Methods of assessment used by osteopathic educational institutions

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ABSTRACT

Background

The methods used for assessment of students in osteopathic teaching institutions are not widely documented in the literature. A number of commentaries around clinical competency assessment have drawn on the health professional assessment literature, particularly in medicine.

Objective

To ascertain how osteopathic teaching institutions assess their students and to identify issues associated with the assessment process.

Design

A series of focus groups and interviews was undertaken with osteopathic teaching institutions.

Participants

Twenty-five participants across eleven osteopathic teaching institutions from the United Kingdom, Canada, Italy and Australia.

Results

Four themes were identified from the focus groups: Assessing; Processes; Examining; Cost Efficiency. Institutions utilised assessment types such as multiple choice questions and written papers in the early years of a program and progressed towards the long case assessment and Objective Structured Clinical Examination in the later stages of a program. Although examiner cost and training were common themes across all of the institutions, they were perceived to be necessary for developing and conducting assessments.

Conclusion

Most institutions relied on traditional assessment methods such as the long case assessment,however, there is increasing recognition of newer forms of assessment, such as the portfolio. The assessment methods employed were typically written assessments in the early years of a program, progressing to long case and Objective Structured Clinical Examination format assessments.

INTRODUCTION

Osteopathic teaching institutions are charged with the responsibility of using appropriate methods to assess their students by professional registration and accreditation bodies such as the Australian & New Zealand Osteopathic Council.[1] Assessment of learning in osteopathic teaching institutions takes a number of forms, with the type of assessment often dictated by the learning outcomes to be assessed. Further discussion of some of the guiding principles of assessment in these teaching institutions is found in the recently released document *Assessment 2020; Seven propositions for assessment reform in higher education*.[2] The present report provides a discussion of seven principles related to assessment for learning (Table 1).

INSERT Table 1 here

Assessment is a well-researched area, particularly in medicine; however, there has been little research into assessment in the osteopathic profession. London[3] describes the educational development of the osteopathic student as moving "…from knowledge acquisition to understanding and application…". The methods of assessment within osteopathic programs change as the student progresses (i.e. written essay & multiple choice questions to objective structured clinical examination & long case assessment) with the methods of assessment having traditionally followed the model proposed by Miller[4] (Figure 1).

INSERT Figure 1 here

The ‘knows’ and ‘knows how’ of Miller’s triangle (Figure 1) are predominantly assessed in the early years of an osteopathic program with the ‘shows how’ and ‘does’ being assessed in the later years once the student has developed the “understanding and application”[3] of the material and techniques presented throughout the program. There may often be overlap between levels on Miller’s triangle (Figure 1) with early year students often being assessed on their ability to perform basic osteopathic techniques on the ‘shows how’ level.[4] This suggests that Miller’s triangle may not be appropriate as a model for assessment in pre-registration osteopathy programs given students do not necessarily progress from the lower to upper levels of the triangle in sequential order.

Written examinations assessing the ‘knows’ and knows how’ levels of Millers triangle are typically set as multiple choice questions, short-answer questions, essays, or a combination of methods[5] covering the clinical sciences and basic health and biomedical sciences. Clinical and practical examinations, such as the Objective Structured Clinical Examination (OSCE) and the long case examination, assess the students’ ability to undertake a particular examination or technique (‘shows how’)[5] or assess their ability to manage a patient or patients using their skill and knowledge set (‘does’). Towards the end of most osteopathic programs, it can reasonably be assumed that assessments are predominantly directed towards the clinical competency of the student and their readiness, or fitness, to practise.

Despite the limited research into assessment of competence in osteopathy, there is evidence of increasing interest in this area. Of note is the recent publication of a report that draws on the literature on assessment of clinical competence in medicine,[6] and several other commentaries on this topic.[3, 6, 7] The aim of the present study was to investigate the methods of assessment used

by osteopathic teaching institutions through different stages of the program. The present study also investigated the issues surrounding these assessments and the ways in which these issues were managed. This project formed part of a larger study designed to inform the development of a model to assess overseas-trained osteopaths who wish to practise in Australia.

METHOD

Study design

Semi-structured interviews and focus groups were employed to explore the assessment of clinical competence within osteopathy programs. An interview schedule and focus group schedule were developed (Table 2) based on the findings of a systematic search and critical review of the literature pertaining to assessment of health professionals,[8] as well as preliminary documentary information collected from the institutions via their websites.

INSERT Table 2 here

A semi-structured format was chosen so that information could be gathered on specific areas of interest (e.g. structure of assessment framework) while still providing participants with the opportunity to describe their unique experiences, relevant to regional variances, associated with assessment.

The study was approved by the Victoria University Faculty of Health, Engineering and Science Human Research Ethics Committee and all participants provided informed consent.

Participants

Fifteen (N=15) osteopathic educational institutions from Australia, Italy, Canada, New Zealand and the United Kingdom were invited to participate in focus groups or interviews. Potential

participants were initially e-mailed inviting them to participate, and follow-up phone calls were also undertaken where required. Potential participating institutions were provided with information about the study and its design.

The focus groups and interviews were lead by a researcher (VS) experienced in conducting interviews and focus groups for research. Focus groups were typically undertaken at individual institutions where multiple representatives were available. The interview schedule was used as the basis for questioning, however the researcher also followed leads and cues from the responses provided by the participants. The interviews and focus groups were typically between one to two hours duration.

Data collection

All interviews and focus groups were audio-recorded using a digital voice recorder with audio files saved to a laptop at the conclusion of the interview/focus group then transcribed verbatim. Notes were taken during interviews and focus groups to include any relevant non-verbal cues and to assist with data transcription (e.g. when the quality of the recording was compromised by background noise). Participants were sent a copy of their transcribed interviews and were asked to make any necessary changes (e.g. if the researcher had misheard any part of the discussion) and/or add any additional comments.

Data analysis

Transcribed data were analysed using NVivo (QSR International, Victoria, Australia). Content analysis was used to select and focus data from transcriptions and notes[9, 10] with the researchers paying particular attention to patterns, regularities, irregularities and propositions within the data.[9, 11, 12] Transcribed interviews were analysed independently by two researchers to identify potential themes. Themes were then generated by consensus of the researchers, through common responses to the semi-structured questions and issues raised by the participants.

RESULTS

Eleven (N=11) osteopathic educational institutions agreed to participate in the study. One (n=1) Australian, one (n=1) Italian, two (n=2) Canadian and seven (n=7) United Kingdom institutions participated. At each institution, between one and five senior representatives of the osteopathy academic staff were involved in the data collection phase of the study (Table 3). Representatives of the institutions were institution principals, course coordinators, senior lecturers and those involved in the educational administration of the program.

INSERT Table 3 here

Analysis of the interviews and focus groups conducted with educational institutions generated four interconnected categories. Each theme also generated several lower-order themes.

