

What role do mentorship relationships play in UK Neurosurgery, including on burnout?

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List of abbreviations

MD Masters

NHS National Health Service

PhD Doctor of Philosophy

UK United Kingdom

USA United States of America

Abstract

Background

This study investigated the role of mentorship within UK neurosurgery, for mentee and mentor. It explored the nature, purpose, and challenges of that relationship. In addition, the issue of burnout was discussed.

Methods

Semi-structured interviews were undertaken with thirty-two doctors at varying grades of seniority in UK neurosurgery. They ranged from one year post graduation, as ‘senior house officer’, to ‘registrar’ and ‘consultant’, from 16 different units. Average age of participants was 41 years and they had worked in neurosurgery for an average of 14 years. Interviews were conducted via face-to-face as well as telephone and video calls. In total 952 minutes of conversation were analysed.

Results

Results highlighted the importance of the relationship for both mentor and mentee. One common theme especially amongst those who had been practising neurosurgery for longest, was that this relationship lasted longitudinally for the majority of their career, spanning many years and developing into friendship. Often the relationship arose organically via proximity; formal mentorship was rarely found and was often limited to those in academic pathways. All participants understood the term burnout and workplace factors were cited as both protective and precipitating.

Conclusion

Mentorship is a valuable interpersonal relationship in neurosurgery that spans beyond the acquisition of operative and clinical skills. Formalisation of this process is not necessarily fruitful due to the need for the participants to ‘gel’. To aid development of these relationships more emphasis could be placed on mixing of doctors and allowing dedicated time for meetings and interactions.

The majority of participants were aware of burnout and a few had experienced it personally and many more had seen it in colleagues. Factors that were quoted as precipitating were the stressful nature of neurosurgery, and a lack of supportive work environment. Home and work life were listed as protective and helpful factors. Of those that did not think burnout was a true entity, they were the more senior doctors in neurosurgery. The findings support that burnout is found within neurosurgery, and there are a number of protective and coping strategies that should be emphasised within departments.

1. Introduction

1.1 What is mentorship

Defining mentorship is a complex process, which is without consensus (Berk *et al.*, 2005). Mentorship is a process by which a mentor, who is experienced, and empathetic, guides the mentee in maximising the development of their ideas, learning and personal and professional development (Oxley and Standing Committee on Postgraduate Medical and Dental Education., 1998). Jacobi (Jacobi, 1991) distilled mentorship into elements such as a focus on achievement and acquisition of knowledge, emotional and psychological support, direct assistance with career and professional development, and role modelling. The relationship involves direct interaction of the parties involved and is personal in nature. Jacobi purported that this relationship is reciprocal where both parties benefit. One of natures of this dynamic, is that it emphasises the mentor's greater experience, influence and achievement within an organisation (Jacobi, 1991).

Mentorship can take a variety of roles; for example with socially excluded youths, a more experienced mentor can aid with integration in society and various aspects of their life, but in a professional setting can help with specific skill development and career planning. In a medical setting, mentorship can range from 'supervision' in an allocated role, to a more informal and less prescribed supportive role (Shaw and Fulton, 2012). Mentorship can be top-down, and hierarchical, but also peer-to-peer. A mentoring relationship can play a role in the emotional wellbeing of mentees, and also be beneficial for the mentors by providing opportunity to reflect on their own experiences and take on a nurturing role, which can in itself be rewarding. This reflection and interpersonal contact and support may have a positive impact in the context of burnout, and aid wellbeing (Tang *et al.*, 2020). This is of significance in the medical field as there is evidence that with burnout and a lack of interpersonal relationships, there is alteration in feelings of empathy which in turn is associated with poorer patient outcomes (Panagioti *et al.*, 2018).

There are advantages and disadvantages to hierarchical mentorship; a senior mentor may be intimidating and more detached from the mentee's situation and so the mentee may

find it harder to relate to them, than they would be able to with a peer (Chanchlani *et al.*, 2018). A more senior mentor may, however, be able to offer experience, advice and insight as well as contacts and knowledge in the field. The benefit of each will depend on the characteristics of the individual, the situation, and what the mentee hopes to gain from the relationship as well as what the mentor can offer (Wadhwa *et al.*, 2017).

1.2 Training within the NHS

There are a number of elements making up a doctor's postgraduate training, spanning knowledge, clinical skills, interpersonal and communication skills. The Socratic method of teaching and learning is one of questioning, debate and testing perceptions and relates to the method by which Socrates learnt from Plato (Assael, 2010). This has a basis in apprenticeship, and in the interaction of the two people involved. Halstead, an educator at Johns Hopkins Hospital, USA, in the late 1800s (*The Founding Physicians | Johns Hopkins Medicine*, no date) championed a method of medical education based on this interpersonal Socratic method incorporating full-time faculty, a defined curriculum and conferences, journal clubs and grand rounds (Assael, 2010). Halstead's own mentee, Harvey Cushing, went on to develop the specialty of neurosurgery in the USA, using the Socratic approach, applied to medical education (Assael, 2010).

The Socratic method has subsequently been adopted across healthcare settings globally (Assael, 2010). In recent years, however, there has been a transition within UK training, from the established, primarily Halsteadian Socratic approach of surgical apprenticeship and mentorship, to one incorporating simulation, group learning and other forms of training (Pugh *et al.*, 2009). This change is in part due to the modernisation of the National Health Service (NHS) and training pathways, and the demands of increasing workload meaning that the time-intensive Socratic approach was not always feasible. Changes to working patterns mean that the landscape of skill acquisition and professional development is further changing. This means that the nature of relationships within the workplace is changing and evolving alongside it (Timm, Education and Unit, 2013). The implications for this are manifold for the development of the postgraduate doctor.

1.3 Impact of NHS organisation on interpersonal relationships

In the early days of the NHS, doctors worked in regular groups, called ‘firms’, in which they spent an extended period, from weeks to months, working together in an apprenticeship with senior clinicians. This has changed over time to ‘shift work’ in which the members of a team will change regularly without continuity. This changes the dynamics of the functional unit of doctors as each shift may be with different colleagues. This constant change of the makeup of the team has been shown to impact on the development of interpersonal relationships, and therefore on support, teaching and opportunity for mentorship relationships to arise (Rimmer, 2019).

The change in working patterns and mix of colleagues has an effect on the teaching, learning and sense of ‘team’. It can affect the sense of community and interpersonal relationships, and some research has suggested that this has led to a disconnect between the junior and senior tiers of doctors (*Being a junior doctor* | RCP London, 2016). This disconnect is attributed in part due to the changes to the NHS in recent years, which include greater centralisation of specialties, change of working model to resemble that of manufacturing industries, and loss of communal areas (Koh, 2019).

Within medical postgraduate training in the UK, there remains emphasis on supervision and guidance from seniors, as trainees are allocated to clinical and educational ‘supervisors’ within training programmes. This is often a formal allocation but such relationships can also form organically – sought out either by the supervisee or supervisor. Whether such relationship can arise spontaneously will depend on many factors, including personality of the two parties, and the amount of time spent together as well as the amount of interest taken, by both parties, in investing in a relationship. There may be a difference in the nature of the relationship between someone that is allocated to supervise, as opposed to those who are chosen by the participants. For example, the allocation may be arbitrary or done based on factors such as location or gender, but a ‘self-selected’ relationship may foster more investment, as the factors that brought the participants together may differ. As the way in which doctors interact and rotate together changes, the way in which these relationships arise may also change.

There are various challenges to mentorship being able to flourish in the medical setting. The old style of a 'firm structure' is less common now, and trainees and consultants will often regularly work with different colleagues. The change to working pattern changes the nature of the relationships formed and the exposure to potential mentors. This may alter the value that the relationship will bring and its role for both participants (Shaw and Fulton, 2012).

1.4 Role of mentorship in burnout

As with many large organisations, there are challenges for the NHS in managing stress, staff retention, burnout, and emotional wellbeing (*Being a junior doctor* | RCP London, 2016). The changes in satisfaction are occurring within the context of changing landscape within the NHS, namely the structure of training and progression for doctor (*Being a junior doctor* | RCP London, 2016).

Burnout has been defined as the triad of the sensation of emotional exhaustion, depersonalisation, and reduced personal accomplishment, as a reaction to prolonged exposure to occupational stress (Maslach, Jackson and Leiter, 1997). There is recent evidence which shows an increase in burnout in medical staff over time (Shanafelt *et al.*, 2015). The financial, economic, and psychological costs are huge for the clinician, patients, and society, therefore ways in which to address and limit these would be invaluable. It is of note that within the field of medicine and surgery, the subspecialty of neurosurgery is particularly stressful (Wise, 2020). The interest in physician burnout and wellbeing is growing, and there are a number of validated assessment tools that can be used to assess physician burnout (Lall *et al.*, 2019).

The implications of burnout are numerous, ranging from effects on the physician themselves, with increased risk of cardiovascular disease, decreased life expectancy, alcohol use, and interpersonal relationships, to their ability to do their job (West, Dyrbye and Shanafelt, 2018). There are also wider economic consequences of reduced productivity or efficiency (Panagioti *et al.*, 2018), and through reduced workforce as

people choose to leave the profession. The rota, and structure of training, cannot easily be changed, nor can the team dynamic within a department, therefore other ways in which to tackle burnout, especially approaches that are cheap and require minimal intervention, are invaluable.

The causative factors on an institutional and organisational level are difficult to change (Sibeoni *et al.*, 2019), although attempts are being made such as restrictions to working hours. There are individual factors which play a part and may be targeted. Surgery in particular which relied on an apprenticeship model has been altered by structural changes within the NHS organisation. Burnout remains a problem, but there are various factors that can influence its development and progression, and professional interpersonal relationships are implicated as one (Tang *et al.*, 2020).

There is a suggestion that, aside from rest and a change in the working environment and work patterns, emotional support and the relationships both inside and outside the workplace can aid in a person's ability to tackle burnout (Dean, 2019). There are many potential sources of emotional and personal support from family, friends and acquaintances, outside of work but also within the workplace from colleagues. In the context of a changing NHS landscape, it would be interesting to see the role that interpersonal relationships play.

2. Problem statement and aims

Mentorship relationships are an important part of learning and development in society, and particularly so in clinical medicine. As the NHS changes and the structure of training and practice changes, there are changes also to the interpersonal relationships within it, and mentorship is one such relationship which may be vulnerable.

Within this study, attention will be given to how mentorship relationships arise in a clinical setting, within neurosurgery. In addition, this study seeks to elucidate the nature and role of the mentoring relationship. Questions will aim to illuminate the function that mentorship plays for both participants, as well as any challenges, or negative experiences of mentorship.

Existing research in this area suggests that there is a problem with burnout in healthcare professionals, and within surgical professionals (Dean, 2019). Burnout was shown to be the greatest predictor of career satisfaction in American surgeons (Shanafelt *et al.*, 2009). Burnout has great consequences and implications for an individual, institutional and on an organisation level for the NHS and economy as a whole (Panagioti *et al.*, 2018). This study aims to look at the experience of this in neurosurgery, and protective and exacerbating factors.

The concept of resilience is not addressed in this study as it is a different aspect to the mentorship and burnout issue and is a term that relates to a particular intrinsic coping strategy. Resilience relates to the individual and their approach to difficulties. Although resilience is an interesting concept, it is a different dimension to the way that individuals deal with the problems of burnout and is outside the scope of this project. This study aims to better elucidate and understand the role of professional interpersonal qualitative human interactions, namely the mentorship relationship, and understanding and experience of burnout. This would be ultimately to raise awareness of the role of protective factors, and so they are valued, prioritised, and optimised.

