Does the 'diffusion of innovations' model enrich understanding of research use? Case studies of the implementation of thrombolysis services for stroke

Annette Boaz*, Juan Baeza[1] and Alec Fraser[2]

*Corresponding author – a.boaz@sgul.kingston.ac.uk, Faculty of Health, Social Care and Education, St George's, University of London, Grosvenor Wing, Cranmer Terrace
London SW17 0RE, UK

[1] Lecturer in Health Policy, King's College London

[2] Research Fellow, London School of Hygiene and Tropical Medicine

Abstract

Objectives: To test the applicability of the model of diffusion of innovations as an analytical framework to explore the implementation of evidence based thrombolysis services for stroke patients.

Methods: Four empirical case studies of the implementation of evidence into stroke services in England and Sweden. Data were drawn from 95 semi structured interviews with a range of clinical and managerial staff within four hospitals, working in stroke units, emergency medicine, radiology, the ambulance service, community rehabilitation services and community medicine.

Results: The implementation of thrombolysis in acute stroke management benefited from a critical mass of factors featured within the model including, the support of national and local opinion leaders, a strong evidence base and financial incentives. However, while the model provided a starting point as an organizational framework for mapping the critical factors influencing implementation, to properly understand the process of implementation and explore the importance of the different factors identified requires a more fine grained analyses of context and, in particular, of the human and social dimensions of change.

Conclusions: While recognising the importance of models in mapping the processes by which the diffusion of innovations occurs, future studies would benefit from a greater use of methods that lend themselves to in-depth analysis such as ethnography and the application of relevant bodies of social theory.

Do models enrich our understanding of research use? Applying the diffusion of innovations model to implementation of thrombolysis services for stroke in England and Sweden.

Background

The so called 'implementation gap,' into which promising practices have been seen to fall, has attracted considerable attention within policy studies for decades [1]. Implementation research has recently been gaining ground within health care research and practice, receiving an additional impetus from debates about evidence based health care [2]. Understanding how innovations, particularly those based on evidence, make their way into practice has been identified as critical to clinical effectiveness in health services [3].

Under the auspices of evidence based medicine there have been numerous intervention studies designed to improve the use of evidence, typically through the use of guidelines, audit and feedback, and leadership [4]. These studies have concluded that single methods to promote the take up of new evidence based interventions have limited impacts and that multifaceted interventions are likely to be more effective [5]. Research contributions have sought to shift the field of implementation research in health service organizations, advocating greater attention to context, theory and process [6,7]. For example, Checkland et al [8] argue that while organizations might identify similar sets of barriers, their underlying processes of 'sensemaking' were rather different at each of the UK general practices studied. While barriers can capture a rhetorical and rational account of practice, the importance of context and social relations is often lost [9].

There has also been a proliferation of models seeking to provide frameworks for the analysis of dimensions of implementation [10, 11]. Notable is the extensive review of the diffusion of innovations literature conducted by Greenhalgh and colleagues [12] for the then UK NHS Service Delivery Organization (SDO). Building on the widely cited work on the dissemination of innovations conducted by Rogers [13] the review draws together other streams of thinking related to the dissemination and implementation of innovations from a wide range of research traditions (including sociology, psychology and organizational studies) to construct a comprehensive model of the implementation process. The dimensions are grouped under the following headings drawn from the model: the nature of the innovation, systems readiness for innovation, the adopter, the implementation process, the outer context and communication and influence. The review advocates a move away from linear models of implementation towards richer, more complex, accounts of the process of change including greater consideration of the role of individuals within the change process [14]. The diffusion of innovations model developed by Greenhalgh et al [14] was chosen for this study as it is a widely recognised, cited and used [15, 16] model providing a framework for analysing implementation processes. Although the model is not explicitly framed as a 'how to' approach, the domains provide a detailed and comprehensive map of the implementation landscape [17].