Assessing (Theme 1)

Educational institutions used a variety of assessment methods to assess graduating students for their preparedness to practise independently and to "*cope in terms of competency, effectiveness and safety.*" Three second-order themes were generated: *Types of assessment* (Theme 1.1), *Risk assessment* (Theme 1.2) and *Other assessment areas* (Theme 1.3) (Figure 2).

INSERT Figure 2 here

Types of assessment (Theme 1.1)

As students progressed through a program, assessment became more applied, developing from written tests in the basic sciences in early years to case presentations in later years. *Assessing knowledge (Theme 1.1.1)* was undertaken using a number of methods including the viva voce, short-answer question, essay, multiple-choice questions (MCQs), progressive case and a research project. *Short-answer* questions (Theme 1.1.1.2) in a written paper were likely to focus on clinical scenarios and were often used in conjunction with other types of questions, such as long-answer/essay questions. Several participants felt that the MCQ (Theme 1.1.1.4) was a tool to examine more basic information rather than clinically-oriented areas where open-ended questions were more appropriate. *Progressive case* (Theme 1.1.1.5) or modified essay questions were used by several institutions where students responded to questions based on clinical information presented to them and then, after answering, being presented with further information and questions on the same case.

Assessment of clinical competence (Theme 1.1.2) was undertaken using one or more of the Objective Structured Clinical Examination (OSCE), short-case and long-case as part of standard student clinical assessments. The *Objective Structured Clinical Examination* (OSCE) (Theme 1.1.2.1) was used in different formats at different institutions. In some institutions, OSCEs did not involve patients but stations of 3 to 15 minutes that used questions based on props such as photographs or x-rays. Another institution described their OSPE (Objective Structured Practical Examination) as focusing on techniques related to individual body systems. It was pointed out "*they're not really having to integrate all their osteopathy and differential diagnosis at that stage*

though they would be expected to later on". Several institutions used linked OSCE stations where a student's performance on a previous station would influence their performance on the next.

Although used by some institutions as a final year assessment, the OSCE/OSPE was not a major feature in most institutions. Some participants favoured its use because of its reported reliability[13] and its ability to assess a range of areas but others were of the opinion that it was not a practical or valid form of assessment:

> *…to bring in an actor who would do the poses and give the same scenario, it's just not practical and as [name excluded] said earlier, with the way the system … approaches this at the moment, it mimics outside practice, you could practically get anyone walking in with any condition rather than having the one which we would use for all students.*

One participant who had an opportunity to observe and review an OSCE/OSPE explained that it may have its place in assessing areas such as communication and history taking, but limitations would arise in physical examinations as the patient "*does not have the symptoms, the signs to explore*". Another participant pointed out that by breaking up areas of the clinical experience, students were limited in further information that can be gathered from the patient[14] and this could affect safety.

Another issue associated with the OSCE was the cost, especially if trained standardised patients were involved. Institutions that used standardised patients generally recruited students from other year levels to keep costs down. Even so, the OSCE was time-consuming to develop and also required considerable assessor time.

The short case involves the candidate or student being observed demonstrating a particular skill or presenting information related to a real-world clinical case; the duration is approximately 10 minutes.[15] *Short cases* (Theme 1.1.2.2) were used by one institution in conjunction with a long-case, where graduating students were assessed using a short case based on a hypothetical patient. Students completed a written pro-forma addressing differential diagnosis, red and amber flags and/or concerns about a patient from a case script, demonstrate appropriate examination and treatment techniques, then present their management plan for the patient. The institution believed this was the most effective way of assessing students near graduation for a number of reasons:

> *…emphasis on psychosocial considerations and how students should alter their communication towards the patient during this short case assessment… The entire assessment is sequential in its design in that it gives us the opportunity to determine how students use information to gain further insight into the patient and how they make sense of information… We assess about 8 students per case so it gives us the ability to compare students accurately.*

Another identified benefit was the cost-efficiency of this style of assessment:

> *...it is really cost-effective as the whole process only uses four examiners in the two stations [standardised patient and oral], the other two stations just need a timekeeper.*

The long-case requires the candidate to undertake a clinical consultation as they would in practice, including the clinical history and examination; the duration is between 30-60 minutes

with a 20-30 minute interview with the candidate afterwards to assess differential diagnoses and treatment planning.[16, 17] *Long-cases* (Theme 1.1.2.3) were used by all participating institutions to assess their graduating students. Patients for these exams were those who presented to the teaching clinic associated with the institution, and were generally not screened but they were assigned so that each student saw patients with different conditions and, in some cases, were evaluated on the responses to situations that impacted on patient safety. Participants did recognise that with limited screening of patients there could be substantial variation between students in the complexity of the patient presentations. Another issue with using real patients was having enough patients for the students to see. Although institutions booked patients in for the assessment, some simply did not show up. To address this, schools would over-book patients and any patients not used in the examination were seen by clinic staff instead.

Students were not constantly observed but were for at least part of each of the three sections of the examination (case history, examination and treatment). Although there was generally no defined limit as to what students could be asked, it was reported that examiners concentrated on areas such as "*clinical awareness, differential diagnosis*". Participants generally saw the long case as a useful form of assessment for graduating students. The main perceived benefit of this form of assessment was its face validity:

> *…the whole point of this assessment is that we're trying to mimic what would happen in private practice. I mean, sure the student's competent when they get into practice, and the one thing you don't know about practice is who's coming through the door. You have no control over that, so we try to mimic that as much as possible.*

Workplace performance (Theme 1.1.3) was assessed through the use of portfolios and the assessment of habitual performance in the teaching clinics. *Portfolios* (Theme 1.1.3.1) were

used by some institutions to encourage students to reflect on patients they had seen during their clinical placements. In some cases the portfolio was started in first year and students were encouraged to record "*critical incidents, good ones as well as negative ones, where things have gone wrong.*" In these cases, assessment of the cumulative portfolio occurred throughout the course. Some participants felt that although the portfolio had limitations with regard to assessing clinical performance, it did offer the opportunity to assess areas such as ethical and personality issues. *Habitual performance* (Theme 1.1.3.2) was assessed in clinics. Students began in the clinic observing higher-level students treating patients prior to treating patients themselves. In some programs, students were required to acquire a "tag" from clinic tutors before being allowed to treat patients rather than this privilege being automatically granted when they reached a certain level of the program. As students progressed through their program the hours of clinic time also increased. Students were observed, monitored and assessed in their clinical hours and were required to discuss patients with experienced clinic staff.

Risk management (Theme 1.2)

Risk management and safety was a primary issue in assessment and in student clinics. Students were monitored to protect patient safety as well as being assessed on their ability to practise safely. During *Assessment development* (Theme 1.2.1.1) risks were best managed by developing assessment tools of acceptable validity and reliability so that they effectively assessed the important areas of osteopathy and identified those who should fail and those who should pass. Part of this included avoiding tools that advantaged or disadvantaged sub-groups of students. *During assessment* (Theme 1.2.1.2), participants identified that there were risks associated with a lack of marker consistency, with impairment due to performance stress, with

failure to identify unsafe practice and with using real patients. *During the course* (Theme 1.2.1.3), the risks identified were student personality issues affecting interaction with patients and other professionals, unprepared students undertaking assessments/progressing through the course, and those associated with students treating real patients in clinic.