3. Literature review

3.1 Purpose and method

The purpose of the literature review was to look at existing research into the role of mentorship within surgical training, particularly neurosurgery. In addition, this review looked at research on surgeon burnout and methods to target burnout. There is a huge body of work existing on the role of mentorship and burnout within medicine, but less is specifically within surgery and its subspecialties, as well as in the intersection of mentorship and burnout.

This search spanned medical literature but also psychology and education. An understanding was required of the work that has already been done to understand these concepts in healthcare, areas of controversy, and questions that arise from existing research. This enables this study to build on what is already known, and to contribute to the academic discussion and knowledge base.

A scoping study was done, then once search terms were refined, a deeper literature review was undertaken. Primary sources, such as journal articles and blog entries, were used as well as secondary sources such as textbooks and review articles, and tertiary sources which included directories. In addition, library resources via the local hospital library were searched, for books on neurosurgical and surgical training, burnout, and mentorship. These were combined using the AND and OR Boolean operators. Once an initial set of searches was compiled in journals published in the English language, these were used, to refine the search strategies, and to find other useful sources which have been referenced. From this the existing literature was critically analysed and appraised. Mendeley, an online reference management tool, was used to compile references and for subsequently writing up the thesis. Further information is in Appendix A.

3.2 Role of structured interpersonal relationships in surgery

Surgery is a unique branch of medicine due to the invasiveness of the interventions offered and the resultant interaction between the doctor and patient, and between surgeons and colleagues. This leads to the unique rewards and challenges of surgery. Orri et al looked specifically at the emotional experience of surgeons in a hepatobiliary department via interviews in the pre- and post- surgery period (Orri, Revah-Lévy and Farges, 2015). Unlike other similar studies, the authors did not focus on a specific adverse event, and instead sampled routine emotional responses and their consequences, and discussed the surgeons' coping strategies. They found that a range of emotions from anxiety to fear, distress, guilt, and accountability were present in routine practice and, notably, pervaded through to relationships with family, colleagues, and patients. There were three main origins for the emotions: from the practice of surgery which is itself a somewhat 'aggressive' act, and from the subjectivity and uncertainty that pervades practice and affects decision-making and outcomes. The third factor that the study looked at related to institutional factors of pressure, fatigue, and level of support. There were a number of coping strategies mentioned by the participants including teamworking, balancing personal involvement and neutrality, and cognitive re-centring. Analysis of the surgeons' reflections was notable for how they often viewed outcomes in terms of their own performance and issues, rather than related to wider patient or system issues. Orri discusses a distancing between the surgeon, and the environment in which they work, and term this 'distancing through technical prowess'. The authors juxtapose the individualism in surgical mentality, to other medical specialties such as psychiatry and oncology where Balint groups are a key part of emotional de-briefing. Surgery is a specialty with a range of emotive events through the operative journey, and one coping strategy is through disconnection and detachment. It therefore may be valuable to look at the role of relationships in this surgical arena, where individuals internalise the events around them.

The concept of emotional awareness has only been defined in more recent years, and is more recently that this has been looked at within the surgical arena, having spilled over from the business sectors (Stobbs and Ward, 2014; Mortensen, 2019). Emotional intelligence is thought of as a degree of self-awareness and monitoring of one's own

feelings, and the ability to understand others in a social context. Within surgery this relates to the interaction with colleagues and patients, empathy, and is associated with better interpersonal relationships and communication skills. There is a stereotype of surgeons that they lack these skills (Stobbs and Ward, 2014) and there is a move towards cultivating these attributes, with greater emphasis during medical school and training. A study of Saudi-Arabian plastic surgeons found a correlation of higher emotional intelligence with a better score on sense of personal achievement, and a lower score on emotional intelligence was correlated with higher emotional exhaustion and depersonalisation (Bin Dahmash *et al.*, 2019). There is a paucity of research looking specifically at the causative role of emotional intelligence within surgery as a whole, and relation to interpersonal relationships.

3.3 Mentorship in surgery: purpose, successes and challenges

The surgical environment is challenging because technical skills, as well as decision-making, communication skills and knowledge, must be learnt and developed. Due to a change in modern clinical surgical exposure, evidence suggests a role for mentors to ensure knowledge, techniques and training. A systematic review of mentorship within surgery noted that mentors are a valuable way for transfer for skills and knowledge (Entezami, Franzblau and Chung, 2012). Other research contributes to our understanding of mentorship's manifold value in surgical training; aside from imparting technical information, mentorship is 'vital aspects of compassion, communication, professionalism and patient care ethics'. These are factors which may be underestimated within quantitative training and assessment and can be conveyed and supplemented within a mentoring relationship. Mentorship has been identified as invaluable when transitioning from resident to more senior doctor, where a mentor can act as guide, friend, confident, teacher, and role model (Agzarian *et al.*, 2019). The mentor has been described, within neurosurgery, as a person to instil enthusiasm and positive aspects of the job (*Letter: How to Combat the Burnout Crisis in Neurosurgery? Cathedrals and Mentorship | Neurosurgery | Oxford Academic*, 2019). Study of orthopaedic surgical trainees in America found that mentorship was highly valued and there was expectation for help in career, research and education. This study also found that rates of satisfaction were higher

for those mentees who selected their own mentors, but the authors did not provide any findings or suggestions for why this might be the case (Flint *et al.*, 2009). Existing literature suggests that mentorship is an important part of surgical training, and progression to independent practice.

There are numerous benefits to mentor and mentee of this relationship, and in particular through sharing life experiences of managing such stresses, work life balance and finding joy and reward. Within the mentorship relationship, it is not only the mentee who benefits; for the mentor also, there is satisfaction and reward seeing a mentee flourish (Platz and Hyman, 2013). A review of studies carried out in nursing mentorships found that the mentors reported personal satisfaction, professional success and organisational and professional contributions as positive aspects of being a mentor (LaFleur and White, 2010). The benefits to the mentor in neurosurgery, are something that would be interesting to explore further.

Mentorship is a difficult relationship to define, as well as to quantify and measure. It is a complex multi-faceted interaction. Khan *et al.* looked at dimensions of mentorships within residency and compiled some objectives, which they called the “Resident Mentorship Milestones” and defined as: availability, making a defined time for mentorship, competence for mentorship, and support of the mentee (Khan *et al.*, 2017). Studies have looked further at factors influencing the success of the relationships. A widescale interview assessment at two large academic institutes looked at factors in successful and failed mentorship relationships, as well as what characteristics are desirable in mentees (Straus *et al.*, 2013). They found that sharing of goals, respect, trust and commitment to the relationship was found in successful mentoring relationships. Interestingly, of those that failed, characteristics that were highlighted include lack of communication, lack of commitment but also competition between mentor and mentee, leading to an exploitative relationship. These interviews were of academics and it would be interesting to look at correlation in the clinical environment. It has been found that compatibility is a key element in this relationship (Persons, Agatstein and Kim, 2018). One study looked into the barriers to mentorship within surgery; they highlighted time constraints and lack of female mentors. They suggested that the implementation of formal

programmes may help (Entezami, Franzblau and Chung, 2012). A common problem with mentorship is a lack of time, and this is commented on across to literature, and one paper shows that having a dedicated program is more likely to ensure resources are protected for mentorship. This group did not find any difference in satisfaction between organic or assigned mentors (Delisle *et al.*, 2017). There are some instances when there was abuse of the surgical mentorship relationship. A systematic scoping review found that misunderstanding of the role of mentor and mentee, malalignment of expectations and lack of clear standards of practice all contributed to difficulties in the mentor-mentee relationship (Lee *et al.*, 2019). One barrier to successful mentoring relationships within surgical specialties are ‘surgical personalities and bravado’ (Orri *et al.*, 2014) which may impede the development of open honest dialogue. This study aims to further study the barriers and difficulties in mentorship, specifically in neurosurgery.

3.4 Surgeon burnout

Evidence suggests that medical students and doctors, both in training and those who have completed training, have rates of burnout which exceed that of their university-educated peers in the general population, and were more likely to exhibit characteristics of depression (Dyrbye *et al.*, 2014). A narrative review of twenty-five years of journal articles on burnout in doctors in training, highlighted a number of consequences of burnout such as undermining professional development and suicidal ideation. The same review also concluded that factors within the work and learning environment contributed to burnout, rather than individual attributes (Dyrbye and Shanafelt, 2016). This is particularly significant for this study, as the suggestion is that risk factors for burnout are modifiable and rectifiable, rather than simply being intrinsic to the individual.

The high prevalence of burnout is reported globally within the field of surgery. A study of American Surgeons found high rates of burnout (McAbee *et al.*, 2015). Excessive workload combined with inefficient work processes, lack of control over one’s working life, leadership culture, and the organizational support structures have been shown to contribute to burnout and mental health problems (Brandt *et al.*, 2014; West, Dyrbye and Shanafelt, 2018). Surgical specialties are unique for their stressors which include long

hours, lack of support, very unwell patients, and physical intensity as well as need for technical skills (Orri *et al.*, 2014; Patel, Huggard and van Toledo, 2017). In more recent years there has been changes including greater scrutiny of outcomes, decreasing autonomy and increasing regulation which all add to the stresses of surgery (Pulcrano, Evans and Sosin, 2016). Sosin *et al.* performed a meta-analysis of studies looking at surgeon burnout and found up to 34% had high burnout in at least one of the three domains of burnout described by Maslach (Maslach, Jackson and Leiter, 1997). A questionnaire of American Neurosurgeon found burnout rate of 27% (Klimo *et al.*, 2013a). A global questionnaire on burnout within neurosurgery reported lowest rates in the USA and Canada, of 11.2% and highest in Europe – of 26.9% (Jean *et al.*, 2020), although a survey of USA neurosurgery residents quoted a figure of 67% (Attenello *et al.*, 2018). The rates are noteworthy across the world and suggest this is a significant problem.

A survey of neurosurgeons from a single American neurosurgical unit was conducted and spanned surgeons from a thirty-nine-year stretch, giving longitudinal insight into burnout and preventative and protective factors. Meaningful relationships with colleagues was mentioned by 42% of respondents as influential in recovery from burnout. 30% noted in free text, that a ‘sense of mission’ was key against burnout for them, and resident camaraderie was also noted. It was notable that the wellness initiatives did not feature in the factors that were found to aid recovery from burnout, and rather it was social activities in the department such as annual hikes. They hypothesise that the formation and promotion of support structures through these events facilitate recover. Their recommendations included institutional support structures such as mentorship (Tang *et al.*, 2020). Oladeji *et al.* studied mentorship in orthopaedic residents and found that those who were dissatisfied with the quality of mentorship they received were more likely to experience burnout (Oladeji *et al.*, 2018). This could also reflect their negative perceptions of colleagues and the workplace, rather than being causative. This study aims to further investigate the role of mentorship in UK neurosurgery, and with respect to its perceived interaction with burnout.

There are a number of factors that contribute to these high rates of burnout in medical professionals. Surgery entails long working hours and a lot of ‘out of hours’ work which

encompasses night shifts and weekends. Rosen et al performed research with junior doctors in America, looking at the correlation of sleep deprivation with mood disturbance, empathy and burnout (Rosen *et al.*, 2006). They found that chronic sleep deprivation was associated with increased prevalence of moderate depression, burnout and decrease in empathetic concern. Studies of work-life balance have found that poor scores strongly correlated to burnout across healthcare workers, including various grades of physicians (Schwartz *et al.*, 2019). These studies demonstrate the factors that impact on development of burnout.