This study focused on stroke, one of the leading causes of mortality and morbidity in the UK and worldwide [18]. In terms of implementation and improvement, stroke has traditionally been associated with limited treatment options for patients and few evidence based interventions. However, stroke research has been animated by the development and introduction of a number of new evidence based interventions designed to improve stroke patient care and outcomes [19, 20]. In particular, the development of specialist stroke units has led to greater coordination in the delivery of stroke care [21] and the introduction of

4

thrombolysis as a treatment for stroke patients has received considerable attention internationally [22, 23]. Thrombolysis is a time critical 'clot busting' intervention, administered intravenously in the first four and a half hours post stroke in line with a strict treatment protocol. Implementation involves coordination between ambulance services, Accident and Emergency and stroke specialists and the recognition by patients and carers of the need for emergency intervention. Few studies have investigated the implementation of thrombolysis services, although one literature review [24] reported barriers to its implementation, which included the limited recognition of stroke as a treatable condition, poor triage of stroke patients and delays in critical neuro-imaging. This study uses the domains within the diffusion of innovations conceptual model to explore the implementation of thrombolysis in stroke care.

Methods

Four case studies were conducted in England (2 hospital sites) and Sweden (2 hospital sites). The countries were selected, following discussions with European stroke specialists, to represent different levels of development in the delivery of stroke services, which were characterised, based on audit data, as highly developed (Sweden) and developing (England). Focusing at the micro level, the sites were selected to include urban and rural hospitals. The sample in each site included clinical and managerial staff within one hospital, working in stroke units, emergency medicine, radiology, the ambulance service, community rehabilitation services and community medicine. The roles of participants and their organizations are listed in the table below.

[Insert table 1 here]

The interview schedule was informed by two literature reviews conducted by the authors – the first based on social science approaches to implementation, and the other based on

approaches prevalent in the medical literature and subsequently published [5]. The study centred on questions around evidence, context and facilitation following principles of the PARIHS framework [25]. This framework considers successful implementation to be dependent on the qualities of the evidence that is to be implemented, the nature of the context and the process of facilitation [26]. An early draft of the schedule was piloted with four clinical staff at a London hospital and significant revisions made prior to the fieldwork.

Participants were asked about their professional background and work history, if they used evidence based research in their work, (and if so) why, whether they were encouraged to do so within the Stroke Unit and within the hospital (and if so by whom). Participants were not given definitions of evidence based research as we wanted to explore their own perceptions of evidence based research in stroke. Participants were also asked to give examples of evidence use in practice to explore their understandings of what evidence based research was and how individual and organisational factors affected the use of evidence.

All 95 interviews were conducted by AF and were recorded and transcribed. Detailed notes were made after each interview to capture the observations and reactions of the interviewer and detailed case study reports were compiled for each site. In Sweden translation services were offered, but were not required. The interviews were conducted between October 2010 and October 2011. The data were entered into Nvivo and coded. Initial codes were generated from a close reading of the transcripts and were aligned with the foci of the interview schedule. For example these initial, or primary codes related to the nature of the evidence behind different interventions – such as thrombolysis and stroke unit care, the contextual factors which were seen to promote or inhibit uptake by informants, and finally, different types of facilitation methods such as audit and feedback, guidelines, leadership and forms of financial incentives. Following team discussions around the interpretation of primary codes, secondary codes were developed and compared with the components of the diffusion of

innovations model. Examples of these secondary codes included specialist identity development, political manoeuvring and managerial limitations. The secondary codes were thematically developed with a particular focus around 'nascent concepts' [27] that appeared to lack sufficient explanation in the existing literature. This part of the analytical process was highly iterative and involved going back and forth between the data and the existent literature.

The Greenhalgh et al [14] conceptual model for considering the determinants of diffusion, dissemination and implementation of innovations was used as a framework for further analysis of the data. Data focused specifically on thrombolysis were re-coded using the dimensions of the model. Where inconsistencies arose within or between case studies, these are highlighted in the text.