Institutions had developed a variety of processes (*Processes in place (*Theme 1.2.2)) in an attempt to minimise the risk of harm to the patient during the course and during clinical examinations. At the stage of *Assessment development* (Theme 1.2.1.1), risk was mitigated by developing strategies for assessing safety, using standardised patients or inanimate props in earlier years of the course and using OSCEs with standardised patients before using real patients for assessment. *During assessment* (Theme 1.2.1.2), risk mitigation strategies included using multiple examiners to reduce examiner bias, using multiple patients in examinations to minimise the effect of case variation, observing interaction with patients in clinical examinations to assess clinical skills and reduce patient-candidate collusion, applying an immediate fail for red flag incidents to remove the possibility of a compensatory pass, and tutors intervening when patient safety was compromised.

During the course (Theme 1.2.1.3), risk mitigation strategies included: encouraging recognition of student boundaries and limitations to minimise harm to patients; recognising examination readiness and advising students who were not adequately prepared; extending clinical hours to increase supervised clinical experience; close supervision in student clinics; presenting hypothetical questions/situations to students as part of the course to assess their capability; and advising students on further study/alternative pathways if they were unlikely/unable to pass the final assessment.

Other assessment areas (Theme 1.3)

Many participants reported that *Cultural competency* (Theme 1.3.1) was assessed through the clinical hours students completed as part of their course as they encountered a variety of patients from different cultures, ages and socioeconomic backgrounds. There was no formal assessment of this area in most courses. One institution noted that it was important that students be able to "*relate to people*", so assessed the ability of prospective students to work with people of different abilities prior to entering the course as part of an entrance interview.

Communication (Theme 1.3.2) was identified as an important part of assessment as it was seen as intrinsic to competence:

> *...communication's a big issue here. Because if the student doesn't appropriately communicate, they can miss something which is blindingly obvious as opposed to somebody who does communicate well and picks up the intonation or the body language the patient is displaying.*

The assessment of communication was included as an identified competency in assessment types such as the long-case and OSCE-type assessments. In these approaches, students were required to complete tasks such as building rapport, gathering a patient history, explaining techniques and gaining informed consent.

The ability to *Communicate with other professionals* (Theme 1.3.5) was not formally assessed by institutions as part of their final assessment (e.g. long case). Some institutions included it as a criterion in their continuous clinical assessment:

> *... one of the criteria of professionalism, not so much in the long-case because there may be no need to make contact with other professions, but certainly within the continuous assessment, one of the criteria that*

describes the ability to communicate practically with colleagues and other health care practitioners is assessed. We don't specifically expect all students to have written a letter to a GP or contacted a GP but it's an element that is considered as part of the professionalism standard.

One institution approached this area of assessment by requiring students to make a presentation to a defined audience. Even though communicating with other professionals may not have been included as part of assessment by many institutions, it was highlighted as a necessary skill, and during their courses students were taught skills such as writing letters to medical doctors.[18] One institution indicated that the ability to communicate with other professionals was something they would like to assess in the future.

Participating institutions utilised a variety of assessment methods as part of their osteopathic programs. The OSCE and long case assessment were widely used, due to the ability to assess a variety of clinical skills and high face validity respectively. A number of institutions reported reservations about the use of an OSCE as it sacrificed validity for reliability and it was perceived as an impractical way of assessing their students. Assessment using a portfolio approach is also being incorporated into the assessment process at some institutions however it is not widely used due to the perceived inability to assess clinical competency.

Processes (Theme 2)

The assessment processes undertaken by institutions are governed by university and registration and/or accreditation body requirements. When considering the first-order theme of Processes four second-order themes were generated, namely *Assessment procedures* (Theme 2.1), *Appeals* (Theme 2.2), *Review processes* (Theme 2.3) and *Reflection* (Theme 2.4) (Figure 3).

INSERT Figure 3 here

Special consideration (Theme 2.1.1) was afforded to students with special needs, including those with learning difficulties (e.g. extra time). One institution reported that the definition of some professional competencies could be exclusionary:

> *We're bound by this [registration body] thing that says that these are the [number stated] competencies you must have and one of them is actually read an x-ray or detect a skin disease and if you're blind you couldn't do it so this one college was arguing well you can't accept anyone who's blind but before we passed two blind practitioners.*

In the *Pre-assessment* (Theme 2.1.3.1) phase, students/candidates normally received information (Theme 2.1.2) on their assessment tasks prior to undertaking them. Institutions reported providing written and oral information on assessment tasks and in some cases, for written examinations, examples of previous examination papers. In many instances, with the clinical long-case examination students undertook a similar examination either as a 'mock' assessment or as part of their in-course examinations prior to undertaking registration body examinations. There was a strong feeling that students should be well-informed about an examination as lack of knowledge about its format may cause them to fail because of performance anxiety rather than because of a lack of clinical competence.

> *But I think the biggest thing, that's the main thing, is prepare the students properly so they're not taken by surprise. They know what to expect and they can respond effectively and they're not confused by it.*

In the *Post-assessment* (Theme 2.1.2.2) phase, feedback to students was emphasised. One institution required students to sign a copy of the tutor comments they received concerning their continuous clinical practice. This was aimed at encouraging discussion with tutors about their

performance. During final clinical assessments some schools chose to have an internal clinical observer. The role of the observer was to advocate on the student's behalf, if necessary, during post-assessment discussions with other examiners and to give feedback to students who had failed the examination.

Appeals (Theme 2.2)

All institutions gave students the right to appeal assessment decisions and provided the *Basis/reasons* (Theme 2.2.1) for the decision. Most institutions allowed students to appeal on the grounds of inadequate examination processes and exceptional circumstances. Some institutions only allowed students to appeal for process reasons.

Institutions also highlighted the *Process* (Theme 2.2.2) by which appeals were dealt with. With written examinations students were able to request reassessment of their examination scripts. One institution allowed students to go over their scripts while supervised and pencil in any queries. The Principal of the institution then reviewed this with assistance from the marking tutor if clarification was needed. It was pointed out that:

> *… quite often, if you want to know for your records, quite often the problem is, it's like they've added up the marks and it's short, not necessarily a challenge. The second most common thing would be a challenge with the way that they worded an answer rather than what the teacher was looking for wording, that's mostly it.*

With clinical assessment, marks were not amended but students were afforded an opportunity to re-sit the examination. In an effort to minimise appeals one institution offered students a second attempt with a long-case immediately, with multiple examiners available to assess the student. In cases where examiner availability made this difficult, they had introduced videotaping clinical

examinations to act as a 'juror.' The benefit of having multiple markers to minimise appeals was also identified by other participants, "*but not forgetting that our process here does have 10 examiners feeding into that one decision … so it's such a fair process*." Most institutions did not offer an immediate re-assessment but instead offered students the opportunity to re-sit several months later after they had had an opportunity to engage in more supervised clinical practice and learning.

