95% CI)*	*Difference in mean change (95% CI)*	P *for interaction*
Gender						
Females	36	38.8	46.8	8.1 (4.3, 12.0)	2.42 (−6.6, 11.4)	0.6
Males	7	37.1	43.4	5.7 (0.4, 10.8)		
Not stated	<5					
Ethnicity						
White British	29	37.8	44.3	6.4 (2.4, 10.5)	3.3 (−5.3, 11.9)	0.4
BME	9	39.9	49.7	9.8 (0.3, 19.5)		
Not stated	6					
Total	44	38.2	46.2	8.0 (4.8, 11.2)	*T*-test, $P < 0.0001$	

Ethical approval was granted by the London School of Hygiene and Tropical Medicine Research Ethics Committee and the National Research Ethics Service.

Results

WEMWBS had not been validated for use in people with learning disabilities; therefore, results for 10 individuals with learning disabilities were excluded from the sample. All other participants receiving the 20-week intervention were included.

Quantitative findings

Linked baseline and follow-up WEMWBS scores were available for 44 participants; 36 (82%) were female. The mean baseline WEMWBS score was 38.2 (95% CI 35.3–41.0). The mean age was 43 years (range 27–73 years); age had little correlation with baseline or outcome WEMWBS scores ($r^2 = -0.02$ and 0.001, respectively).

Mean outcome WEMWBS score was 46.2 (95% CI 43.3–49.0); a significant increase from baseline (8.0, 95% CI 4.8–11.2, $P < 0.0001$) after an average of 14 art sessions attended. Increases in WEMWBS were somewhat greater in females (8.1, 95% CI 4.3–12.0) than males (5.7, 95% CI 0.4–10.8), and in participants from Black and Minority ethnic (BME) groups (9.8, 95% CI 0.3–19.5) compared with White British (6.4, 95% CI 2.4–10.5) (Table 2). Wide confidence intervals for the difference in mean change in WEMWBS by gender and ethnicity (Table 2) reflect the small numbers of males and BME participants recruited. There was little evidence of interaction by gender or ethnicity ($P = 0.6$ and $P = 0.4$, respectively).

The model for the association of gender, ethnicity, baseline score and number of sessions attended with outcome WEMWBS scores explained 33% of the variation in outcome WEMWBS scores ($R^2 = 0.33$). Having controlled for other variables each additional session attended resulted in a 0.3 (95% CI 0.0–0.5, $P = 0.03$) increase in WEMWBS and each point increase in the baseline score was associated with an increase of 0.4 (95% CI 0.1–0.6, $P = 0.01$) in outcome WEMWBS (Table 3).

Table 3 Predictors of outcome WEMWBS scores

Variable	*Mean difference (95% CI)*	P-*value*
Per session attended	0.3 (0.0, 0.5)	0.03
Per unit of baseline WEMWBS score	0.4 (0.1, 0.6)	0.01
Black and minority ethnic (BME) participants (compared with White British)	5.2 (−0.9, 11.2)	0.09
Male (compared with females)	−3.7 (−10.4, 3.0)	0.28

In an attempt to further explore these potential associations we now turn to the qualitative findings.

Qualitative findings

Participant characteristics are presented in Table 4 along with qualitative findings organized by themes. Our analysis focused on themes relating to differences between gender and ethnicity, highlighted by the quantitative analysis, and other emerging themes associated with participants' process of change. Participant names have been replaced with pseudonyms.

All participants reported benefitting from AoR, irrespective of their measured change in WEMWBS. Early successes seemed to facilitate greater improvements in well-being; Kate and Sue had large increases in WEMWBS and enjoyed the sessions from the outset. Kate in particular conveyed a sense

Table 4 Summary of participant characteristics and key themes for interviewees

Pseudonym	*Kate*	*Sue*	*Mark*	*Danny*	*Henry*	*Alice*
Change in WEMWBS score	Large increase	Large increase	Large increase	Small increase	Slight increase	Small decrease
Age group	25–29	35–39	55–59	25–29	40–45	40–45
Gender	Female	Female	Male	Male	Male	Female
Ethnicity	White British	Asian	White British	Black British	White British	White British
Reason for referral	Chronic pain and Post-natal Depression	Depression	Social isolation and impaired mobility	Depression	Depression	PND
Local support	Yes	No	Some	No	No	Some
Themes						
Interventional characteristics						
Expectation of effectiveness through NHS delivery	Y	Y	—	Y	Y	Y
Non-judgemental atmosphere	Y	Y	Y	Y	Y	Y
Group size, layout and artist facilitation	Y	Y	Y	Y	Y	Y
External stressors	—	—	—	—	Y	Y
Sharing experiences and normalizing emotions	Y	Y	—	—	—	Y
Breaking social isolation	—	Y	Y	Y	Y	—
Art as therapy	—	Y	—	Y	Y	—
Self-efficacy						
Positive feedback	Y	Y	Y	Y	Y	Y
Early success	Y	Y	Y	—	Y	—