Findings

The implementation of thrombolysis in acute stroke management benefited from a critical mass of elements featured within the diffusion innovations model. The following sections present the data relating to three elements of the model chosen to illustrate how the application of the model helped to explain the implementation of evidence based improvements for stroke patients in terms of how evidence was used and how implementation was accelerated and/or adopted. The final section of the findings uses the example of data emerging around the theme of personal and professional conflict to suggest some limitations of the model in terms of generating insights and explanation.

The nature of the innovation

In the field of stroke care, the historical inability to offer patients treatment options seems to have led to a willingness by health professionals to try something new (described in the

model as a tension for change), leading to a high level of system readiness for innovation. Medical staff described how they used to admit patients but be able to do nothing for them. Stroke is characterised as a low profile specialty, with one participant in Sweden capturing a wider, historical sentiment [28] that 'there is no glamour in stroke.' The traditional low profile of stroke care as a medical specialism and the lack of treatment options were often mentioned in the interviews.

Thrombolysis, as a medical intervention administered by clinical staff in a hospital setting, was also considered to be compatible with the norms of those tasked with implementation:

'I think it's [the implementation of thrombolysis] following the evidence, but it is highly convenient that that evidence supports a medicalised model...I mean you could pretty much argue, I think, that the, that the evidence around multidisciplinary stroke unit care has been around for tens of years and yet we haven't done terribly well at implementing it, and where it has been implemented it's generally been implemented relatively quietly. Compare that to the huge big bang effect [for thrombolysis], and this ripples all the way.' (Commissioner, Primary Care Trust, England)

In addition to its high compatibility with the medical model of acute care, it was considered to be of relatively low complexity. Furthermore, in Sweden, there had been scope for local involvement in trying out thrombolysis (described in the model as trialability and observability). Swedish participants mentioned their extensive early experience of, and experimentation with, thrombolysis (as collaborators in clinical trials).

There was also evidence of local developments and, where required, local adaptation. One participant in England described how he had gone back to the original studies to check the evidence base for thrombolysis with hypertensive patients as he considered that the national guidelines were not sufficiently detailed. Guidance for patients with hypertension was

incorporated into the local guidelines. A Swedish Internal Medicine Consultant described how they had prepared local guidelines to ensure that the key messages were presented in a way that was clear and accessible in 30 minutes. Participants also talked about the value of 'drilling down' into local data and conducting local studies of improvements in, for example, the speed of transfer from the ambulance service to the stroke team.

The main challenge identified across the four sites in terms of implementation was the need to offer a 24 hour service. Staff had considered the implications for their working practices and sought and received assurances that the costs (in particular, of 24 hour service delivery) had been taken into consideration and would be fully supported:

> 'So we understood that this would probably increase the number of scans done in the middle of the night, and this has great impact to us as a department, because it means we lose a radiographer for compensatory rest for the following afternoon, and means we cannot necessarily run two full lists, for example, the following day. So we had to know that there would be a prospect of getting more radiographers on board as a result. And I think, and we waited until we had that sort of agreement. So there must have been funding.' (Consultant Radiologist, England)

In one of the Swedish case studies, the need for 24 hour support for thrombolysis was identified as a challenge to sustained implementation, given the resource and skill requirements.

> '... one of our great problems is that we need to have that competence, that skill, that flow 24 hours a day, and we don't have our stroke nurses, and we don't have our neurologists here. We don't have –enough money, it's not enough money and it's not enough of personnel to have this high competence every minute you need. So that's

of course, if you should be a real effective hospital, you should have this thrombolysis

flow or process working at the same way all, every hour and even during the

weekends. But it's of course, both an economical problem, mostly, but also that we

don't have enough with the doctors and nurses that have that stroke competence that

you need.' (Head of Internal Medicine, Sweden)

Thus a number of aspects of the intervention, as a relatively simple yet technical evidence

based intervention delivered in an acute setting, supported implementation. However, other

aspects, such as the need to have a 24 hour service in place proved more challenging and

required a supportive organisational and wider context.