Review processes (Theme 2.3)

Most institutions reviewed their clinical and written examination processes by having multiple internal assessors and gaining feedback from external assessors or moderators. External assessors often took part in clinical assessments and were asked to review written examination scripts and written coursework samples of each mark. Several institutions also indicated that they sought student feedback on the assessment process as "*student feedback is important, absolutely important*."

Reflection (Theme 2.4)

Educational institutions were asked to identify the *Strengths* (Theme 2.4.1) (Table 4) and *Weaknesses* (Theme 2.4.2) (Table 5) of their processes. Institutions typically stated the strengths of their processes to be the use of multiple examiners, multiple forms of assessment and feedback and support for those students who failed an assessment or were deemed to be borderline for that assessment.

INSERT Table 4 here

INSERT Table 5 here

Institutions routinely provided information to their students, both pre-assessment and as feedback on performance post-assessment. Assessment development, particularly in the final stages of a program, was set by the registration bodies however there is a substantial degree of flexibility in the assessment process that can be used throughout an osteopathic program. Once developed, these assessments were reviewed on a regular basis by internal and external examiners or moderators.

Examining (Theme 3)

When considering the second order themes generated under Examining there was some general consensus of opinion on issues with regard to *Marking* (Theme 3.1) and *Assessors* (Theme 3.1.1) (Figure 4).

INSERT Figure 4 here

Marking (Theme 3.1)

Setting standards (Theme 3.1.1) and deciding on the pass mark was a challenging issue for many participants. Institutions were generally required to meet standards set by their accrediting

body, registering body and/or university and one institution pointed out that they were also waiting on possible guidance from the World Health Organisation.

Some institutions reported that they developed assessment rubrics that explicitly defined criteria and standards for each grade. It was recognised by several participants that in clinical assessment it was difficult to develop specific criteria and standards for marking. One participant pointed out that the key criterion was: 'Are you ready for autonomous practice?' and argued that it was not possible to develop objective standards for this criterion.

Several institutions explained that there was a reliance on the examiner's subjective opinion. One participant pointed out that, although there was always an element of professional judgement on the examiners part, it was important to "*make it much more explicit so that it's just not just: in my opinion...*"

When addressing *How* (Theme 3.1.2) students were assessed, most institutions indicated that there were criteria that students were required to meet during their assessment but a checklist style of marking was not used.

> *What it is, we have to look at safety, we have to look at competent academic knowledge, we have to look at physiological knowledge, we have to look at awareness of implications of changes in physiology with the system, if dangerous, if they're not dangerous, what implications does that mean maybe for the future, should I refer, should I not refer … All these sorts of things are part of what the individuals do, but I wouldn't necessarily mean tick individual boxes, though we have quite a large scheme, proforma scheme, that the assessors write on, which is a guide to them and it makes it shorthand for them too. But it's not a check box.*

There was a general feeling that "*ticking boxes doesn't work for osteopathy*" and that criteria were more like headings for examiners to make comments under. One institution used a form of

assessment in clinical hours that rated students in terms of their need for constant, intermittent or minimal supervision.

All institutions used multiple examiners for clinical examinations and several required more than one marker for written examinations. All institutions also had external examiners (i.e. examiners who are not involved in the day to day teaching of a program) whose role was to review assessments and give feedback to the institution.

All institutions incorporated the requirement that breaches in clinical safety (e.g. failed to recognise a 'red flag' indicating endangered patient safety) could mean an instant fail for students, even if they did extremely well in other areas of the examination. In teaching clinics students were stopped immediately.

> *'Sometimes you can get into a situation where a student might meet the anticipated learning outcomes but they've done something that is dangerous … an alarm bell comes up that they shouldn't have done it … so the G grade is that sort of red flag grade.'*

Assessors (Theme 3.2)

Experience in practice and teaching were identified as important requirements in the *Selection* (Theme 3.2.1) process for internal and external assessors because professional judgement was required to make decisions in clinical examinations. Institutions differed in their educational requirements for external examiners and teachers. Some made a concerted effort to recruit graduates of other courses as this offered different perspectives in the practice of osteopathy. One institution reported that recruiting graduates other than their own meant that examiners were more likely to seek help rather than assuming that things were the same as when they were

students. On the other hand, another school felt that by offering opportunities to their previous graduates they were gaining examiners and teachers with the highest level of education. Another pointed out that by having their own graduates assessing there was an increased probability that the assessors had a similar approach to assessment as the institution.

There was an understanding by most institutions that "*you might be brilliant at your profession but no good as an educator*." One participant noted that "*it's so crucial that the right people end up in the right role*", noting that assessment requires professional judgement and observing that "*if you have a rigid assessor … it's really easy to pass or fail someone on a performance exam - really easy - you could pick, pick, pick*."

Institutions reported making considerable effort with *Training* (Theme 3.2.2) their examiners to help them understand the examination process and marking criteria prior to assessing students. It was preferred that prospective examiners have experience in both practice and education and have observed the examination process for at least one year. One institution required examiners to have completed a certain number of years of practice and teaching in addition to a minimum of two years observing examinations. Another had developed a comprehensive assessment handbook and asked examiners to meet prior to examinations to draw their attention to important issues whilst other institutions asked examiners to meet prior to the examination to review the marking criteria. One participant noted that inexperienced examiners could learn from observing or participating in moderation sessions.

The *Number* (Theme 3.2.3) of assessors varied between institutions however the use of up to three assessors, including an external assessor, was common in clinical examinations. Some

institutions had a moderator who oversaw the process and attempted to deal with any assessor concerns and/or collect evidence of any disparities in marking. Often the moderator was mobile, moving between assessment sites to ensure a consistent level of assessment. Where multiple examiners were used in an exam process, examiners discussed and decided collaboratively on the student mark as a pair/group. This was felt to be fairer to the student:

> *… the fact that we have 10 people making that decision not one, in the past it could be one person saw the student and they do one wrong thing and say that's it, it's all over for that student. Whereas if you have ten people feeding in, or even if there's two or three people feeding into a decision [it] becomes much more fair.*

Second marking was also commonly utilised in written assessment. External examiners were also often brought in as part of quality assurance processes and to provide feedback to the institution about their processes.

Setting a pass mark for an assessment was often reported as a challenge, particularly as professional judgement is still a part of the assessment process and therefore part of pass mark setting. To improve this process, a number of institutions used assessment rubrics to assist their examiners with defined standards. As part of the risk management strategies in the assessment, all institutions incorporated 'red flag' criteria where safety issues, if not identified by a student led to an automatic fail for that assessment.

<u>Cost efficiency (Theme 4)</u>

The cost of examinations was rarely raised as an issue when considering the efficacy of examinations. There seemed to be a belief that 'logistics, cost, is a price we have to pay'. Figure 5 presents the sub-themes generated under *Cost efficiency*.