Aside from the negative consequences and experience for the surgeon, including mental health and stress related consequences. There has also been shown to be wider implications for their colleagues, family, and their patients, relating to empathy and performance. As personal stress increased, the ability for a person to empathise decreases (Bellini, Baime and Shea, 2002). This has serious implications for those in medical professions where empathy is a key part of the interaction with colleagues and patients and impacts on productivity and performance. A more recent meta analysis has found association between burnout and unsafe care, unprofessional behaviour and low patient satisfaction. The depersonalisation score in particular was most highly associated with these negative outcomes (Panagioti *et al.*, 2018). These highlight that the issues arising from burnout are very significant, and particularly so due to the unique position that healthcare professionals are in. Burnout amongst healthcare professions also has systems-level implications on the viability of health-care systems (Panagioti *et al.*, 2018).

There is little work looking specifically at neurosurgery within the UK, which is one of the smallest surgical specialties and found only at tertiary and quaternary hospitals. It is a particularly high stress environment due to the nature of the patients, pathology and surgical procedures undertaken and provides its own unique precipitants for burnout (Eddleman, Aoun and Batjer, 2013; Wolfe and Fargen, 2019; Wise, 2020).

3.5 Methods to tackle surgeon burnout, and role of mentorship

Evidence shows that doctors are poor at calibrating their own level of distress (Shanafelt *et al.*, 2014) and registrars and consultant level doctors are both reluctant to seek help for any mental health concerns (Wallace, Lemaire and Ghali, 2009; Shanafelt *et al.*, 2011) This precludes the early detection of problems, and burnout and reduces the availability and access to help. Formalised interpersonal relationships may be of help here, providing feedback and support.

There is ongoing work, looking specifically at doctors, into strategies to decrease burnout. These span the individual, the structure and the organisation, and include self-care workshops, mindfulness meditation and on a more systems level – change in working hours and patterns. Outcomes are mixed but suggestive that there can be meaningful reductions in burnout, emotional exhaustion and depersonalisation (Williams *et al.*, 2015; West *et al.*, 2016; Busireddy *et al.*, 2017). A Cochrane review in 2015 concluded that the evidence was low quality and showed minimal effects (Ruotsalainen *et al.*, 2015). The mixed results from these interventions suggest that there are a number of mitigating and moderating factors in their efficacy, so a greater understanding of the underlying causative factors may be required in order to adequately prevent and reduce the rates of burnout (Kalani *et al.*, 2018).

Spiotta *et al* suggest that to target burnout, as mentors, senior surgeons should be celebrating and highlighting the positive aspects of neurosurgery to their junior colleagues (*Letter: How to Combat the Burnout Crisis in Neurosurgery? Cathedrals and Mentorship | Neurosurgery | Oxford Academic*, 2019). Much of the research in neurosurgical burnout has been in the USA, but work from Poland also highlighted the important of the mentor-mentee relationship against burnout (Szmuda, Ali and Słoniewski, 2019).

It is of note that in the case of difficulty, residents would like their seniors to be involved and enquire about their wellbeing. When residents were surveyed about their preference for various sources of assistance in the case of burnout, a majority wanted their training programme director to enquire about their wellness and stated they would then be more likely to seek help (Kolarik, O’Neal and Ewing, 2018). This highlights the role of a

mentor in enabling these discussions around wellbeing. This study aims to assess what the role of the mentor is perceived to be in UK neurosurgery and the relation to burnout.

An enquiry was performed by the American graduate medical education council following two physician suicides in close succession in New York. The conclusions of this suggest that mentorship can be protective. They questioned twenty-eight residents about what helped them manage difficult times during residency; effective mentorship by faculty and more senior colleagues was identified as a key factor in stress management and creating an ideal learning environment. Camaraderie, mentorship and a supportive culture were stated as ideal characteristics of a training environment (Daskivich *et al.*, 2015). This survey of residents supports that mentorship is a key part of an ideal working environment.

A national survey of mentorship in Canadian general surgery residents acknowledge a link between burnout, mentorship, career satisfaction, and resident attrition rate. The found that junior trainees more commonly reported not having a mentor due to being unfamiliar with possible mentors, when compared to senior trainees. As the majority of the burnout burden is in the early years of training, this was highlighted as an issue to be addressed. In addition, units with formal and informal mentorship programs had more resources available for mentorship to occur, compared to those without any programs.

An American neurosurgery residency programme implemented a “Wellness Initiative” including a series of lectures on wellbeing as well as exercise sessions, and a mentorship programme to tackle the problem of burnout. They did not see any significant change in burnout rates over a year and one problem they encountered was engagement from residents. One factor quoted in this lack of perceived senior and departmental support, and feelings of shame for focusing on wellness as well as guilt at making this a priority (Ares, Maroon and Jankowitz, 2019). This highlights the need for a thorough understanding of the underlying issues and barriers to seeking help, in order to make effective changes to tackle the problem of burnout.

One study of burnout and working hours had an interesting finding outside of their main aims, which was that satisfaction with clinical faculty had a significantly inverse relationship to burnout, with a p value <0.01 (Martini, Arfken and Balon, 2006). In this same study, the association of hours worked to rates of burnout was only associated with a p value < 0.05. This suggests that satisfaction with senior colleagues had a greater association with burnout than hours worked. The study was small and there may be selection bias in those that chose to complete the survey may have had particular experience of burnout, however the response rate was 31%, which is comparable to other studies in this field. Another survey study at the Mayo Clinic found that there was a significant association between burnout and satisfaction, with the rating of the leadership qualities of supervisors in neurosurgery. Those who rated the leadership qualities of their supervisor more favourably, had lower burnout rates (Hamade *et al.*, 2015). Of the occupational risk factors for burnout, stressful relationships with supervisors was associated with greater burnout in a meta-analysis (Prins *et al.*, 2007). In a cohort of otolaryngology-head and neck surgery, there were high rates of burnout and this was associated with high attending physician demands and insufficient autonomy (Golub *et al.*, 2007). The findings raise an interesting question as to the role that the interpersonal relationships in the workplace play in burnout.

Conversely, a study of postgraduate training found that in environments with a positive learning environment, where supervisors are perceived as accepting of junior colleagues' need for education, feedback and support, there better scores in exhaustion scores (Dahlin, Fjell and Runeson, 2010). Similarly, a study in Denmark found that in a group of residents who described their relationship with their supervisor as mutually supportive and beneficial had lower scores in depersonalisation and emotional exhaustion, than residents who had a relationship which was not balanced between investment and outcome (Prins *et al.*, 2008).

The relation of supervisor behaviour and trainee burnout is a relationship that warrants further investigation and development. The wider implications of this would be that training should ensure that those in supervising positions have the appropriate skills to

provide an optimum learning environment and provide effective feedback and cultivate a reciprocal relationship (Prins *et al.*, 2008; Thompson, Goebert and Takeshita, 2010).

A systematic review of physician wellbeing and burnout in the USA concluded that individual and organisational strategies were only partially effective in mitigating burnout and developing wellbeing. It suggested that two highly effective strategies were aligning personal and organisational values, and enabling physicians to devote twenty percent of their work activity to a part of their practice that is particularly meaningful to them (Rothenberger, 2017). Similarly, a literature review of burnout in orthopaedic surgeons recommended professional appreciation and mentorship as valuable tools in tackling burnout. In particular, valuing one's contribution and wellbeing, and assistance in overcoming any crises are noted as especially useful (KP, AK and JYL, 2019). These studies lend support to the development of institutional interventions for burnout that focus on cultivating the individual, and their relationships.

Swensen *et al* summarised that to flourish, physicians need some degree of control over their lives, camaraderie, and an opportunity for excellence (Swensen, Kabaceneil and Shanafelt, 2016). Mentorship relationships can fulfil a number of these.

4. Methodology

4.1 Study design and conceptual framework

There is a lack of theories regarding the nature, role, and purpose of mentorship, and the experience of burnout, in neurosurgery and for this reason, an inductive approach was used to take comments and experiences and build theories from the what was observed (*How to Do Thematic Analysis | A Step-by-Step Guide & Examples*, no date). The conceptual framework used was of constructivism, via an interpretive paradigm. As there was no pre-existing theory, the data from the study was interrogated to develop themes and concepts and placed within the context of the neurosurgical environment. The emphasis was on the social interactions and subjective experiences of the participants. Account is taken of the lead researcher's influence both on the data collection and analysis (Appendix E). The strength of an interpretive approach is that it is well-suited for complex multi-faceted interactions and concepts, such as mentorship and burnout, which are difficult to investigate in any other way. The interpretive approach is also invaluable in areas where there is a dearth of pre-existing theories (*Chapter 12 Interpretive Research | Research Methods for the Social Sciences*, no date).

The design of this study was cross-sectional, and at a single time point, taking experiences from a number of individuals. The sampling was purposive in that it included those within neurosurgery, and of different stages of training, but was opportunistic as it did not specifically select participants, and was open for anyone eligible to contact the lead researcher. It would be challenging and invasive to make participation anything other than voluntary, especially due to the nature of the topic covered and personal experiences that are discussed, so opportunistic sampling was most appropriate. Sampling methods are covered in greater detail in the next subsection.

Regarding the means of obtaining this insight into participants' experiences, questionnaires can be vulnerable to interpretation, and can limit the response of the participant (Creswell, 2003; Boynton and Greenhalgh, 2004). For this reason an interview format was chosen, to enable participants to elaborate on points as needed, so

that a deeper and richer understanding, regarding the mentoring relationships that participants have had, may be ascertained. A semi-structured format was chosen to retain the structure of an interview schedule, but incorporate scope for the interviewer to explore thoughts, perceptions and experiences as well as identify any important questions that arose during the individual discussions (Creswell, 2003). The interview included a combination of closed questions to get specific details such as demographics, as well as open questions to gather qualitative data on experience and opinion (See Appendix C). Qualitative research is, by nature, resource-, time- and effort-intensive and the data is often rich and used for theory generation (Creswell, 2003). This type of data is thought to reach parts that other methods of data collection and analysis cannot (Pope, 2000).

Initially, informal discussions with three clinicians across specialities was carried out by the lead researcher to explore their opinion and experience of mentorship, and burnout. These discussions and the literature review were used to formulate questions for the interview; the resultant interview schedule was discussed with the study supervisor. A pilot was then run of the developed questions amongst two doctors in surgical subspecialties outside of neurosurgery in order to assess duration, tailor questions, and adjust phrasing. Following the pilot, the demographic section was extended to include duration of time in neurosurgery and number of units worked in. During the pilot it became apparent that the questions had to be explicit and precise but not lengthy. Questions around successful mentoring relationships were shortened to a single open-ended question about successful relationships as a mentor, or as a mentee. Follow up questions could then be asked as needed and tailored to the participant.

The final version of the interview schedule (Appendix C) was then submitted for ethical approval by the Health Research Ethics Committee, University of Keele. The participant information sheet and consent form are presented in Appendix B.

4.2 Participants and recruitment

Following ethical approval, an email advertising the project was disseminated amongst neurosurgical departments via national email lists including the Society of British

Neurosurgeons, and the British Neurosurgery Trainees Association, and local departmental email lists. Email was used to disseminate the study, in order to recruit participants across geographical distribution, and at a range of training stages.