The outer context

Participants often discussed the impact of a supportive local and national context. It was

acknowledged at one of the English hospitals that, by the time their hospital had come to

implement thrombolysis, many local clinical staff had picked up on the value of thrombolysis

as 'a good thing' through 'osmosis' in their workplace, networks etc. External collaboration

in networks, in particular, was often mentioned. In England, the local stroke network was

cited as an external driver for change and source of knowledge (including a regional study

day on thrombolysis) on the value of thrombolysis and approaches to implementation.

However, participants in the two countries described the local development of stroke services

differently. In Sweden, participants characterised developments as 'bottom up' and clinically

lead, while in the UK the impetus for change was considered to be more 'top down.' In

England, the importance of incentives and mandates, in the form of national guidelines and

additional funding were regularly mentioned. Often, at the micro level, participants talked in

terms of the national drive as complementing incentives operating at other levels and

supporting local plans for change. The Clinical Nurse Specialist in one hospital commented

that 'it was national government, it was region, it was everything, everyone wanted it in place.' Another highlighted the National Stroke Strategy and the pressure put on hospitals to implement it. However, in Sweden, where stroke services were more established, participants were concerned about their ability to sustain the quality of service currently delivered due to resource constraints.

Inter-organizational norms and comparisons figure highly in the case study accounts. Participants frequently make reference to the national picture and to practice elsewhere in the country, particularly in their own locality. They also discussed the role of national stroke data (Rikstroke data in Sweden and Royal College of Physicians data in England) and its impact on practice.

> 'And also with this RIKS stroke, when you have a quality register, it does make people tick, because you compare and you start phoning each other' (Medical Auditor, Sweden)

Attitudes of adopters

Finally, the role of significant individuals (referred to in the literature as leaders, champions and opinion leaders) is highlighted in participants' accounts of the implementation of thrombolysis in all four sites. In particular, the model facilitated an analysis of the positive aspects of leadership in supporting implementation.

> 'I'm lucky enough to have two very devoted superior doctors at the stroke unit, so they push themselves and they are up to date and they go to congresses here and in Europe, in the US as well. So they push themselves and they inform me, so I don't need to push there. But I have to push in several other areas. But not in the stroke area.' (Medical Director, Sweden)

These were not always senior figures and were not only doctors. In one case study the leadership for the implementation of thrombolysis came from the Clinical Nurse Specialist.

> I think it was good that we had the two stroke nurses in post...there was good leadership from them. I myself didn't really think down here that the consultant had promoted it, it's been all nurse led (Senior Sister, England)

Local leaders were also able to see ways in which the additional resources available for thrombolysis could be used to enhance local stroke services more widely. One general manager concluded that 'we are aware that it [the thrombolysis service] would give us other opportunities in that their time [clinical nurse specialist posts] is not always going to be spent doing clever stuff around thrombolysis.'

Personal and professional conflict

Although the importance of leadership is highlighted in the model in terms of communication and influence, adopter characteristics and systems antecedents for innovation, explaining the nuanced role of leaders lay beyond the scope of the model. For example, the impact of personal and professional conflict between key individuals in leadership positions was highlighted at different sites. In one English case study hospital, colleagues described how two senior consultants involved with stroke services couldn't get along and work together. As a consequence one had manoeuvred the other out of stroke care decision making, but the remaining individual could not provide sufficient clinical leadership to promote the thrombolysis service. Thus, despite having a strong team at the delivery level providing effective leadership to the implementation team, leadership was missing at senior management team level where critical, relevant decisions were being made. Here the political manoeuvring and conflict had left a leadership void that was both challenging the implementation of thrombolysis and hard to tackle. An attempt to bring in a new consultant

failed and the personal conflict between the existing consultants continued to impact upon the services:

> '[At a local hospital they] tried to fill the gap by advertising for a consultant. And
> they didn't get someone, then they had a problem, because they've got two
> geriatricians, [they] can't stand one another. [one] has managed, either by design or
> by accident, to manoeuvre [the other] almost out of the stroke care arena entirely. But
> [he] is not a leader of men, and struggles to deliver anything. He's certainly not a
> champion. A clinical champion.' (Commissioner, Primary Care Trust, England)

In Sweden, participants discussed the corrosive impact of conflict between two senior figures which acted as a barrier to implementation in one of the hospitals. Participants were describing very personal conflicts using expressions such as 'they can't stand one another.' The potent personal feuds identified in our case studies seem to be missing from many accounts of implementation and models of the implementation process. These micro social relations in healthcare settings seem to influence diffusion and may also explain why there are wide variations in service delivery and outcomes.

Conclusions

The findings go some way to explain empirically the implementation of thrombolysis in stroke services in England and Sweden. The diffusion of innovations model provided a detailed framework for mapping key dimensions of implementation. For example, the study identified evidence of support for implementation in the outer context (including funding, guidelines and strategy documents), in the nature of the innovation itself and in the attitudes

of the adopters in all the sites. It was also possible to detect an inter-play between different aspects of the model [29, 30] within the case studies.

The findings section explored data relating to three elements of the model: the nature of the intervention, the outer context and the role of leadership. These elements were chosen to illustrate how the application of the model might explain the implementation of evidence based improvements for stroke patients. In contrast to complex health care interventions with multiple organisational, technical and behavioural dimensions [31], thrombolysis was described as a relatively simple yet technical evidence based intervention

While the compatibility of the intervention with organisational practices and norms in acute care created a tension for change [15], other aspects such as the need to have a 24 hour service in place proved more challenging and did require a supportive organisational and wider context. However, participants highlighted diverse aspects of the outer context that were pushing in the same direction and supporting implementation. These included formal encouragement from national and regional government and national and local data. More informal support for implementation came through comparison with other Trusts and contact with colleagues within networks. Positive aspects of leadership were also identified in supporting implementation. It was observed that leadership did not always come from senior figures or clinicians, although the extent to which it constituted distributive leadership, including the sharing of power and influence was less clear [32].

The particular focus of this study was the ways in which research evidence is transferred into practice (variously labelled as research implementation, knowledge transfer and translational research). The Greenhalgh et al model suggests that the fact that an innovation is evidence based gives it a relative advantage. This was supported in our data, where the strength and quality of the data from the original clinical trials [19] was frequently mentioned. Although the model supported a detailed mapping of critical factors, developing a deeper understanding of factors that seemed critical to implementation meant looking further afield. For example, to understand the role of unprofessional behaviour of senior staff in the case studies required a consideration of a wide range of relevant organizational and behavioural literature.

Fitzgerald and colleagues argue that research which characterize individuals as translators and reinventors does not capture the scope (both positive and negative) of actor involvement in the diffusion of innovations [30]. The role of individuals in the change process has been discussed previously in the literature on implementing evidence into practice in terms of the lack of enthusiasm or active hostility of influential clinicians and its impact on change [33]. It is also discussed in the management literature where the 'darker side' of employee behaviour is highlighted [34]. Others have tackled the negative impacts of, for example, personal feuds in the workplace [35]. In understanding the implementation of knowledge, there is scope for greater attention to be paid to the human and social aspects of organizational change [36]. Currie and Suhimlinova [37] highlight the significance of the professions and power in understanding how poor behaviour can continue to affect organizational change in health care organizations. Personal attributes and motivations are often sidelined in analyses of change and are 'explained away' by structural and political factors – while these link to wider organizational structures, processes and politics, they have a life of their own.