INSERT Figure 5 here

Financial (Theme 4.1)

The cost of examiners seemed to be the main concern when considering the issue of finances particularly if part-time staff were required to work more hours during examination periods. This appeared to have an impact on the particular types of assessment used. One institution indicated that one of the benefits of the short case was that it only required two examiners and the same written case could be used for eight students. This actually assisted with marking consistency. Institutions noted that for the long case, in addition to multiple examiners, there was also the need to pay for advertising for real patients. Some institutions offered free treatment sessions to encourage patient participation to overcome this cost related issue.

Other resources (Theme 4.2)

One of the challenges in clinical assessment was gaining real patients for the long case.[19, 20] This was a time-consuming exercise that required over-booking patients due to the high likelihood that not all those that who consented to participate would attend. If there were too many patients the excess were treated in the clinic. Another issue raised by several participants was the time taken for moderation meetings with multiple examiners.

The costs and availability of resources for examinations, particularly in the later stages of a program, were identified by participants as issues that need to be addressed in the design, implementation and conduct of examinations. In some cases, these issues dictated the type of assessment method used, even though it may sacrifice elements of validity and reliability.

DISCUSSION

The current study explored how osteopathic institutions assessed their students. Using verbatim transcripts of interviews with pre-registration osteopathic teaching institutions, content analysis identified four interconnected themes: *Assessing*, *Processes*, *Examining* and *Cost-efficiency*, each with several lower order themes. The discussion of these themes will take place within the context of the *Assessment 2020*[2] propositions articulated previously (Table 1).

"…assessment is used to engage students in learning that is productive."[2]

The majority of the assessments undertaken by the institutions are point-in-time assessments (e.g. written papers, MCQs, long case, OSCE) rather than assessments over time. Assessments over time engage students in the learning process and are significant learning activities in themselves.[2] Given that point-in time assessments occur throughout osteopathic programs, there is the potential for these assessments to 'hamper' learning. Students may only be studying to pass the assessment, or the examination is an 'assessment of learning' rather than an 'assessment for learning'.

In relation to the assessment of clinical competence, both the OSCE and long-case examinations were utilised by the institutions. While the long-case dominates clinical assessments in osteopathy, the OSCE is being used because of its reported reliability[13] as well as the ability to assess a wide range of skills and knowledge using this format.[15, 16] A number of participants in the present study suggested that the OSCE is not a valid form of assessment within osteopathy, given that it breaks up the clinical consultation into components, therefore reducing the validity of

the assessment[21, 22] and authenticity of the process.[14] It could be argued the OSCE format, particularly when properly implemented and as part of a final competency exam is an 'assessment for learning', as students are studying for an examination that potentially examines a range of areas relevant to their practice as a healthcare professional.

Of note is the fact that while the OSCE is used by the institutions for its reported reliability, there is no research within osteopathic education to support this position. It is also important to interpret the reliability results of studies from other professions with caution, as it is difficult to compare OSCEs given that the number of stations, examiner numbers, station duration, content etc. differ from institution to institution[23]. This necessarily limits the generalisability of results.

The cost of developing and conducting an OSCE was also seen to be an issue, in particular the number of assessors required for such an examination, the length of time assessing and the subsequent financial outlay for assessor remuneration. Standardised patients, often students from other year levels in the program, were used to reduce costs. Again, while cost was noted as an issue, there is no published information within osteopathic education about the cost of conducting such an examination.

The long-case is regarded as the 'traditional' form of clinical assessment in osteopathy, particularly given that it replicates osteopathic clinical practice, has high face validity and, to an extent, authenticity. The concept of high face validity with this type of assessment is widely supported in the literature,[24-28] however both content validity[7] and reliability are questioned by some authors. This is particularly in relation to the heterogeneity of cases,[14, 21, 27] limited sampling of patients,[21] and lack of standardisation.[29] Institutions did not generally perceive these reliability

issues as problematic, as multiple cases were used, and in some instances, examiners were asked to account for case complexity in their marking of the consultation.[30] Again, there is no research within osteopathic education to support these assertions and is an area that requires investigation.

Where ongoing assessment is used, it is typically used in the assessment of clinical competence in student clinics, sometimes documented through ongoing review by clinical tutors or through the use of portfolios. Portfolios have been suggested as a potential method to assess some of the more challenging areas such as ethical and personality issues,[31] and to also assess personal and professional development.[32, 33] While some participants did recognise the benefits of using portfolio assessment, they were not widely used. It appears that the use of portfolios would be appropriate for the process of engaging students in their learning through reflection and developing an understanding of all facets of osteopathic practice, particularly where the assessment is linked to other assessments and capabilities.[34]

"…feedback is used to actively improve student learning."[2]

Feedback to students was widely utilised by the institutions both post-assessment and on an ongoing basis in the student teaching clinic setting. Post-assessment feedback can be used by the student to improve their work, particularly if the feedback is structured in such a way that it highlights what the student has done well, and the areas in which they need to improve. Continuous feedback was used in the student teaching clinic setting to improve practice. The results of the present study suggest that the institutions are providing feedback to their students, and also receiving feedback on their assessments, on a regular basis. Further investigation of

this area could include how students incorporate feedback they receive into their practice, as well as encouraging students, not just the institution, to provide feedback to their peers. These elements can assist the student to develop their own reflection and critical appraisal skills.

Another aspect of the feedback cycle, highlighted in the present study but not articulated in the *Assessment 2020* propositions,[2] is the use of feedback by the institutions. External examiners were typically used to provide feedback on an assessment, thereby assisting the institution in continuing to improve and review the quality of the assessment. In addition, students were also encouraged by the institutions to provide feedback on the assessment processes.

"…students and teachers become responsible partners in learning and assessment."[2]

Student participation in the assessment processes outlined in the present study appeared to be limited to being assessed and providing feedback about the process. Institutions are encouraged to develop student participation in the assessment process further by encouraging them to assess their own performance and identify areas for further learning. Students appeared to be well informed about the assessment tasks to be undertaken as they were provided with written information and sample examinations prior to an assessment. While details of how the assessment task is to be undertaken are important, there is also the need for students to be made aware of the standards by which the assessment is to be marked. This allows the student to potentially make judgements, and reflect, on their own work as well as comparing their work to their peers.

A number of institutions reported the development of assessment rubrics for clinical competency examinations, however setting pass marks and specific criteria were reported to be difficult. This issue experienced by many health professions,[35] is compounded by the reliance on the opinion of the examiner(s) in clinical competency examinations.[35]

"…students are inducted into the assessment practices and cultures of higher education."[2]

Assessment was undertaken in all years of the programs conducted by the institutions interviewed. These assessments typically progressed from written papers (e.g. essays, MCQ's) in the early years, to clinical competency assessments (e.g. long case, OSCE) in the later years. Boud and Associates[2] suggest that assessments in the early years of a program should be manageable in order for the student to build confidence with assessment, as well as allowing for the early examination of student progress and identifying those students in need of further assistance. The use of 'simpler' or more readily recognised forms of assessment by the institutions may assist in developing this confidence. As the clinical competency assessments are assessing performance they may generate a degree of anxiety which could affect the outcome of the assessment. As osteopathic teaching institutions also typically assess osteopathic and clinical skills in the early years of a program, further support to students may be required to help them develop confidence with this type of assessment.