This study was an exploratory study, which aimed to outline the issue and explore in-depth any points of discussion and interest. An element of purposive sampling was used, as recruitment was of participants whose perspectives and experiences were relevant to the research aims of this study – so those in neurosurgery. The participants eligible for this study included all grades of neurosurgical doctors: consultants, registrars and senior house officers. The study was limited to doctors currently practising in the UK, as the study looked at the context of the NHS. All were currently practising and none were retired; some were currently taking time out of clinic practice to pursue academic studies but had recently worked within clinical neurosurgery. There was an opportunistic element to the recruitment, because the details of the study were circulated and anyone interested in taking part could enquire regarding further information. The participants were not specifically selected or stratified, but by using certain mailing lists and circulating the advert for the study, specific subgroups of the wider medical population – neurosurgeons – were reached.

Saturation was determined as the point at which newly collected data was no longer providing additional insight, and no further interviews were scheduled after this was reached (Creswell, 2003; Lacey and Luff, 2009; Varpio *et al.*, 2017). It was important to determine when saturation was reached so that the recruitment and interview process could be stopped and final analysis started. Data collection, which is time- and labour-intensive, would otherwise continue indefinitely without adding anything to the conclusions and requiring even longer to analyse.

The nature of the participants and sampling introduced a limit to the broader generalisability of the results, and this was not an aim for this study (Creswell, 2003). This study is specific to neurosurgical relationships within the NHS. Applicability of conclusions to a wider audience will depend on the nature, and context, of the mentoring

relationships of the participants. The aim however was not to be generalisable, but rather to gain an insight into the mentor relationship, and burnout, within UK neurosurgery.

4.3 Data gathering

Once a participant volunteered for the study, they were sent the information sheet and consent form. Video, face-to-face, and telephone interviews were offered, which increased the feasibility of being able to reach more neurosurgeons and obtain views from across different units, because neurosurgery departments are spread widely geographically. Of note, there has been a global coronavirus pandemic during the course of this study which has affected the way in which participants could be approached and interviewed; more interviews were done remotely for this reason. The method of interview was determined by the participant.

All participants were asked the same standardised list of questions, whether known to the lead researcher or not. A minority of the participants had mentored, or been mentored, by the lead researcher, or worked as colleagues. Due to the small specialty size, this was unavoidable and as much as possible impartiality and neutrality was sought and this was aided by the interview schedule. Nevertheless it is acknowledged that in qualitative studies there is an element of personal interpretation of the data, which adds to the richness of the conclusions and that complete objectivity is not possible (Creswell, 2003). The researcher who conducts interviews will always inevitably have some effect upon their interviewee, and on the analysis of the data, and awareness of reflexivity in the study is important (Pope, 2000). A reflective diary was kept throughout the study in order to aid the lead researcher to reflect upon the impact that they had on the participants and vice versa, as well as on the data interpretation and analysis. The issue of objectivity, and effect on the analysis, is further considered within Appendix E.

The interview began with introductions, enquiring as to whether the participant had any questions, and were happy for audio recording. No questions were omitted for any participant, unless they expressed wish during the interview not to answer. This was not the case for any. Each participant was given a unique number once they gave consent to

participate. The interview was recorded using the lead researcher's mobile telephone device, which is device is passcode-protected. The audio file was also stored on the lead researcher's laptop, which is also password-protected, as a backup. The details of each participant and the allocated participant number was kept in a password-protected excel document on this same laptop. The lead researcher was the only person to listen to these audio files.

4.4 Data analysis

A thematic analysis approach was used to analyse the data (Ratelle, Sawatsky and Beckman, 2019). Notes were taken, by the lead researcher, during the interviews and reflected upon during the interview process. In addition, the audio files of the interviews were listened to and transcribed verbatim, by the lead researcher, after all interviews were complete. Once there was familiarity with the interviews, thematic analysis was conducted on these transcripts (Lacey and Luff, 2009). Codes were created for phrases and concepts that recurred across interviews, and sub-codes were devised for those statements that fed into these overarching codes (exampled are given in Appendix D). Constant comparison was performed between the interviews and refinement of the codes was carried out. Codes were then clustered to form categories; categories were further catalogued under core categories to enable development of themes and theories. These reflected the concepts, phenomena and ideas expressed by the interviewees. Once themes were compiled, the interview transcripts and notes were reviewed again in order to check their relevance and whether they reflected the data (*How to Do Thematic Analysis | A Step-by-Step Guide & Examples*, no date; Braun and Clarke, 2006).

Quotes were also taken, when they epitomised or summarised the codes, or described a concept that arose. These were useful as representative excerpts that illustrated the points well (Creswell, 2003). Quotes were also used when succinct points were made, which differed from the other participants. As far as possible, an objective, detached, deductive approach was used to code the transcripts, and identify common themes and categories (Lacey and Luff, 2009). The notes made at the time of the interviews were used in this process. Findings were discussed with the supervisor for external commentary on the

interpretations made. This inductive approach enabled themes to be identified from the data, rather than using a pre-existing framework, and was felt to be most appropriate for this exploratory piece (Lacey and Luff, 2009).

Collecting data from a range of neurosurgery units as well as grades of doctor within neurosurgery gave a breadth of insight and allowed comparison and contrasting of the categories that arose between differing locations or grades of doctors to assess for what effect those variables may have had. Participants had a wide range of experience and perspective and enabled insight of the mentor relationship from a range of angles. The themes and results that arose were examined in the context of existing literature (Varpio *et al.*, 2017) and these are discussed in forthcoming sections.

5. Results

5.1 Participants

Thirty-two neurosurgery doctors working within the NHS, from sixteen neurosurgery departments in the United Kingdom, took part in the interviews. Below is a breakdown of their grade of training.

Table 1. Training level of participants

| Grade of training | Total |
|--------------------------|--------------|
| Consultant | 14 |
| Fellow | 3 |
| Registrar | 9 |
| Senior House Officer | 6 |

Table 2. Demographics of participants

| Demographic | Number |
|---|-----------------|
| Gender (M:F) | 25:7 |
| Average age (years) | 41 |
| Average number of years in neurosurgery | 14 (range 1-39) |
| Number of units worked in | 5 (range 2-22) |

Participants were from a range of locations within the United Kingdom. Birmingham and regions south of this were counted as South England, and units north of Birmingham were counted as North England.

Table 3. Location of participants

| Location | Number |
|-----------------|---------------|
| North England | 14 |
| South England | 11 |
| Scotland | 4 |
| Wales | 3 |

The number of interviews by each method is shown in the table below. There was a total of 952 minutes of interview recording, and the mean length of interview was 30 minutes.

Table 4. Mode of interview

| Method | Number |
|---------------|---------------|
| Audio | 19 |
| Face-to-face | 11 |
| Video | 2 |

6. Discussion

The data was analysed via an inductive method (*How to Do Thematic Analysis | A Step-by-Step Guide & Examples*, no date), and approached question by question within the interview. There are a number of themes that arose from the interviews, related to the mentorship relationship, including benefits and challenges within the relationship. The discussion of burnout within neurosurgery was very interesting and views varied depending on the grade of the participant. These are discussed below. Where quotes are given, the participant number is stated also.

6.1 Being mentored: who was involved in the relationship, and how it arose

There are various attempts in the literature to define mentorship (Jacobi, 1991), but when discussing mentors during these interviews, no specific definition was given. This was in order for the participants were to determine whether they viewed particular people in their lives as mentors, and if that person fulfilled the mentor role for them. It also enabled that relationship to be further explored without predefining it. It was notable that the majority of participants, although not all, were able to identify people that they considered to be mentors.

All the mentorship relationships described by participants within neurosurgery were hierarchical relationships, often by consultants and occasionally senior registrars. For many participants the interactions they had with mentors was the reason for them pursuing neurosurgery. They were given an insight into the speciality, often one they would not otherwise have had. There was no experience of peer mentorship within neurosurgery and this is understandable in a specialty that is relatively small.

As the mentor was a more experienced person than the mentee, they had endured many of the issues that the mentees face and so could give advice from their experience and had “*suggestions you have never even thought of*” [06]. The role of the mentor in instilling enthusiasm and positive aspects of the job has previously been mentioned in neurosurgery

(Letter: How to Combat the Burnout Crisis in Neurosurgery? Cathedrals and Mentorship | Neurosurgery | Oxford Academic, 2019). During these interviews, insight into the neurosurgical career was often highlighted as a benefit of the mentoring relationship. For many participants, exposure to a mentor was the reason for them pursuing neurosurgery as a career, but also for those within neurosurgery training specific mentors offered insight into subspecialties. This role of mentorship, giving a window into the hidden curriculum, has been described by a number of participants.

“it makes you think about the ways in which you need to behave to succeed and do well and gives you some insight into that...”[20]

For many participants, one of the advantages of mentorship is that there are aspects of the neurosurgery profession which cannot be understood or researched without a first-hand awareness, and a mentor can offer this.

Formal versus informal

For most participants the mentorship relationship predominantly arose organically, by informal connection; rarely was it formally allocated. For many, the relationship arose from proximity, and circumstantial exposure to people in departments that they worked in, during formative years of training.

There is a distinction that has been made between mentoring, and teaching, where the latter is the conveyance of knowledge and skills, and the former is a broader interaction that may incorporate teaching. There is also ‘supervision’ in which senior doctors are formally allocated to oversee more junior neurosurgeons. In the role of ‘clinical supervisors’ neurosurgery doctors that rotate to work alongside them for a ‘rotation’ which is typically 6 months long. The consultant in this setting is a ‘clinical supervisor’ and for some participants they saw this relationship as a mentorship relationship, but this was not the case for all participants.

“the consultant-registrar relationship is not mentorship, this is a working unit” [01]

These allocations of supervisor are predominantly done formally, often by a training programme director, and not selected by either party.

“Sometimes you can’t force these things, if you get paired up, it might work, it might not work. It depends on your relationship with that person”[02]

Of these ‘supervisor’ relationships, not all participants stated experience of this as a mentoring relationship, but for some this interaction developed into such a relationship, if the personalities suited each other and a bond developed.

“you’re allocated consultants, at least initially by your seniors. So you don’t have much influence in early part of training” [26]

The supervisor role enabled mentees to be exposed to potential mentors, but as to whether a mentorship relationship arose depended on the interactions between them.

“there is a degree of selection that occurs during training where you align yourself with particular consultant” [017]

Very few mentorships were formal. Some of the allocated ‘clinical supervisors’ became mentors but aside from this, other mechanisms for formal mentorships was via academic training pathways. There is an established national group for academic neurosurgeons which has a mentorship scheme which was set up due to the scarcity of academics at each neurosurgery unit, meaning little exposure to people in these positions. Of the participants, few felt they had acquired a meaningful mentor via this route.

A small subset of the participants made reference to academic pathways within neurosurgery, these included formal higher education programmes such as MD or PhDs, alongside academic pursuits such as research projects and publications. This relationship often had a different dynamic and there were more instances of this being formalised. This is because the higher degree, or the project would have specific a senior neurosurgeon overseeing it. There were instances when relationships with academic neurosurgeons arose naturally but this was predominantly when there was geographical proximity and therefore a lot of contact between mentor and mentee.

“unless you see them day to day, [the relationship] can be too formalised” [18]

One participant, who was allocated a professor elsewhere in the UK as a mentor, felt the relationship was distant and formal because all contact was via email. The mentee felt that without a specific question to ask of sufficient weight, it did not feel appropriate to make contact for small queries.