Models, like barriers and facilitators, may constrain analysis if used in isolation. Models are illustrative (such as the London Underground Map) and abstract and as such should not be seen as reflecting the complexities that exist in reality. As Checkland et al observe [8] the lure of the metaphor of barriers and facilitators continues to be strong in health services research, reinforcing a linear model of change that is not sufficiently sensitive to context. A predilection for models (both linear and more complex) also encourages a mechanistic and descriptive mapping of key factors (including barriers and facilitators). While detailed mapping can be helpful for descriptive purposes, this is a first step rather than a satisfactory endpoint for exploratory studies of implementation.

Models should not replace social and political theory in supporting our investigations of the implementation of research. There is still potential to draw learning from psychology, sociology and management into the field of research implementation if we are to make sense of the process of change and get beneath the surface of implementation [9]. Others are developing and testing approaches that use theory to construct more nuanced accounts capturing contextual factors [38]. A realist approach which distinguishes between context, mechanisms and outcomes is also attracting attention in implementation research [39, 40]. In particular, this study suggests that a deeper theoretically informed analysis will be critical is we are to understand the potential of individuals within health systems (professionals, patients and carers) to both drive change as inspirational leaders, but also to de-rail the implementation process.

References

1. Hill M. *The Public Policy Process*. Harlow: Pearson Education, 2005.

2. Dickinson H. Implementing Policy in Glasby J (ed) *Evidence, Policy and Practice: Critical Perspectives in health and social care.* Bristol: Policy Press, 2011.

3. Eccles M, Armstrong D Baker R et al. (2009) An implementation research agenda. *Implement Sci.* 2009, 4:18doi:10.1186/1748-5908-4-18.

4. Grimshaw JM Shirran L Thomas R et al. Changing provider behavior - An overview of systematic reviews of interventions. *Medical Care*; 2001, 39:II2-II45.

5. Boaz A Baeza J Fraser A and the European Implementation Score Collaborative Group. Effective implementation of research into practice: an overview of systematic reviews of the health literature. *BMC Research Notes* 2011; 4:212.

6. Dopson S. & Fitzgerald L (eds) *Knowledge in Action? The diffusion of innovations in health care*, Oxford, Oxford University Press, 2005.

7. Ferlie E Crilly T Jahapara A et al. Knowledge mobilisation in healthcare: A critical review of health sector and generic management literature. *Social Science and Medicine*; 2012: 74 (8): 1297–1304

8. Checkland K Harrison S and Marshall M Is the metaphor of 'barriers to change' useful in understanding implementation? Evidence from general medical practice. *J Health Serv Res Policy*. 2007; 12 (2): 95-100.

9. Weick KE (1995). *Sensemaking in organizations.* Thousand Oaks, CA: Sage, 1995

10. Graham ID Logan J Harrison MB et al. Lost in knowledge translation: Time for a map?. *Journal of Continuing Education in the Health Professions*, 2006; 26: 13–24. doi:10.1002/chp.47.

.

11. Ferlie E Gabbay J Fitzgerald L et al. Evidence based medicine and organisational change: an overview of some recent qualitative research. In Ashburner L ed. *Organisational Behavours and Organisational Studies in Health Care: Reflection on the Future*. Basingstoke: Palgrave, 2001.

12. Greenhalgh T Robert G Bate P et al. *Diffusion of Innovations in Health Service Organizations: A systematic literature review.* Oxford: BMJ Books: Blackwell Publishing, 2005.

13. Rogers E *Diffusion of Innovations*. New York: Free Press, 1995.

14. Greenhalgh T Robert G Macpharlane F et al. Diffusion of Innovations in Service Organizations: Systematic Review and Recommendations. *The Milbank Quarterly*. 2004; 82: 4.

15. Damschroder L Aron D: Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implement Sci* 2009, 4:50.

16. Carayon P. Human factors in patient safety as an innovation, *Applied Ergonomics* 2010;41 (5): 657–665.

17. Greenhalgh T Stramer K Bratan T et al. Introduction of shared electronic records: multi-site case study using diffusion of innovation theory *BMJ* 2008; 337:a1786.