of pride in her artwork from her first session. Conversely, Danny and Alice, who showed small changes in WEMWBS, reported taking a while to settle into the groups and/or find a particular activity of interest.

> 'You could get in and make something effective on your first session . . . you could always come out with something and think I did this – it was brilliant!' (Kate).

Small changes in WEMWBS for Henry and Alice may, in part, be explained by stressful experiences during their intervention period; Alice returned to work following maternity leave to face potential redundancy and Henry's benefits payments were reduced. Henry also had a low baseline score which the modelling suggests may be related to his small increase in WEMWBS. Despite this Henry found the opportunity to be creative was important for managing his depression and he valued the availability of a non-pharmacological intervention.

> '. . . art had become such an important part of my mental health' 'I'm trying to stay off medication through this episode'. (Henry)

Only one interviewed participant, Kate, was on anti-depressants throughout her intervention period; her large increase in WEMWBS may be confounded by the medication. Sue was on anti-depressant when she was referred to the art groups but stopped taking them a few weeks into her intervention period. All other participants were not on medication at the time of the intervention and expressed a desire for an alternative treatment.

Differences by gender: normalizing emotions

Men and women seemed to benefit from the normalization of what could be considered as 'deviant' emotions through their participation in AoR, although they appeared to achieve this in different ways, possibly related to inherent gender differences or the composition of the groups. All women interviewed spoke of the importance of sharing experiences at the groups. In particular, women with post-natal depression (PND) faced challenges around expectations of motherhood which conflicted with their own experiences. Sharing experiences with other new mothers who could empathize enabled these women to normalize their emotions

and feel less guilty or alone in facing challenges, as described by Kate and Alice.

> '. . . other mums had postnatal depression as well and were able to just talk to me about what they were going through'. (Kate)

> '. . . hearing what other people are going through, makes you feel . . . feel better, or less isolated'. (Alice)

Male participants also valued social aspects of the groups but the gender imbalance may have limited their ability to benefit from sharing experiences, as highlighted by Henry below. However, some men valued the opportunity to express their individuality and found a way of normalizing their emotions through the creative process itself. Danny spoke of finding liberation from pressures to conform to social expectations; engaging in artistic creativity developed his self-confidence and allowed him to feel good about diverging from society's script.

> '. . . quite often I was the only male attending and um, female participants . . . are more sharing'. (Henry)

> '. . . there's always a template that society tells you, you have to follow and it's difficult when you don't . . . it's nice to have that freedom . . . you know with painting, it's very therapeutic' (Danny).

The social context also encouraged some men to develop a sense of pride in their work and belief in their abilities; for instance Mark was encouraged to appreciate his work in new ways. Furthermore, Henry became particularly animated when he spoke of feedback at a public exhibition which helped nurture a positive self-image which he reported he often lacks.

> '. . . that was one of the best things, if I produced something and I didn't think it was particularly good, somebody would see something in it I hadn't' (Mark).

> '. . . when people say something nice about me, it doesn't always click with my own self-image so it was very helpful in that way, people just spontaneously saying 'oh that's nice' (Henry).

Differences by ethnicity: the importance of breaking social isolation

The opportunity for social interactions in a safe environment played an important role in the process of change for many participants. In particular, both BME participants benefitted from the breaking down of social barriers that engaging in the activities offered. Sue lived alone with her young child, lacked a local social network and faced language barriers. She benefitted from connecting with people in her area and a sense of belonging it provided outside of the art sessions. Danny knew many people locally but lacked close relationships and had never discussed his depression with friends or family; he benefitted from connecting with other participants, both verbally and creatively, perhaps on a deeper level than he experienced elsewhere.