“The person appointed formally is a professor and miles beyond my level and had different training structure to what we are going through, so advice is different. As he

lives further away we catch up less frequently and I would take something [to him which] I'd thought about for longer"[10]

For some, being in different generations meant there was a lack of commonality or understanding of each others approach or stage so it was not always useful, particularly when geographically distant.

It was highlighted a number of times by participants that there are no mentorship schemes within clinical neurosurgery. Many participants felt that formal schemes for allocating mentors did not work.

"Introducing formality, I think, destroys the whole concept of mentorship mentor [it] is supposed to be a bigger brother or sister; someone who just looks at the overall wellbeing of someone, you can't formalise it"[03]

If formal allocations of mentors do not tend to lead to successful relationships, as was the experience of most participants, it raised the question as to what about the interaction made for a mentorship relationship arising. A commonly mentioned theme was 'clicking' between similar personalities, and being 'taken under someone's wing'. This is a sense of nurturing that occurs by the mentor.

The mentor as a role model

Within neurosurgery, participants often stated the mentor was a role model, someone that the mentee 'looked up to'. The mentee often would emulate the mentor, both for clinical situations, but also professionally and in challenging situations. One person described their mentor as *"someone I really have modelled myself on, mostly unconsciously"[13]*. There was an element of inspiration and aspiration, which factored heavily for many in their mentor. Respect for the mentor was important. The mentor was *"someone you could socialise with and you could operate with, who you still held in awe in a way, in spite of being a friend. It is an interesting relationship, that"[13]*. These elements of respect between mentee and mentor, and the perception of the mentor as a role model, fits with existing literature, which described a mentor as a guide, friend, confidant, teacher, and role model (Agzarian et al., 2019).

6.2 What was the purpose of the mentor relationship for the mentee

Many of the roles of the mentor relationship centred around teaching, with clinical, academic, and professional skills and knowledge being conveyed. It was the more junior neurosurgical participants (SHOs or junior registrars) who most commonly mentioned that the mentor taught them skills or gave practical advice such as *“guide you through application process and things you need to do to get in [to neurosurgery]”*[19].

Another key aspect of the relationship was of affection, support and kindness, and this was mentioned more by the senior registrars and consultants.

“This is required for the mentorship: mutual acceptance and sympathy, love, that is important because if you don’t love somebody, who cares about them”[01]

“At the end of the interview she said I got the job and gave me a hug, it was very touching. She bought my loyalty with just one touch of kindness almost. It makes you feel like you’re part of the team, like you’re part of the family”[21]

This suggests that as the participants became more senior, there was a move from a more practical role of the mentor, to one that was more supportive and nurturing, *“transmitting the unwritten knowledge the tricks, the little things, which are not possible to read anywhere”*[01]. Some senior consultants reflected that they learnt things that could not be defined. *“Some of the deeper lessons of life are taught informally or in mimicking them as a whole model and the way they conduct themselves ... some of the lessons taught were beyond what one can learn or teach”*[09].

A common theme was of holistic input from the mentor. Participants valued being seen as a three-dimensional being, not just a doctor, but the mentor understanding them as a whole person, their other interests such as religion and being seen as a researcher, parent, or any other role that the mentee may be inhabiting. Being seen as a person, outside of their role as a neurosurgeon was a common theme of what mentees valued most about their mentors, and frequently named as a factor giving rise to successful relationships.

“Training is educational – ability to do the job, and mentorship is more holistic so helping with career and the associated things, and personal things...advice or signposting or helping with long term goals, getting into academia, managerial things, recommending different side interests that a lot of neurosurgeons have”[24]

Mentees strongly valued being seen, and respected by the mentor. One participant's description highlighted this:

“the fact they were willing to treat me as a human being. Pretty much that was it for me. Once you have that basis you can build on it. If you're just another nameless reg you have nothing you can work with”[21]

A key part of successful mentorship relationships is for acknowledgement of the mentee as a human being, and the way in which that builds trust and loyalty. This was epitomised in the way one mentor described his approach:

“If you are interested in someone, you're interested in what they want to do and where they want to go, that's more important than any other skill that I have...I can tell you about my mentees, their families, their children, what they do, hobbies, I used to know what car they drive ... If you're interested in someone the other stuff falls together”.

Having this mentoring relationship, and an underlying bond can enable the difficulties of neurosurgery to be weathered. It is known for being a stressful and arduous subspeciality(Wise, 2020) *“I think the main reason for mentorship is because neurosurgery is hard”[04]*

There is an element of trust that forms between the mentor and mentee and is important at times of stress and difficulty.

“Unfortunately the stress of neurosurgery is a great provoker of that kind of reaction...that's why [when my mentor] shook my hand and welcomed me. It established a trust straight away. What happens in the heat of battle is water under the bridge, as long as you know you have that underlying trust and good will towards your fellow man, you can always hang on to that as an anchor”

A comparison drawn by many people, was that this relationship resembles that with family members, where they are able to give 'tough love' when required, and sometimes may say or do something hurtful, but are forgiven due to the bonds of the mentorship relationship.

Mentee-centred approach to mentorship

Having a mentee-centred approach was frequently mentioned as a contributor to a successful relationship. It is interesting that this was mentioned both by mentees, and by

mentors in the way that they approached mentoring. Rather than enforcing their own views, participants who saw themselves as mentors, strove to be ‘facilitators’ and allow the mentee to set goals or aspirations; as a mentor they saw their role as aiding and advising.

“as a mentor to handle the way you treat different trainees to get the best out of them, and make them enthusiastic without being too demanding or too indifferent sometimes.....the biggest role is to wake up the drive that every trainee has... it is different between different trainees”[27]

This ties into the concept of knowing and understanding the mentee holistically, and also a sense of caring about them and their needs and so tailoring advice to this. This mentee described how it felt to have a mentor who understood them.

“...having someone who is thinking on the same wavelength is important...who understands what you [the mentee] need, and who has the time to spend with you to help you achieve the goals. I think they have to see eye to eye with you, and understand you”[31]

Benefits of mentorship

In addition to offering the mentee in-depth knowledge of the specialty, the relationship also offered material benefits. This included contacts and networking, which translated to job prospects and opportunities, where the mentor was well-connected to other departments or within the neurosurgery community and were able to promote their mentee and obtain access to particular fellowships or senior jobs.

“clinically it has been useful as I’ve had someone all along who has looked after my experience... also in terms of encouraging me to do things that enhance my career, like going for prizes I would never have thought to”[31]

In addition to benefits on career progression, the mentor, by virtue of being more experienced, has an oversight of the neurosurgery career meaning they are able to encourage the mentee to go for various career-enhancing endeavours and acts as a ‘sponsor’ and give advice which allows them to excel and flourish.

“You have someone who looks at things from a slightly different perspective because they’ve already made it and things you may not see at your level.”[31]

The nature of the relationship

The duration of time with the mentor was often mentioned as being important in a successful relationship. This was predominantly mentioned by the more senior participants such as consultants. There was reference to the shorter 6 month attachments with a consultant, that doctors in training have, as being too short to develop a relationship, rather it grew over years.

“Good mentors, when you have one, they become a mentor for life which is a real bonus. I think most people have those characters that they can remember and trace their names throughout their lives, often the fingers on one hand as they are few and far between...”
[28]

This longitudinal nature of the relationship was mentioned often. This mentoring relationship often developed into a friendship over time, *“you can’t ever mentor someone who can’t be your friend”*[03]

The concept of friendship was a recurring theme and very frequently mentioned, particularly by the consultants, who have had a longer career and therefore a longer exposure to mentorship.

“it wasn’t official, you don’t call them mentors, you call them friends. they guide you, give advice, they take you through different approaches, and they look after you”[05]

Reference was often made to a social interaction with the mentor, such as having coffee, going to the pub with them, or one participant played in a musical band with their mentor. This is a way of bonding with the person. It also links into seeing the mentee, but also the mentor, as a whole person. Compatibility has previously been identified is a key element in the mentoring relationship (Persons, Agatstein and Kim, 2018) and the findings of these interviews support this.

What is interesting is how every mentee continued to look up to the mentor, even at consultant level. Of those consultants who were mentors and were mentioned by other participants, the consultant often didn’t see themselves in that ‘role’ and rather just as friends of their mentees.

Mentorship for women in neurosurgery

Of those interviewed, seven were female. A minority of the female participants made reference to their gender within the context of mentorship. Women still make up the minority of neurosurgeons, particularly at the consultant level and therefore it was interesting to assess whether mentions of gender and the mentorship relationship. One female participant stated that she felt this was an important area:

“there’s something to be said about female mentorship ... Especially in neurosurgery where there aren’t many women...I feel like it is our duty to encourage [women] and inspire them”[02]

One female participant highlighted that female-specific mentorship is often centred around ‘caregiver’ roles and therefore may not be gender-specific, but is a broader issue around flexible working.

“[female trainees may] need a bit more thought because they career pathways are not the simple straight though. Sometimes I think they need more advice which is difficult to get about things like full time working, being a mother and a neurosurgeon”[24]

“having a female mentor can give you that extra layer. You might be planning on having a kid or something but your male mentor can’t relate to [that] so there is this extra layer you can get from a female. And the whole confidence thing...the ‘imposter syndrome’, yes they do experience it but probably women experience it to a higher level and talking about those things is important”[02]

Another female neurosurgeon who had a caregiving role said that female mentorship was important to her due to the insight that the mentor had, to the unique hurdles of women in surgical fields.

“depending on their demographic or life experience might determine whether they can support you through certain things... for example taking time out to have children...for me I do have male mentors and they are very important in certain ways but in terms of overall career development, it can be difficult to get a perspective on that or understanding...someone who is never going to experience that in their life...”[15]

This participant wanted a mentor who she felt could relate to her particular demographic or issues, would be more valuable in giving specific tailored advice or guidance, from a place of experience. This aspect of having a mentor who was relatable, and understood the mentee’s perspective, translated to other domains:

“particularly in academic there are no female academics within neurosurgery, there are no female professors”[15]

With few women in senior academic roles, there is limited availability of mentors for female trainees, and the route of training which they may take. One female participant felt that female mentors could act *“like a sponsor, someone who is going to push you forward for posts, that the world we live in and on paper doesn’t look that way ‘we are all equal’ but its nice to have someone looking out for you”[02]*

Giving confidence to junior women was seen as important and valuable.

“When you see [male students] they are much more confident when they apply for neurosurgery, and women are not. And they need to be confident in applying or they will neve get there. And tell them they are as good as their male colleagues even though [male colleagues] might be more pushy”[02]

The value of female mentorship that was highlighted, relates to the ability to relate to the challenges that female neurosurgeons may be more likely to have, such as flexible working, and the feeling of ‘imposter syndrome’.

6.3 Mentoring others

Within the mentorship relationship it is not only the mentee who benefits. This sentiment was echoed throughout the interviews: a commonly cited reason for mentoring was the satisfaction of seeing someone flourish, and reward of contributing to someone’s progression.

“for me it is the satisfaction of getting someone to do their best, and achieve... You get some satisfaction out of wanting people to get to their potential”[31]

It is fulfilling to have contributed to someone’s development and is a strong motivator amongst participants, for them to mentor within neurosurgery.

A common theme was to repay what had been received as a mentee during training. There was mention of a sense of duty and obligation, and often related to the mentor themselves having benefited from mentorship during their career.