"…assessment for learning is placed at the centre of subject and program design."[2]

Assessment tasks were typically determined by what was to be assessed, reflected the content of the curriculum and developed by the module/subject lecturer in line with institution processes and

procedures. A range of assessment tasks were undertaken and feedback provided to students, either post-assessment or an ongoing basis depending upon the type of assessment, which Boud and Associates[2] suggest should take place in the early years of a program. The assessment tasks then develop into integrated assessments, such as the long case and OSCE, where a range of skills, knowledge and attributes are on display by the student. These authors also suggest that assessments should be organised across subjects and programs, something that the institutions in the current paper may be knowingly or unknowingly doing at present. While assessments such as the long case and OSCE are embedded in a particular subject, they are assessing content from a variety of subjects that have been undertaken, or are being undertaken, by the student. It would appear that there are opportunities to further integrate the assessment of students across the program and across subjects, particularly in the early years.

"…assessment for learning is a focus for staff and institutional development."[2]

While the present study did not specifically address the area of assessment design, there was consideration of the role of examiner training in the conduct of the clinical competency assessments. Participants were of the opinion that teaching and clinical practice experience was required to be an examiner, as professional judgement was required in clinical competency examinations.[35] However, the institutions were also mindful of the fact that just because a practitioner was qualified and experienced, this did not automatically make them an appropriate examiner.[36]

Previous research suggests that inadequately prepared examiners impact on the reliability of an assessment,[24] and that examiner training improves both the reliability and validity of an

examination.[27, 36] Examiner training was mostly addressed using an apprenticeship approach, whereby new examiners would observe the process initially, then undertake assessments after a period of time. Some institutions also reported that they were in the process of formalising their examiner training.

Assessment marking and judgements against standards external to the institution have been highlighted as an important aspect of assessment practice. Most of the institutions in the present study undergo accreditation and review of their programs on a regular basis by government or professional bodies, and in the case of institutions in the UK, final clinical examinations were governed by the registration body. This provides the profession and the public with a degree of confidence in the awarding of a degree and fitness-to-practise, as well as providing a degree of standardisation of assessment across different institutions.

"…assessment provides inclusive and trustworthy representation of student achievement."[2]

Boud and Associates[2] highlight the need to ensure that learning and knowledge is integrated at the end of a program, versus a student just demonstrating their achievements in separate elements of the program. This integration can be assessed through the use of "larger scale" assessment methods that require the student to demonstrate that they have synthesised information from a range of subjects and sources. Again, the use of the long case or OSCE as a "larger scale" assessment by the institutions may go part of the way to fulfilling this assessment of integration. In addition, Boud and Associates[2] propose the ideas of *veracity* (of the information from the institution itself) and *richness* (of the information about student accomplishment). Institutions are encouraged to establish learning outcomes for subjects and be able to

demonstrate that assessments, and subsequent grades, can be aligned with these learning outcomes and any professional standard by which they are accredited, thereby demonstrating the veracity of their judgements. There should also be a demonstration of student accomplishment, that is, what the student can and cannot do. Not only can this demonstration be undertaken by the institution, the student can also be involved through the compilation of, and reflection on, their own work. This allows them to recognise their strengths and identify those areas where they need to invest in their learning further. A portfolio may be an appropriate method to compile and present this accomplishment.

additional issues

Communication is reported to underlie competence.[37-39] Much of the assessment of communication in the present study was undertaken using the long-case and OSCE, although it did also take place during the students' clinical placements. Although the participants indicated that communication with other health professionals was an important skill to develop and assess, it was rarely assessed. This type of communication could potentially be assessed with a portfolio approach.

Under *Examining*, the point was frequently made that "ticking boxes doesn't work for osteopathy" and that professional judgement is required. This also ties in with the fact that participants also found setting a pass mark to be difficult and the setting of pass marks in performance assessments did not appear to be particularly well understood. This again however is not an issue isolated to osteopathic education.[40]

Moderation of examinations and assessment was raised by some participants, but mostly with a focus on negotiating marks after assessment and the role of external examiners. Where multiple examiners were utilised, the mark was negotiated post-assessment by consensus of the examining group. External examiners were primarily used as a quality assurance mechanism,[23] providing feedback to institutions, however a number of institutions also utilised these examiners in the clinical competency assessments prior to a student graduating from a program.

Cost-efficiency was a relatively minor theme in that participants recognised that assessment was costly but that it was "*a price we have to pay*". Much of the discussion on cost was related to the cost of examiners and resource availability (i.e. patients for clinical examinations) and was often taken into account when designing and conducting an assessment. The costs associated with the development and conduct of examinations has not been reported, however it is likely that the cost will be dependent on the institution (including availability of resources) and type of assessment method.

CONCLUSION

Osteopathic teaching institutions focussed on ongoing assessment over a period of years as the students developed their clinical competence, both in class and in clinics. The final examinations are but the culmination of this long process and the participants were therefore concerned about those who fall at this final hurdle. They were well aware of the need to reduce performance anxiety and of the steps that failed candidates could take to redeem themselves. Few revealed much knowledge of research findings in the area of student assessment in the health professions and tended to rely on traditional methods of assessment, such as written examinations, long cases and research theses. However, for some of the study participants, their experiential learning as practitioners of assessment led to recognition of the potential of other approaches, such as portfolio assessment, and recognition also that assessment of complex learning demands striking a balance between pre-defined criteria and professional judgement.

While most institutions relied on a small number of traditional approaches, the participants reported considerable effort in improving the validity and reliability of their assessments, particularly those used to assess clinical competency (e.g. long-case assessment, OSCE) but this has yet to flow through to the published literature. These efforts largely focused on changing the practice of examining rather than on introducing different types of assessment. This was addressed by increasing the number of examiners, using examiners who were external to the institution and/or strengthening examiner training. Interestingly, while these efforts to improve the assessment process inevitably increased the cost to institutions, very few participants perceived this increase in cost to be an issue.

When developing both pre-registration and fitness-to-practice assessment approaches to assess both specific competencies and broader capabilities, it is important to consider the themes that emerged from the current study. Most institutions use similar assessment methods at similar stages of the osteopathic program (i.e. written examinations in the early years, long-case assessment in the later years and prior to graduation) and this movement through different types of assessment typically follows that process described by London[1] being "...from knowledge acquisition to understanding and application." The themes identified in the present study provide an insight into osteopathic education at a pre-registration level, an area that is not particularly well documented in the literature.

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1. …assessment is used to engage students in learning that is productive.
2. …feedback is used to actively improve student learning.
3. …students and teachers become responsible partners in learning and assessment.
4. …students are inducted into the assessment practices and cultures of higher education.
5. …assessment for learning is placed at the centre of subject and program design.
6. …assessment for learning is a focus for staff and institutional development.
7. …assessment provides inclusive and trustworthy representation of student achievement.