18. Strong K Mathers C Bonita R. Preventing stroke: saving lives around the world. *Lancet Neurol* 2007; 6:182-7.

19. NINDS. Tissue plasminogen activator for the treatment of acute ischaemic stroke. *NEJM* 1995; 333, 1581–7.

20. Stroke Unit Trialists' Collaboration. Organised inpatient (stroke unit) care for stroke. Cochrane Database Syst Rev 2007; (4): CD000197.

21. Langhorne P Pollock A. With the Stroke Unit Trialists' Collaboration. What are the components of effective stroke unit care? *Age and Ageing* 2002; 31: 365–371.

22. Sudlow C and Warlow C. Getting the priorities right for Stroke. *BMJ* 2009; 338:b2083.

23. Wardlaw JM et al. *Thrombolysis for acute ischaemic stroke (Cochrane Review).* Cochrane Library 2004, Issue 1.

24. Carter-Jones C. Stroke thrombolysis: Barriers to implementation. *Int Emerg Nurs* 2011; 19 (1): 53-57.

25. Stetler C. Damschroder L. Helfrich C et al. A Guide for applying a revised version of the PARIHS framework for implementation. *Implement Sci.* 2011, 6:99.

26. Kitson A Rycroft-Malone J Harvey G et al. Evaluating the successful implementation of evidence into practice using the PARiHS framework: theoretical and practical challenges. *Implement. Sci.* 2008; 3:1.

27. Gioia DA Corley KG & Hamilton AL. Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational Research Methods*, 2012; 16(1): 15-31.

28. Anderson R. The aftermath of stroke: The experiences of patients and their families. Cambridge: Cambridge University Press, 2006.

29. Pettigrew A Ferlie E and McKee L. *Shaping Strategic Change: The case of the NHS*. London: Sage, 2002

30. Fitzgerald L Ferlie E Wood M et al. Interlocking interactions, the diffusion of innovations in healthcare. *Human Relations*. 2002; 55 (12) 1429-1449

31. May C Finch T Mair F et al. Understanding the implementation of complex interventions in health care: the normalization process model. *BMC Health Serv Res* 2007; 7:148.

32. Bolden R Distributed Leadership in Organizations: A Review of Theory and Research. *International Journal of Management Reviews*. 2011; *13: 251–269.*

33. Surrender R Locock L Chambers D et al. Closing the gap between research and practice in health: Lessons from a clinical effectiveness initiative. *Public Management Review*. 2002; 4(1):45-61.

34. Robinson S and Bennett R. A typology of deviant workplace behaviours: A multidimensional scaling study. *Academy of Management Journal*. 1995; 1 (38): 555-572.

35. Kaye K. *Workplace wars and how to end them*. New York: American Management Association, 2004.

36. Currie G Finn R and Martin G. Spanning boundaries in pursuit of effective knowledge sharing within networks in the NHS. *Journal of Health Organization and Management*. 2007; 21 (4/5): 406-417.

37. Currie G and Suhomlinova O. The impact of institutional forces upon knowledge sharing in the UK NHS: The triumph of professional power and the inconsistency of policy. *Public Administration*. 2006; 84 (1): 1-30.

38. May C and Finch T. Implementation, embedding, and integration: an outline of Normalization Process Theory, *Sociology* 2009: 43 (3): 535-554.

39. Greenhalgh T Humphrey C Hughes Jet al. How do you modernize a Health Service? A realist evaluation of whole-scale transformation in London. *Millbank Quarterly* 2009, 87(2):391-417.

40. Rycroft-Malone J Wilkinson J Burton C et al, Implementing health research through academic and clinical partnerships: a realistic evaluation of the collaborations for leadership in applied health research and care (CLAHRC). *Implement Sci* 2011, 6(1):74.