“[mentoring] gives me a sense of pride. That person gained something from me and I taught them something. That transaction is almost payback for people who taught you 10

years ago. That's medicine really, you learn something and if you do it well you try and impart it on others"[25]

Many wanted their mentors to learn from their mistakes, and their journey within neurosurgery *"[I wanted to] make a difference, whether you call that arrogance or not, I don't want people to make the same mistakes I did."*[04]

Another important part of mentoring for the mentor, was learning from the mentee, and this emphasises the mutually beneficial aspects of the relationship.

"I like ... watching them grow, I like seeing what they can do. It is amazing watching someone go from not being able to something, to thinking 'bloody hell they are brilliant', and I am now learning from them. That's my favourite bit, then I think, I am learning from you now. I love that feeling..."[07]

Aside from the selfless implications of mentoring, a few participants mentioned the other benefits of this role, such as 'CV points'. It was highlighted that this relationship can be mutually beneficial, for reasons such as getting academic publications, where the mentee collects data or writes up manuscripts.

"if they are doing research for you then getting papers and things published, benefits everyone"[31]

Such reasons were less commonly mentioned, and predominantly by those in academic realms. This could be due to this not being a common reason, or due to the fact that participants did not want to appear to be mentoring for personal gain.

Some participants acknowledged that their mentees would likely be their peers one day, so it was rewarding and beneficial to help people they would be spending a lot of time with. Unlike the point above, it is not necessarily for direct benefit for themselves, but rather to make a more pleasant environment within a department, or within the neurosurgery specialty as a whole. One person stated it was an investment into making their department overall better, and everyone benefited from that.

"[often the mentee is an] active members of the department, making a difference to what's happening in the department...so its like keeping your car serviced: if you make an effort

[to mentor them] ...everything works a lot more smoothly... having people satisfied and happy is good for everyone...”[31]

6.4 Hurdles and challenges of mentorship

Issues within mentorship were not common and the majority of people felt that if they had a negative interaction with someone who was in a senior, or mentor, position, that they “*don’t remain as a mentorship if you have issues*”[28]. Due to this, the incidence of negative experiences were few, but when they occurred they gave an interesting insight into the challenges and experiences that neurosurgeons have had within mentorship.

The absence of acknowledgement of mentoring

An interesting concept that was mentioned twice, was that mentors are rarely acknowledged or thanked. The role of mentor was compared to school teachers, to whom we rarely feedback, or thank. Their contribution is often taken for granted.

“like school teachers, you never hear from [the mentee] again. How many people go back to their school teachers... its an extraordinary thing. Must be incredibly unsatisfying. Its only when you get to be an adult that I think you realise, you need to continue to give people that feedback”[13]

This aspect of acknowledging the mentor is an interesting one; many of the participants could recall very influential mentors in their careers, yet it wasn’t clear if they conveyed this gratitude to them directly. The comments by these participants highlights the value of articulating to mentors, the impact they have.

Lack of exposure to mentors

For some participants, the lack of access to mentors was a negative. They felt that they were disadvantaged, and were resentful due to lack of opportunity and exposure to mentors for the type of advice, support, and career guidance that has been outlined in previous sections. Often the reason for this was a either a lack of interaction and exposure between the participant and seniors within the department, or a lack of mentors within a department. One element, highlighted in an earlier section, was that geographical

proximity to the mentor aided development of the relationship, so in departments where mentees did not ‘click’ or gel with seniors, it made it difficult for such relationships to arise. Some participants felt there was a “*lack of interest*”[32] from seniors, and lack of an effective, meaningful mentors. They were not being exposed to people who were ‘knowledgeable and well connected’ but rather “*more liability than help*”[29].

Some participants noted that there were seniors within a department who felt that during their training they did not receive any particular help or guidance, so they did not want to mentor and support, and questioned why a junior generation should be helped

“I think there is a bias, every generation thinks that the one below is lazier and there is an element of bias: ‘I didn’t get this help’”[24]

This attitude may be limiting the availability of mentors amongst more senior neurosurgeons. This is something that cannot be surmounted, and only to be understood. A mentor is only someone who does so willingly, but knowledge and insight of this may help a mentee seek out mentors.

The impact of NHS structure on mentorship in neurosurgery

Participants discussed the effect of the change in NHS structure, on the mentorship relationship. Often comments centred around the lack of contact between different grades of neurosurgical doctors, so SHOs were not exposed to consultants and it was therefore difficult for mentorship relationships to arise.

“Now, there is no direct relationship and therefore no responsibility on anyone senior to make sure a junior person is progressing or giving advice, or any encouragement”[16]

Also, as shift patterns were introduced, the members of the team may not consistently work together and this affected the exposure of individuals to their mentors, or potential mentors.

“Rotas made it hard to feel you were part of the team as you feel like you’re barely there”[32]

“When I trained there was the concept of the firm there was a consultant, senior registrar, SHO... it was like a family, so you got to know them...whereas now I don’t know who the SHO or houseman is, they change all the time”[03]

One participant also highlighted the lack of longitudinal understanding of their mentees skills and knowledge, and camaraderie, which was attributed to lack of contact due to the way shifts were scheduled *“the banter across the [operating] table is something that I saw disappear as people moved from firm based structures to group based firms”*[04]. The change in interaction between members of the team affect the way in which these interpersonal relationships grow; this supports existing literature on the negative impact of rota changes on the development of interpersonal relationships (Rimmer, 2019).

Favouritism within mentorship

Another element in the procurement of mentors, was seeing favouritism to certain members within a department: *“the people who mentor you, will see things that they like or reflect their own values etc so that becomes a sort of echo chamber and can then mean you get a reinforcement of people who think the same, and a lack of diversity of thought actually means the profession is weaker and can’t respond to change”*[08]

This is a difficult element to tease out, because it has already been discussed that for a mentoring relationship to flourish, it arises organically, chosen by both parties and often there is a similarity of personality or perspective. For some however this translated to a degree of nepotism. Flint et al noted that mentorships predominantly arose by self-selection but did not give any explanation for why this and it could be that there is an element of favouritism within that (Flint *et al.*, 2009).

“One thing I have noticed about mentorship is that it can be a form of favouritism as well, and for a profession to professionalise rather than it being just about supporting your mates everyone having access to those relationships is quite important. I don’t think that really happens”[08]

One mentor made reference of this, and how he endeavours to treat all juniors equally *“You cannot have favourites. You can like people and know you like people but for every scenario you have to have the same way of assessing needs and analysing the trainee, doesn’t matter whether you like the person, like similarities in character or totally different to you”*[27]

Exploitation and ulterior motives

There were negatives highlighted within the relationship itself. There were some instances when there was abuse of the surgical mentorship relationship such as competition between mentor and mentee, particularly on nearing completion of training, where the mentor might be close to the grade of the mentee

“people always have an ulterior motive [for helping you] but the person needs to be far enough away from you in career or geographical location for it not to impact on you too much”[08]

Some of these factors have been described in the literature; a widescale interview within the academic realm found that of mentorship relationships that failed, characteristics that were highlighted include lack of communication, lack of commitment but also competition between mentor and mentee, leading to an exploitative relationship (Straus *et al.*, 2013).

Another negative aspect of the mentoring relationship was ulterior motives for helping someone, either for control, help oneself, or to look popular or for power over others. These exploitative interactions lead to loss of mentee’s trust.

“The person would argue, would be very vocal about ‘come to me if you have a problem, if you guys want to talk about something troubling you etcetera’ but of course there was never any meaningful conversation. Instead there was blaming and shaming. Not only were they not there for us, they would do exactly the opposite. People would trust them with issues and they would go and discuss it with other people”[06]

Transitioning from mentee to mentor

Some of the senior registrars and junior consultants noted that they did not yet feel fully equipped to mentor others. What was interesting was that as they transitioned from mentee, to mentor, they gained a new insight into the responsibility of being a mentor. Namely, they noted the amount of time, effort, and energy required to mentor someone. One theme that emerged was that they did not feel ‘worthy’ of the aspiration and inspiration of junior colleagues. This is interesting as it ties together the role of mentor as someone who is a role model, and to be emulated, with the sense that the mentor invests a lot into the relationship, sometimes more than the mentee might realise, and it may be without thanks or acknowledgement. When thinking back to their own mentors,

one consultant notes *“There’s no financial or status benefit [to being a mentor], they are so humble. They don’t want the accolade. I have a new found respect for [my previous mentors], cause sometimes you wonder, ‘why do I bother [to mentor the juniors]’, like any relationship you need to work at it to make it work”* [16]

Managing the challenges of being a mentor

From the mentor’s perspective, there is a significant effort made on their part to guide and support a trainee. Along with this personal investment that a mentor makes, they have to decide when to give advice, what advice to give, understand the trainee and tailor it to them. They also need to have an appreciation of what to do when things do not go well for the mentee. There is a sense of responsibility that sits on the mentor’s shoulders. This was highlighted by two mentors in particular who described instances when their mentee struggled, and they questioned their advice and guidance.

“Was I too encouraging?... Neurosurgery is a tough job... should you encourage someone down the route and drag them in or should you let them struggle to get in make sure it is right for them....What I worry about is, that I was too encouraging and I ruined a life...that was something that upset me...the damage done to [the mentee]... People are fragile things and you can damage them greatly” [21]

Another mentor discussed the challenges of seeing their mentee struggle, and giving difficult feedback. This can lead to a breakdown of the trust in the relationship, if the mentee does not agree with the advice.

“I’ve had people who looked to me as their mentor who I didn’t think were good enough to carry on with what they wanted to do and that’s really difficult, more difficult for them than me but difficult for me, as I am feeling I let them down as well ...there’s a worry they aren’t going to come back to you for further help and advice” [07]

These episodes highlight that this mentoring relationship is not to be taken lightly. It demonstrates that the best mentors are invested and entwined with the mentee, and endeavour to take their best interests to heart, but it is also a relationship in which the mentor may feel responsibility to give ‘good’ advice, and this can be very challenging. This is made smoother by a strong relationship with the mentee, and a rounded understanding of who they are and the facets that make up their personality, life, and skills, but even with these, it is unpredictable as to the course that the mentees’ careers

and lives may take. As discussed in the earlier sections, there is an element of ‘tough love’ within the mentorship relationship, and almost familial ties.

6.5 Burnout

Perception and experience of burnout

Many of the participants had an understanding and awareness of what burnout was and some had colleagues in neurosurgery who had experienced it. There were a small number of participants, predominantly consultants, who did not think burnout was a real entity, and was rather a *“luxury of western society”*[01] or *“management bullshit to make a point”*[29]. Another participant described it as *“what people call struggle in the modern day, is a natural way for us. So I don’t feel that there is anything wrong”*[09]. These suggest that there is a perspective that burnout is a new entity and a natural part of life rather than anything pathological. There appeared to be an influence of seniority and experience upon this perspective, as one consultant noted regarding burnout that *“I’ve become more relaxed as I got older”*[31].

Workplace as a protective factor against burnout

There were a number of people who mentioned colleagues and a supportive work environment as a key factor in avoiding burnout.

“Supportive colleagues makes a massive difference, being able to talk to them”[24]

One element of this, is the camaraderie in knowing that others are also experiencing the same thing, and not being alone in this experience.

“Its always nice to know people are suffering the same as you are, and being able to talk to your colleagues. They can often put perspective on it.”[31]

For many participants there was a catharsis in discussing their experiences and *“the expression a problem shared is a problem halved, is one that I really really believe in..., it is enormously helpful to go and talk to someone who can say ‘I’m sure that would have happened to me’, or... ‘you did that as well as you could have done’”*[13]

These points highlight the importance that participants placed upon their professional interpersonal relationships in order to weather times of stress and protect against burnout.