Table 1. Assessment 2020 propositions.

Final Year Assessment Processes
1) How does your institution assess final year students who will be entering professional practice after graduation?
2) How do you assess osteopath-patient (practitioner-client) communication?
3) How do you set the standard (pass mark) for final year assessment?
4) How does your institution deal with candidates who fail part of final year assessment?
Examiners
5) How does your institution select and train examiners for final year assessment?
Risk Management
6) What risks are associated with the assessment of students who will be entering professional practice after graduation?
Review of Assessment Processes
7) How does your institution review the performance of your final year assessment processes?
8) What are the strengths of your institution's final year assessment processes?
9) What are the weaknesses of your institution 's final year assessment processes?

Table 2. Interview schedule.

Institution	Number of participants in interviews/focus groups
United Kingdom 1	4
United Kingdom 2	2
United Kingdom 3	4
United Kingdom 4	1
United Kingdom 5	4
United Kingdom 6	1
United Kingdom 7	1
Canada 1	3
Canada 2	1
Australia 1	2
Italy 1	2
Total participants	25

Table 3. Interview and focus group participants.

Assessing

- Support to borderline/fail students – offering failing/borderline students opportunities for further support such as summer school or one-on-one supervision
- Continuous assessment – length of the course enables tutors to assess students over time 'so it's not just a snapshot'
- Focus on social factors – course and assessment focuses on social issues in addition to 'health and illness'
- Diversity of patients – students see, and are assessed with, patients from a variety of backgrounds in the student clinics
- Assessment over time – conducting the three long-case examinations on three separate days so any negative experiences are less likely to affect their ongoing performance
- Mimics private practice – using real patients mimics the unpredictability of private practice; assessing students on one day mimics a day of seeing multiple patients in private practice
- Multiple forms of assessment – fair for students as some may be better at certain examination-types than others

Process

- Good records – ability to access comprehensive student records in the event of an appeal
- Review process – time spent on thorough and effective feedback from external examiners

Examining

- Fair examiners – fair examiners with the ability to be flexible if needed

§ Multiple examiners – multiple people assessing the one student supports fair decisions § External examiners – internal tutors can have expectations about student performance while the external examiner can assess students with no preconceptions about their performance

Table 4. Strengths of the current assessment processes used by the institutions.

Assessing

- One high-stakes examination – students having one ‘death or glory’ examination that may not actually reflect their abilities as shown by their performance in continuous assessment throughout their studies
- Long-case examination – while the long-case had good face validity, the content validity was poor; real patients are ‘not a level playing field’ for all students
- OSCE – expensive and time consuming to train simulated patients; when using a standardised patient students are limited in what they can examine and do
- Over-assessment – students were required to complete too many assessments and this also lead to a large workload for staff with marking
- Portfolio – although reflective writing is encouraged, students may leave themselves vulnerable to an unfavourable judgement if they write honestly about their experiences
- Performance anxiety – in high-stakes assessment students can develop performance anxiety which can affect the outcome of their assessment

Examining

- Expertise of examiners – difficult to find assessors who have expertise in osteopathy and education so they are able to assess at a level for newly qualified professionals
- Examiner bias – some examiners may have ‘views coloured by one particular area of the performance so everything is coloured by that same impression’
- Marking is time consuming –marking clinical examinations such as the long-case was time consuming

§ Staff qualifications – as osteopathy is a relatively young profession it can be difficult to gain appropriately qualified staff

Table 5. Weaknesses of the current assessment processes used by the institutions.

Assessing

- One high-stakes examination – students having one ‘death or glory’ examination that may not actually reflect their abilities as shown by their performance in continuous assessment throughout their studies
- Long-case examination – while the long-case had good face validity, the content validity was poor; real patients are ‘not a level playing field’ for all students
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Table 6. Weaknesses of the current assessment processes used by the institutions.

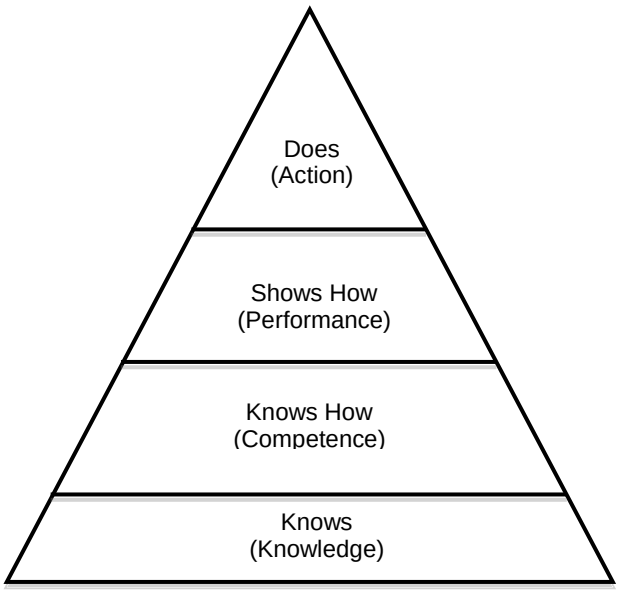

Figure 1. Miller's framework for clinical assessment.