> 'I meet someone down the road and then we just say 'hello, how's it going' . . . it's nice' (Sue).

> '. . . you want that interaction . . . you sort of see into people's soul when they're doing something, picking that type of paint or that brush' (Danny)

Social interactions were also beneficial to others suffering social isolation. Henry (White British, 40–45) sometimes became isolated due to his depression and Mark (55–59, White British) lost regular social contact at work after a physical health condition led to long-term leave. They both benefitted from the social context and weekly routine that the art groups provided.

> '. . . it gave structure . . . structure to the week that was lacking' (Mark)

> 'when I'm in a bad episode . . . I turn myself away, and it was very good for me, putting structure in, low level social contact and that creative opportunity' (Henry)

Art as therapy

Differences by gender and ethnicity may be confounded by other factors, such as type of mental health problem. We found that all participants enjoyed learning new skills and engaging in visual arts activities; however, those with depression spoke poignantly of how engaging in creative activities helped them cope; both BME participants suffered from depression. The creative process helped Danny to explore his emotions and foster a renewed interest in the world around him. Sue had experienced abusive relationships and found attending the AoR group was an important step in her journey towards recognizing reasons for her depression and accessing further support. Learning skills for creative expression helped her express herself non-verbally and cope with difficult emotions.

> 'it's just a good reflective tool and you need that really . . . problems in your mind but you just need to find it'. 'I like to sort of look at photography and look at things in general now, it's got me curious' (Danny)

> '. . . being creative is just express our mind . . . some people express through drawing or wool, whatever . . . it's really

important for our well-being, I'm definitely not the verbal type' (Sue).

Additionally, Henry found painting helped him escape negative thought patterns associated with depression and to find a sense of peace.

'it certainly helps to break that cycle of vicious contemplations and rumination'. '. . . I was feeling a bit low and feeling I could get in a dangerous head space, I just sat down and painted a fairly simplistic picture, sky, some trees and just sat there and got such a feeling of peace' (Henry).

Discussion

Main findings of this study

Mean well-being improved following participation in AoR and WEMWBS scores increased with each AoR session. Well-being improved more slowly for participants with low baseline scores; however, qualitative findings suggest these individuals may find arts participation helpful in managing emotions and preventing deterioration of well-being. Triangulation also showed those with little/no improvement in WEMWBS experienced stressful life events during their referral.

What is already known on this topic

Findings from this study are congruent with existing evidence supporting AoR for improving well-being. Mean increases in WEMWBS in this study were similar to previous studies[4,8,25] and findings that self-confidence and social isolation improve are supported elsewhere.[4–9,11,13,22,23,25] Additionally, early successes leading to greater improvement in well-being is underpinned by theories of motivation and self-efficacy.[34]

The impact of external stressors on outcome WEMWBS scores highlights the challenge of measuring well-being, a subjective factor with many influences. This research supports views that not all the benefits of AoR are quantifiable and that mixed-methods are required to improve the validity of findings.[5–7,19–23]

What this study adds

To our knowledge this is the first mixed-methods study exploring associations between pre-existing factors and differential outcomes from AoR. This study contributes to the scarcity of studies offering an understanding of processes of change underlying this under-researched area.

Modelling was suggestive of greater improvement in WEMWBS in females and BME participants; qualitative findings support and offer insights into possible reasons for these associations. Women formed the majority of participants and experienced greater social support through shared experiences and the consequent normalization of emotions. This corroborates findings that development of specific 'group norms', which better relate to an individuals' own experience than perceived social norms, can abate internal conflict and improve well-being.[35] That women benefitted more from this aspect fits with traditional stereotypes that women are more likely to express pro-social emotions, such as empathy, and those which imply vulnerability, such as sadness.[36] BME participants in this study benefitted from opportunities for self-expression and community integration. BME participants may gain greater benefit from the social acceptance at the art groups if they feel discriminated against in other aspects of their lives. Additionally opportunities for self-expression and developing a positive self-image, or 'identity capital', through arts participation may be protective against the impacts of discrimination.[13,37] This may, in part, explain our findings of greater improvements in well-being among BME participants, although other participants also developed identity capital through creative expression. Participants with depression gained particular benefit from the creative process; the distraction and change in perspective it offered helped them to manage their emotions. Neurocognitive theory posits that engaging in 'deliberate creativity', such as in visual arts classes, increases activity in neural networks in the pre-frontal cortex which tend to be under-active in people with depression.[38,39] Learning new skills for creative expression may help re-balance this activity and aid development of novel neural connections, potentially helping individuals with depression to alter their patterns of thinking.[38] Studies of arts interventions for people with depression could incorporate functional magnetic resonance imaging in order to test this theory.