For the majority of participants, protective factors centred around *“support from friends and family, they get you through anything that is going on”*[19] as well as hobbies and interests outside of work, *“doing something else apart from work, swimming, hiking, because that makes me feel my life is not just work”*[14]. Interestingly there was often a divide in the issues that participants would discuss with family and friends, compared to colleagues. One participant summarised it as using *“friends and family for personality, emotional, social issues at work and peer support for more clinical stuff”*[17]. This was explained by another participant as their family *“[didn’t] really understand and usually react emotionally. You evoke the same feelings in them that you have yourself and it is not a constructive way forward”*[21]. This highlights the importance that the shared experience and understanding plays in discussions and debriefing from stressful events. This highlights the importance of talking to people within the same field who are more likely to understand your experiences.

Workplace as a precipitant for burnout

Factors that precipitated burnout included the working pattern and stress of neurosurgery, but as a broader theme, the general working environment. One of the underlying reasons was summarised as *“not being in control, or feeling that you cant really influence what you want to”*[31]. This lack of control is a commonly mentioned precipitant of burnout in the literature and is something that often found within neurosurgery due to the high-paced stressful environment (Klimo *et al.*, 2013b) *“Neurosurgery is very pressured and can be frightening to people when they start, and medicine can be an unfriendly environment.”*[03]

One explanation for burnout that was given by a number of participants centred around a boredom and lack of enjoyment of the job: *“I have seen it in trainees and colleagues over the years, fed up, tired, to me it is often a sign you just don’t enjoy what you’re doing”*[07]. Another, junior participant remarked that *“a lot of what you do as a doctor*

is stressful and can be boring or repetitive at times”[10]. This lack of stimulation and enjoyment is seen as a trigger for burnout.

Interaction with colleagues was mentioned as a precipitant to burnout, when there are *“issues with interpersonal relationships with people that you work with, and say a little bit of politics, there are different personality types”*[17] or the feeling that *“someone is going to stab you in the back, or criticise you if you have complications”*[27]. Interpersonal relationships in the workplace can also influence burnout, not by negative experiences but *“lack of peer support, and isolation”*[30].

These experiences of the workplace within burnout echo the findings of Dyrbye and Shanafelt who noted that burnout related more to situational and environmental factors, rather than intrinsic factors of the individual(Dyrbye and Shanafelt, 2016). This study is limited to participants reported experience of burnout and neurosurgery and does not directly assess intrinsic factors.

6.6 Implications of the study

Mentorship in neurosurgery predominantly arose informally via proximity to potential mentors. This was often within the same department. A negative for some participants was a lack of suitable mentors in their department and lack of exposure to senior neurosurgeons. Although mentorship within neurosurgery does not appear to be amenable to a formalised process, to aid development of these relationships efforts could be placed on facilitating mixing of clinicians and enabling exposure of mentees to possible mentors. This could be across specialties and include academic clinicians. Mentees found it particularly valuable to have mentors who had faced similar issues to them, such as female trainees who were planning on taking on caregiver roles. Mixing of a diverse range of clinicians would increase the opportunity for mentees to find mentors who could offer insight into their concerns or aspirations. In addition, allowing dedicated time for meetings and interactions and weighting of the role of mentorship within the training programme may aid these relationships arising and being sustained. The impact of rotas and the NHS structure on mentoring was highlighted by the participants. Emphasis should be placed by neurosurgical departments on optimising time that colleagues spend consistently with a particular team in order for relationships to grow, within the confines of the working pattern (Rimmer, 2019).

Social interactions, such as going to the pub or for coffee, were important in cultivating the relationship. This links to the concept of being seen and understood as a 'whole person', outside of the clinical working environment. To aid development of mentorship relationships, mixing of clinicians could be widened outside of the workplace and into social settings. This fostering of relationships and forming bonds with colleagues socially was also highlighted by participants as being valuable and protective against burnout.

Making neurosurgeons aware of what they can provide as a mentor or mentee is important, especially to be aware of unconscious bias in selecting mentors and mentees. It was interesting that some participants tried to ensure they were not biased towards or against mentoring trainees that they liked, or saw similarities in, so as not to disadvantage those they were different from. Enabling those involved in the relationship to see its value and understand what the mentee is seeking, and what the mentor can offer, can be

beneficial as well as encouraging appreciation on both sides to the effort and energy brought to this relationship. It was interesting, the comment that we rarely thank our school teachers even those we remember years later and similarly that we rarely think to thank or debrief with our mentors.

Participants listed a plethora of benefits of good mentorship. It is clearly a valuable relationship within neurosurgery. There were however challenges within the relationship, such as implications for a mentor when a mentee faces difficulties. It is important to raise awareness of the investment needed as a mentor and ensure that there is support for the mentor in managing that situation. Understanding this aspect of mentorship is key as the mentor's role is rarely emphasised or discussed; the comments of the junior consultants highlighted the amount of investment and dedication needed within the role of mentor.

It is of note that the more senior clinicians may have had mentors during their training so this offers an insight into the perspective of both mentoring and being mentored. In addition, those neurosurgeons who have been practising for longer will have insight on the impact that mentorship may have had at various times of their career or in various circumstances. Having clinicians at a range of seniority enabled a longitudinal look at the nature and role of mentorship, which will span some of the changes seen in the structure of training and NHS. This gave a greater depth of insight into the relationships outside the current working climate. Some doctors had worked and trained abroad, in addition to the NHS, so brought a perspective that encompassed other methods of teaching and clinical practice. Although this study aimed to look at UK neurosurgery this perspective was very important in putting UK methods into the context of global clinical practices. The incorporation of interviewees of varying demographics as well as comparison to multiple sources of existing data was considered form of triangulation of the results, towards establishing validity of the findings (Varpio *et al.*, 2017).

The workplace played a key part in participants' experience of and perception of burnout. It was seen as a trigger when there was competition and isolation from colleagues. Equally colleagues and interpersonal relationships at work were seen as protective, when they were supportive relationships, due to the camaraderie of shared experience and

understanding. Raising awareness of the role that workplace factors have in burnout and encouraging neurosurgery departments in fostering supportive environments is important(Tang *et al.*, 2020).

6.7 Limitations of the study

The busy clinical environments in which neurosurgeons work will affect the rate of response and participation in the interviews. This may skew the results to being from those who are engaged, or personally interested, in the subject matter. Those with particular positive or negative mentorship experiences may be more likely to participate compared to those who had neutral experiences and views. The number of participants who took part indicate that there was engagement with the study. A wide breadth of training grades and academic positions were included, which spanned gender and geographical locations.

The sensitive and personal nature of the enquiry around negative mentorship experiences and emotional support and vulnerability of the individuals may have affected the depth of disclosure. In addition, reflection on experiences of mentorship requires insight on the part of the participant. For this reason the depth of answer will depend on the fluency and articulation of the participant and is a snapshot in time. The interview requires a level of reflection and insight; it does not directly, or objectively, assess mentoring or burnout but rather their perception and experience of it.

7. Conclusion

Mentorships within neurosurgery are highly valued and desired. This relationship is often long-lasting and evolves into friendship. When present, mentorships enrich the lives and experiences of both mentor and mentee. In their absence there is often a desire by mentees to find someone who takes genuine interest in them, guides, supports and provides advice tailored to their situation and circumstances. The mentor was frequently a source of inspiration and aspiration, as well someone to model behaviours and decisions upon. Participants described that within this relationship there is an awareness of both mentee and mentor as individuals, inside and outside of the neurosurgical environment, and enables both parties to be seen holistically. Mentorship within neurosurgery was a precious, nuanced, and rich interpersonal relationship.

As participants became more senior, within the neurosurgery pathway, the mentorship relationship took on a different role. Beginning as a conveyance of knowledge and skills, over time mentorship grew beyond this to give deeper insight into the career and lifestyle of neurosurgery, and serve as a source of compassion and kindness. It is a relationship in which the mentor makes a significant investment which may explain why participants only had few mentors during their career. The experience of those transitioning from mentee to mentor highlighted the amount of dedication that the mentor brings to the relationship. Descriptions of how mentors faced challenging situations, such as struggling mentees, demonstrates the responsibility placed upon them. Despite these drawbacks mentors find it a fulfilling and rewarding relationship, seeing their mentees flourish, and consider it a way to repay the mentoring they themselves received. This is a complex relationship in which there is a lot of investment of time, energy, and efforts by both mentee and mentor.

Participants highlighted the choice that mentors make in whom they choose to mentor, and it was noted that there might be biases in selecting mentees. It was widely acknowledged however that a bond needed to develop for the relationship to be fruitful; this was not something that could be forced. It would be valuable, however, for mentors to reflect upon their own practice and interaction with juniors as these interactions often

have long-lasting effects, even if brief and not vocalised. A number of participants noted small acts of kindness or brief mentoring that had profound impacts on them, a fact which may not have been conveyed to the mentor.

The neurosurgical workplace played a key part in participants' experience and perception of burnout. It was a precipitant due to the stress of the job, competition with, and isolation from colleagues but was also protective when there were supportive interpersonal relationships and a sense of camaraderie. There is an opportunity here to target the situational factors that contribute to burnout to reduce its incidence.

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Appendix A

Literature search terms

The following source databases were used:

Search Eric

Ebsco publishing

PubMed

<http://psyresearch.org/abstracts/>

ebsco host

OVID

ProQuest

Google Scholar

| MeSH search terms |
|--------------------------|
| Mentor |
| Mentors |
| Mentorship |
| Mentorships |
| Psychological burnout |
| Burn-out |
| Burn out |
| Burnout |
| Burnout syndrome |
| Surgery |
| Surgeon |
| Neurosurgery |
| Neurosurgeon |

The search was performed using Boolean operators in various configurations to ensure all the ways in which these terms might be used, was captured.

Appendix B

Participant Information Sheet and Consent Forms

INFORMATION SHEET



Study Title: Are mentorship, and interpersonal relationships, valuable against burnout in UK Neurosurgery?

Invitation

You are being invited to consider taking part in this research study, which is being undertaken by Miss Menaka Paranathala. She is a distance-learning masters student with Keele University, as well as a neurosurgical registrar in the North East of England.

Before you decide whether or not you wish to take part, it is important for you to understand why this research is being done and what it will involve. Please take time to read this information carefully and discuss it with friends, relatives and colleagues if you wish. Please ask if there is anything that is unclear, or if you would like more information.

Aims of the Research

This research is an exploratory piece looking at the role that mentorship, and interpersonal relationships, play within neurosurgery in the UK and whether participants perceive any benefit from mentoring relationships to address issues of burnout.

Why have I been invited?

This interview is open to any doctor working within the specialty of neurosurgery, in the NHS, of any grade from senior house officer, to registrar, to fellows and consultants. There is no limit on the number of participants. Invitation to participate is open and via mailing list distribution and social media.

Do I have to take part?

You are free to decide whether you wish to take part or not, it is entirely voluntary with no repercussions.

If you do decide to take part you will be asked to read and assent to the associated consent form. You are free to withdraw from this interview at any time and without giving reasons. If there are any questions you would rather not answer then you can skip these. No personally identifiable information will be included in the dissertation or subsequent publications. Anything that could be identifiable will be excluded, or results pooled to ensure that no individual can be identified.

If you take part and would later like to withdraw our data then please get in touch with Menaka or her academic supervisor. Both contact details are within this information sheet. The masters will be submitted by the 23rd August 2020, so any withdrawal of data should be requested before 15th June 2020 to allow enough time.