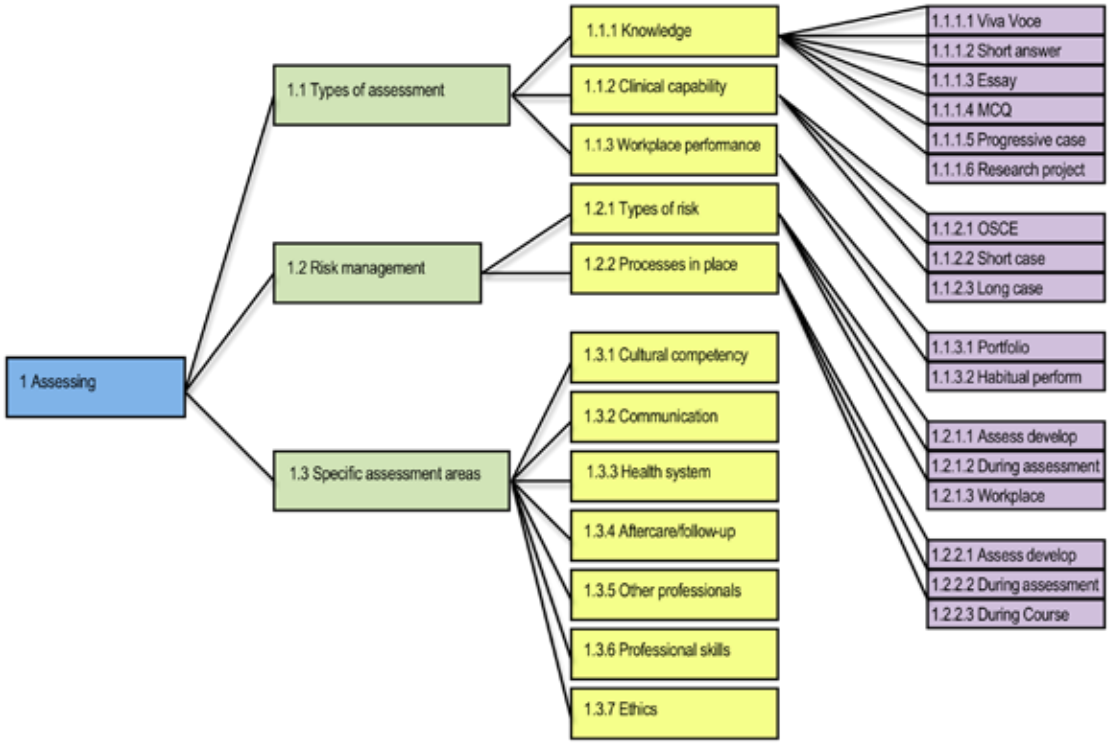

Figure 2. Sub-themes identified within the Assessing theme.

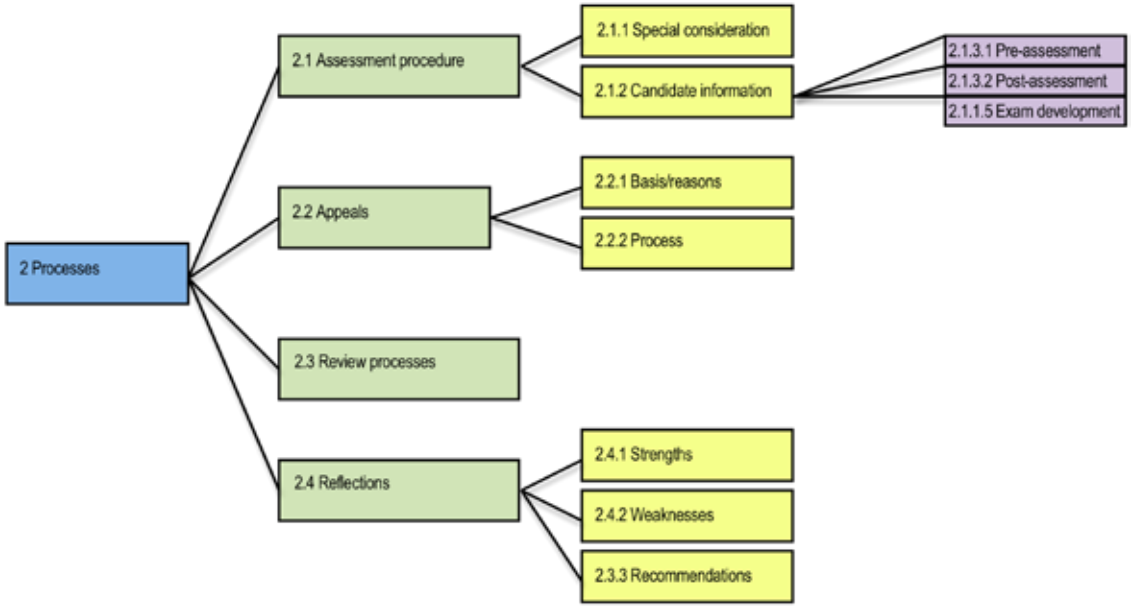

Figure 3. Sub-themes identified within the Processes theme.

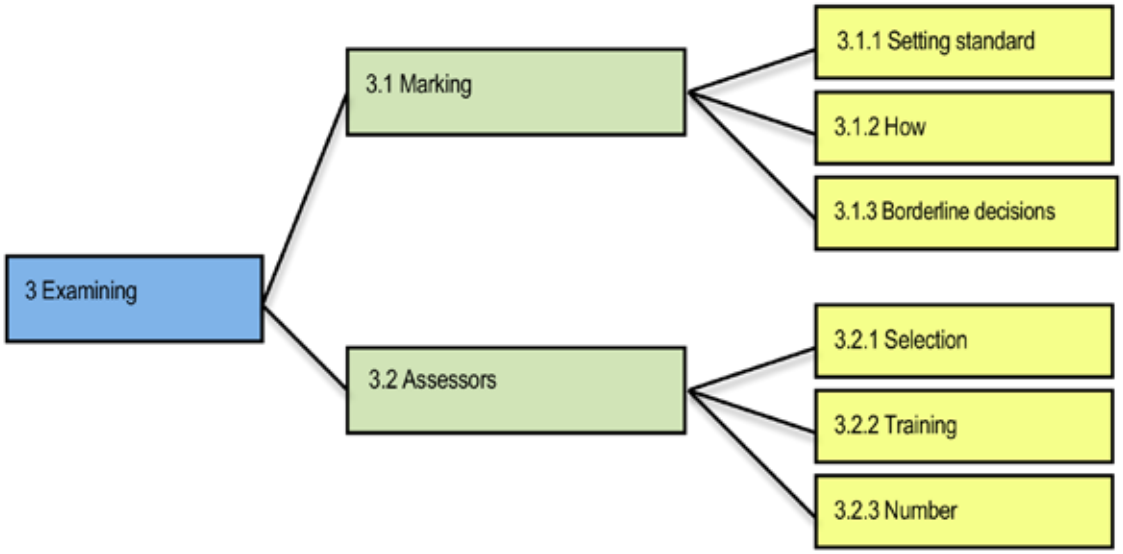

Figure 4. Sub-themes identified within the Examining theme.

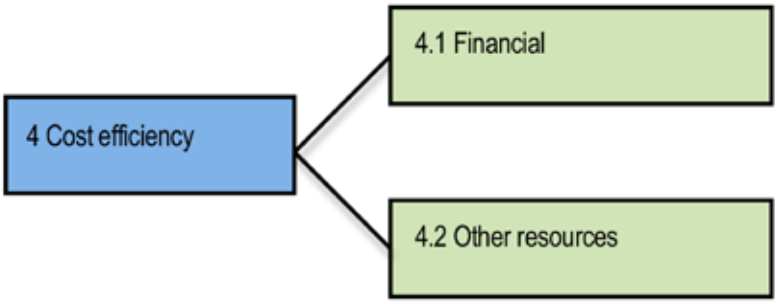

Figure 5. Sub-themes identified within the Cost efficiency theme.

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Authorship Statement

All authors were involved in the design of the study. VS and BV undertook the literature review. VS lead the focus groups and interviews. MW assisted with the focus groups and interviews. RG, CG, VS and BV analysed the data. GF and PMcL developed the discussion. All authors contributed to the compilation and review of the manuscript.

Statement of Competing Interests

Brett Vaughan is a member of the Editorial Board of the Int J Osteopath Med but was not involved in review or editorial decisions regarding this manuscript.

Gary Fryer is a member of the Editorial Board of the Int J Osteopath Med but was not involved in review or editorial decisions regarding this manuscript.