This study supports AoR interventions for promoting well-being. AoR schemes could prioritize individuals who lack social support and people with depression; the latter may particularly benefit from arts participation over other social interventions. Gender imbalances in participation should be addressed, be this by promoting male participation in existing mixed groups, or considering male-specific activities such as community-based 'Men's Sheds' projects.[40] Further mixed-methods studies with bigger samples should be carried out to explore potential differences by ethnicity and diagnosis. Ideally, these studies should include a waiting-list control group which would not initially receive the AoR intervention in order to better establish the impact of AoR on well-being.

Limitations of this study

Qualitative findings were based on only six interviews which limited our ability to reach data saturation; however, findings supported the interpretation of quantitative results. Limitations

of the quantitative component were a small sample size, lack of control group, selection bias and the lack of a power calculation; however, this was a pilot study in which all participant data were used. It was not possible to adjust for additional confounders, such as GP-recorded diagnosis, medications and life events due to lack of data and the limited number of variables that could be modelled given the sample size.[41] Instead potential confounders were explored qualitatively. Individual components of WEMWBS were not analysed.

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References

1 World Health Organisation. *The Global Burden of Disease: 2004 Update*. Geneva: World Health Organisation, 2008.

2 Department of Health. *No Health Without Mental Health: A Cross-Government Mental Health Outcomes Strategy for People of All Ages*. London: Department of Health, 2011.

3 Centre for Mental Health. The economic and social costs of mental health problems in 2009/10, 2010. www.centreformentalhealth.org.uk.

4 Margrove KL, Heydinrych K, Secker J. Waiting list-controlled evaluation of a participatory arts course for people experiencing mental health problems. *Perspect Public Health* 2012. doi:10.1177/1757913912461587

5 Staricoff RL. Arts in Health, a review of the literature. Arts Council England; Research Report 36, 2004.

6 Secker J, Hacking S, Spandler H *et al.* Mental health, social inclusion & arts: developing the evidence base. The Anglia Ruskin/UCLan Research Team, 2007. http://www.instituteofhealthequity.org/projects/mental-health-social-inclusion-and-arts-developing-the-evidence-base (14 March 2013, date last accessed).

7 Macnaughton J, White M, Stacy R. Researching the benefits of arts in health. *Health Educ* 2005;**105(5)**:332–9.

8 Matarasso F. *Use or Ornament? The Social Impact of Participation in the Arts*. UK: Comedia, 1997.

9 Burt EL, Atkinson J. The relationship between quilting and wellbeing. *J Public Health* 2012;**34(1)**:54–9. doi:10.1093/pubmed/fdr041

10 Arts Council England. *A Prospectus for Arts and Health*. London: Department of Health with Arts Council England, 2007.

11 Department of Health. Report of the review of arts and health working group. Leeds: Department of Health, 2007.

12 Clift S, Camic P, Chapman B *et al.* The state of arts and health in England: policy, practice and research. *Arts Health* 2009;**1**:6–35.

13 Kent L, Hacking S, Shenton J. Catching life: the contribution of arts initiatives to recovery approaches in mental health. *J Psychiatr Ment Health Nurs* 2007;**14**:791–9.

14 Crone D, O'Connell E, James DVB *et al.* Art lift, Gloucestershire: evaluation report. UK: University of Gloucestershire, 2011.

15 NHS Gloucestershire. Cost–benefit evaluation of Artlift 2009–2012: summary. NHS Gloucestershire and NHS Gloucestershire County Council, 2011. http://www.artlift.org/storage/what-people-say/Simon_Opher_cost_benefit_report_2.pdf.

16 Turner RJ, Lewis Brown R. Social support and mental health. In: Scheid TL, Brown TN (eds). *A Handbook for the Study of Mental Health: Social Contexts, Theories and Systems*, 2nd edn. Cambridge: Cambridge University Press. Chapter 10, 2010.

17 Friedli L, Jackson C, Abernethy H *et al.* Social prescribing for mental health—a guide to commissioning and delivery. Care Service Improvement Partnership; North West Development Centre. http://www.centreforwelfarereform.org/uploads/attachment/339/Scalia-prescribing-for-mental-health.pdf.