Once the data is collated and anonymised it will no longer be possible for individual interviews to be identified and removed.

What will happen if I take part?

If you choose to take part, you will be contact by Menaka, the lead researcher via email. You will be sent the information sheet and consent form to read and given an opportunity to ask any questions. Following this you will be contacted to organise a suitable time and location to carry out the semi-structured interview. Ideally this will be face to face, but may also be via skype/video call, or telephone call. It will take approximately 20 minutes but may be longer or shorter depending on the answers and discussion. You are free to end the interview at any time without giving any reason.

This will be one-to-one and in a private location to ensure confidentiality. If it is via video or telephone call please ensure it is at a time you will not be disturbed and in a quiet, private location.

The interview will be audio recorded and the file kept on a password-protected laptop. This will be used for thematic analysis by Menaka, the lead researcher. The audio file may also be heard by the project supervisor Dr Viktoria Joynes, and in rare instances perhaps by the programme director Dr Janet Grant, if there is any input for analysis needed. After the dissertation is completed, the audio files will be deleted.

Please do not give any information that would identify anyone else or disclose details of events that you do not feel comfortable sharing, nor that would breach confidentiality and identify those who are involved.

What are the benefits (if any) of taking part?

There is no financial remuneration for participation. This research aims to enable a better understanding of interpersonal relationships in neurosurgery, which may be useful in guiding future mentorship schemes and departmental organisation of supervisors and mentors. It is hoped that this may be useful for the wider surgical and medical community in understanding the factors that may be protective for burnout. There are no personal benefits of taking part, but talking about experiences of mentorship and the workplace

experience may be useful to you as an individual, reflecting on your practice and experiences.

What are the risks (if any) of taking part?

Some of the questions may cause distress as they may bring memories of mentors, colleagues and interpersonal relationships in the workplace, as well as of times of difficulty and burnout. If this is the case then you are free to stop and restart the interview as you wish, or to withdraw at any time. You do not need to disclose anything that you feel uncomfortable talking about.

Should you feel distressed following this and feel you require it, then please discuss with your clinical and education supervisors, training programme director or equivalent. If required contact your GP for further assessment and support.

How will information about me be used?

Any data will be processed anonymously and confidentially. When the final thesis is produced, none of the results will be uniquely identifiable to any participant. All audio files will be deleted after completion of the masters degree, to which this piece of research will contribute. The manuscript produced may be submitted for publication but there will be no uniquely identifying information in it.

Who will have access to information about me?

The interview will be audio recorded and the file kept on a password-protected laptop. This will be used for thematic analysis by Menaka, the lead researcher. Anonymised parts of audio files may also be heard by her supervisor Dr Viktoria Joynes, and in rare instances perhaps by the programme director Dr Janet Grant, if there is any input for analysis needed. After the dissertation the audio files will be deleted. The files will be saved with a participant number, not with any identifiable details. The record of the participant number and any personal details will be kept in a password protected excel document on this same laptop.

The researchers have to work within the confines of current legislation over such matters as privacy and confidentiality, data protection and human rights and so offers of confidentiality may sometimes be overridden by law. For example in circumstances whereby the researchers are concerned over any actual or potential harm to yourself or others, this information must be passed to the relevant authorities.

Who is funding and organising the research?

There is no funding for this research. The research is all organised by the lead researcher Menaka, with guidance from her supervisor Dr Viktoria Joynes.

What if there is a problem?

If you have a concern about any aspect of this study, you may wish to speak to the researcher(s) who will do their best to answer your questions. You should contact Miss Menaka Paranathala on telephone 0191 282 1753, or via email menaka.paranathala@nhs.net Alternatively, if you do not wish to contact the researcher, you may contact her supervisor Dr Viktoria Joynes at the University of Liverpool Viktoria.Joynest@Liverpool.ac.uk

If you remain unhappy about the research and/or wish to raise a complaint about any aspect of the way that you have been approached or treated during the course of the study please write to Nicola Leighton who is the University's contact for complaints regarding research at the following address:-

Nicola Leighton
Research Governance Officer
Directorate of Engagement and Partnerships
IC2 Building
Keele University
ST5 5NH
E-mail: n.leighton@keele.ac.uk Tel: 01782 733306

CONSENT FORM

Study Title: Are mentorship, and interpersonal relationships, valuable against burnout in UK Neurosurgery?

Name and contact details of Principal Investigator: Miss Menaka Paranathala
(Telephone 0191 282 1753 or via email mparanathala@doctors.org.uk)

Please initial box if you agree with the statement

1. I confirm that I have read and understood the information sheet dated March 2020 (version number 1) for the above study and have had the opportunity to ask questions

2. I understand that my participation is voluntary and that I am free to withdraw from the interview at any time. In the event of withdrawal, and where it is possible, relevant data will also be withdrawn

3. I agree to take part in this study

4. I agree to allow the dataset collected to be used for future research projects and publications

Name of participant

Date

Signature

Researcher

Date

Signature

**CONSENT FORM
(for use of quotes)**

Study Title: Are mentorship, and interpersonal relationships, valuable against burnout in UK Neurosurgery?

Name and contact details of Principal Investigator: Miss Menaka Paranathala
(Telephone 0191 282 1753 or via email mparanathala@doctors.org.uk)

Please initial box if you agree with the statement

1. I agree for my quotes to be used in anonymised form, and not attributable to me

2. I do not agree for my quotes to be used

Name of participant

Date

Signature

Researcher

Date

Signature

Appendix C

Semi-Structured Interview Schedule: Mentorship and Burnout within Neurosurgery

Please do not give any identifiable information such as names of mentors or mentees, locations, or details of particular events that would identify anyone.

| Topic | Question |
|--|---|
| Demographics | <ul style="list-style-type: none"> • Age • Gender • Stage of neurosurgical training (senior house officer, registrar, consultant) • Number of years in neurosurgical training • Current training location • Number of changes of location (hospital) during training (since graduating) |
| Introduction | <p>Tell me what you think about the mentoring relationship (in a clinical environment)</p> <p>Such as benefits and drawbacks, structure of the relationship</p> |
| When have I been mentored (peer and hierarchical, within the workplace and outside) | <p>When have you been mentored (this is any interaction, formal or informal that you would consider mentorship and could be during medical school, training or current practice)</p> <p>a) At what stage of medical school and or/training</p> <p>b) By whom</p> <p>e.g. as an SHO by a consultant, junior reg by senior reg, or by someone in a different specialty or non medical</p> <p>c) Was it formal or informally allocated</p> |
| | <p>In your opinion, please describe what you think the purpose of mentorship is, as a mentee</p> |

| | |
|---|--|
| | <p>Consider the most successful mentoring relationship you have been involved in as a mentee.</p> <p>How did you meet this mentor?</p> <p>What role did that mentor play for you? Please describe why was this a successful relationship</p> <p>Describe the impact it had on you, and the mentor?</p> |
| <p>When I have you mentored someone else (peer and hierarchical, within the workplace and outside)</p> | <p>Have you mentored others</p> <ul style="list-style-type: none"> a) At what stage were you b) who did you mentor c) was it formal or informal <p>If you have not, then proceed to the next section</p> <p>Why did you mentor? What do you feel is the purpose of mentorship as a mentor?</p> <p>Do you feel equipped to mentor someone, how so</p> <p>Consider the most successful mentoring relationship you have been involved in as a mentor</p> <p>How did you meet this mentor/mentee</p> <p>What function did that relationship play for you? What impact did it have on you, as the mentor?</p> <p>In what ways was this a successful relationship?</p> |
| <p>Please tell me more about the mentorship relationship</p> | <p>Have you ever had any negative experiences of mentorship, either as mentee or mentor?</p> <p>If you are happy to talk about them, please tell me more</p> <p>Informal vs formal</p> |
| <p>Can we now discuss burnout and wellbeing</p> | <p>What is your understanding of the term ‘burnout’?</p> <p>Would you be happy to share, any experience of this</p> <p>Is there anything inside, and outside, the clinical environment that has helped you manage times of difficulty as a trainee or consultant, please tell me about this (Daskivich <i>et al.</i>, 2015)</p> <p>Of these were any formal, or informal?</p> <p>Has being a mentee had any impact on these feelings?</p> |

| | |
|--|---|
| | If so, how |
| | Has being a mentor had any impact on these feelings? |
| | If so, how |
| | Tell me about role do you think interpersonal relationships have in feelings of burnout |
| | Any other comments |

Appendix D

Coding

An example of interview coding is given below. The interview was listened to and transcribed verbatim. Once all interviews were transcribed, they were read through a few times for familiarisation. Following this, each interview was coded and quotes taken which illustrated points. The codes were then refined by going back to the raw data to assess how accurately they reflected what the participant had expressed, and codes were grouped together when there were common concepts (such as: mentors being role models, being emulated by the mentee, and being inspirational). These were then used to give rise to the discussion points that were made, and this was taken back to existing literature to assess where the findings of this study sat.

| Participant | Notes on the transcript | Codes |
|-------------|---|--|
| 01 | <p>Western type -someone leads and you can join and learn; no one will tell you aren't suitable</p> <p>Mentor is more than a working relationship – friendship as well</p> <p>Should be informal</p> <p>Mentor is not exploring and transmitting written knowledge, it is the unwritten tricks, the little things you cant read</p> <p>Reg-cons is a working relationship – understand each other, accommodate each other and learn</p> <p>Peripatetic learning like Aristotle, walk and talk – CBDs</p> <p>Success: friendship and mutual appreciation</p> <p>“to a successful mentorship you need a fruitful, friendly relationship between the mentor and mentee. So aristotle told once to some rich man or king, that I am unable to teach your son because the son doesn't like me and without it, it is impossible. So this is required for the mentorship, mutual acceptance and sympathy, love, that is important because if you don't love somebody, who cares about them. If a registrar doesn't like a consultant they are not going to be willing to learn from them, they will criticise”</p> | <p>Friendship</p> <p>Affection</p> <p>Conveying unwritten knowledge</p> <p>NHS structure</p> |
| 24 | <p>“those one looks up to, and admires”</p> <p>“unstructured, more admiration side of things, and more sort of ... educated friend situation”</p> <p>Informal</p> <p>Took under wing</p> | <p>Role model/Aspiration/inspiration/admiration</p> <p>holistic approach</p> |

| | | |
|--|---|--|
| | <p>“training is educational – able to do the job, and mentorship is more holistic so helping with career and the associated things, and personal things...advice or signposting or helping with long term goals, getting into academia, managerial things, recommending different side interests that a lot of neurosurgeons have” “more personality and person dependant in mentoring understanding the person behind the trainee, of the mentor”</p> <p>mentor has information you need/knowledgeable</p> | <p>personality dependant</p> <p>understanding the person</p> |
|--|---|--|

Appendix E

Personal Reflections

The influence of reflexivity is important in this study, as the lead researcher is a clinician in the field of neurosurgery and known to some of the participants. Due to the associated issues around confidentiality and anonymity in the context of interviewing within the field of neurosurgery, a disclosure was made at the start of the interview that the responses were entirely confidential and would not be spoken of again out of this context. Due to the nature of the questioning and the close personal interactions that the participants are disclosing, reassurance of anonymity and the voluntary nature of participating was clearly stated. A reflective diary was kept during the process to be able to analyse the influence had as a researcher, upon the data collection and participants, and considered during the data analysis and discussion.