18 Stuckey HL, Nobel J. The connection between art, healing, and public health: a review of current literature. *Am J Public Health* 2010;**100(2)**:254–63.

19 Medical Research Council. Developing and evaluating complex interventions: new guidance. Medical Research Council, 2008.

20 Curry LA, Nembhard IM, Bradley EH. Qualitative and mixed methods provide unique contributions to outcomes research. *Circulation* 2009;**119(10)**:1442–52.

21 Daykin N, Pilkington P, McClean S. *Evaluation of art lift: a partnership arts and health project*. Bristol: University of the West of England (UWE), 2008.

22 Angus J. *A Review of Evaluation in Community-based Art for Health Activity in the UK*. London, UK: Health Development Agency, 2002.

23 Secker J, Loughran M, Heydinrych K *et al.* Promoting mental well-being and social inclusion through art: evaluation of an arts and mental health project. *Arts Health* 2011;**3(1)**:51–60.

24 McKenzie K, Whitley R, Weich S. Social capital and mental health. *Br J Psychiatry* 2002;**181**:280–3.

25 van de Venter E, Newman L. NHS Bristol. Arts on referral for Inner City Bristol: evaluation report. Bristol, UK: NHS Bristol, 2011.

26 O'Cathain A, Murphy E, Nicholl J. Three techniques for integrating data in mixed methods studies. *BMJ* 2010;**341**:1147–1150.

27 Tennant R, Hiller L, Fishwick R *et al.* The Warwick-Edinburgh Mental Well-being Scale (WEMWBS): development and UK validation. *Health Quality Life Outcomes* 2007;**5**:63.

28 Clarke A, Friede T, Putz R *et al.* Warwick-Edinburgh Mental Well-being Scale (WEMWBS): validated for teenage school students in England and Scotland. A mixed methods assessment. *BMC Public Health* 2011;**11(1)**:487.

29 Stewart-Brown S, Platt S, Tennant A *et al.* The Warwick-Edinburgh Mental Well-Being Scale (WEMWBS): a valid and reliable tool for

measuring mental well-being in diverse populations and projects. *J Epidemiol Community Health* 2011;**65(Suppl. II)**:A1–A40.

30 Stewart-Brown S, Janmohamed K. *Warwick-Edinburgh Mental Well-Being Scale; User Guide Version 1*. Edinburgh, UK: NHS Health Scotland, 2008.

31 Hedeker D, Gibbons RD, Flay R. Random effects regression models for clustered data with an example from smoking prevention research. *J Consult Clin Psychol* 1994;**62(4)**:757–65.

32 Cooke A, Friedli L, Coggins T *et al. Mental Wellbeing Impact Assessment; A toolkit for well-being*, 3rd edn. London: National MWIA Collaborative, 2011.

33 Fereday J, Muir-Cochrane E. Demonstrating rigor using thematic analysis?: a hybrid approach of inductive and deductive coding and theme development. *Int J Qual Methods* 2006;**5(1)**:80–92.

34 Bandura A. Self efficacy: toward a unifying theory of behavioural change. *Psychol Rev* 1977;**84(2)**:191–215.

35 O'Gorman R, Wilson DS, Miller RR. An evolved cognitive basis for social norms. *Evol Hum Behav* 2008;**29**:71–8.

36 Fischer A. *Gender and Emotion. Social Psychological Perspectives*. Cambridge, UK: Cambridge University Press, 2000.

37 Callard F, Friedli L. Imagine East Greenwich: evaluating the impact of arts on health and well-being. *J Public Ment Health* 2005;**4(4)**:29–41.

38 Dietrich A. The cognitive neuroscience of creativity. *Psychon Bull Rev* 2004;**11(6)**:1011–26.

39 Drevets WC, Price JL, Simpson JR *et al*. Subgenual prefrontal cortex abnormalities in mood disorders. *Nature* 1997;**386**:824–7.

40 Ballinger ML, Talbot LA, Verrinder GK. More than a place to do work: a case-study of a community-based Men's Shed. *J Men's Health* 2009;**6(1)**:20–7.

41 Kirkwood BR, Sterne JAC. *Essential Medical Statistics*, 2nd edn. Ch. 29. Oxford: Blackwell Publishing, 2005.