**‘Decision diaries’ – stimulating conversation about clinical reasoning during extramural studies**

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**Introduction**

Clinical reasoning is a decision making process which allows clinicians to determine where to look for information, pick out relevant findings and form a differential diagnosis (Vinten 2016). The aim of this study is to determine the impact of decision diaries on student insight into the clinical reasoning of clinicians during Clinical Extra Mural Studies (CEMS) in comparison to a standard case study template and an unstructured notes sheet.

Introduced by the RCVS in 1932, extramural studies (EMS) are a significant component of the undergraduate veterinary curriculum (May 2008). All British veterinary students are required to complete 12 weeks of animal husbandry based EMS (AHEMS) and 26 weeks of clinical practice based (CEMS) to achieve professional recognition in the UK (RCVS, 2009). In 2014, the RCVS published the results of their survey investigating EMS during undergraduate courses (RCVS 2014c). It was found that the greatest benefits of CEMS were the opportunity to experience medical/surgical procedures not typically seen at university; development of communication skills; and appreciation of the need for reflective clinical practice. However, clinical reasoning development, problem solving practice and case responsibility are not currently included within the RCVS EMS advisory documentation (RCVS 2009, p. 2), suggesting that they are not within the remit of CEMS. The British Veterinary Association (BVA) also provides CEMS guides for both students and practitioners – neither of which reference decision-making as a skill for development (BVA 2011, 2013). However, more importance is being placed upon clinical reflection and it is becoming an essential component of veterinary education, particularly in relation to professional development (Mossop 2012, Mossop and Cobb 2013): a ‘Professional Development Phase’ has been introduced by the RCVS – requiring all new graduate veterinary surgeons to reflect on their development during the first year of practice (RCVS 2012).

The literature suggests that EMS is a highly valued aspect of the veterinary curriculum, but one that needs some degree of standardisation and increased focus. Presently, vet students on placement have little to no guidance on how to develop clinical reasoning skills as there appears to be inconsistency and confusion in the resources available to students.

**Methods**

The study builds on the work of Vinten (2016), in which a ‘Decision Diary’ was piloted with veterinary students. The diary was developed with the intention of increasing student insight into decision-making occurring during EMS placements and consisted of a structured case study template focussing on the reasoning process. The project received ethical approval from the RVC Social Science Ethical Review Board.

An unstructured notes sheet, a case reporting template used by a prominent veterinary journal and the Decision Diary were prepared. Veterinary students at the Royal Veterinary College were recruited to take part in the study and convenience sampling was used to select a minimum of 20 participants. These students were all given a £10 amazon voucher for fully completing the study. The criteria for selection included: student must be within years three, four or five of the course and they must be planning to complete at least two weeks of CEMS at a first opinion veterinary practice. To avoid bias, it was important to ensure the placement did not involve working with veterinary surgeons with formal teaching experience or qualifications. Participants were instructed to make notes on six clinical cases that they encountered during their placement. For the first two cases, students were asked to take notes on the unstructured notes sheet. For cases three and four, students were asked to use a standard case study template to make notes. Finally, for cases five and six, participants were asked to use the Decision Diary to make notes. The forms only became available to the students in that order, once the previous form had been completed. The students filled out the forms in this order of least to most structured, to prevent content of the more structured resources from sub-consciously influencing the less structured sheets. The content of each form was analysed using selective deductive coding for evidence of observation and reflection (Table 1) (Vinten, 2016). The unit of analysis was set as one comment – not necessarily a whole sentence or question answer, as the students often did not write in sentences or made multiple points in one answer. The returned forms were categorised into: gender of author (male/ female), Year group (third/fourth/fifth), species (small animal/farm animal/equine) and case type (routine/emergency/medical/surgical). The forms were blinded from the participants and the data analyst to ensure no bias in totalling observation and reflection frequencies.

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| Code | Inclusion criteria | Exclusion criteria |
| Observation | Description of a clinical interpretation or decision made by a veterinary surgeon **and the reasoning behind it** | Description of a clinical interpretation or decision without accompanying reasoning |
| Reflection | Reflective comments on the method of clinical reasoning used by the veterinary surgeon and/or comparison between veterinary surgeons | Description of clinical reasoning without analysis of pros/cons or implications for own practice |

*Table 1 Criteria for categorisation of diary entry case type*

The observation code frequency and reflection code frequency were then statistically compared to each of the classification variables to identify differences - for example, significant difference in observations made between males and females. This was done using Mann-Whitney U test and Kruskall Wallis tests. Total observation and reflection in the forms were then compared to each other using Mann-Whitney t tests to detect an overall statistical difference for conclusion.

**Results**

Thirty-one students were recruited for the study. Nineteen students returned a fully completed set of forms. Of these, 15 were third-year students, 3 were fourth-year students and one was a fifth-year student.

The mean average of observations and reflective comments identified in each of the forms is summarised in table 2. The decision diary shows a marked increase in both observations and reflective comments made over the unstructured notes sheet and standard case template, indicating that the decision diary aided in the clinical reasoning process. The standard case template had a slightly higher frequency of observations made than the unstructured notes sheet, however it also had almost less than half the reflective comments than the unstructured notes sheet. The most reflections were made in the decision diary, then the unstructured notes sheet and the fewest in the standard case template.

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| --- | --- | --- |
|  | Mean observation frequency | Mean Reflection frequency |
| Decision Diary | 2.36 | 2.21 |
| Unstructured Notes sheet | 1.66 | 1.31 |
| Standard case template | 1.71 | 0.63 |

*Table 2 Mean average of observations and reflective comments identified in each form.*

The results from the statistical analysis of significance of these differences is shown in table 3. The Decision Diary was shown to produce significantly higher observation and reflection scores in comparison to the unstructured notes sheet, and the standard case study template.

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| --- | --- | --- |
| Comparison of forms | Observation score p values | Reflection score p values |
| Decision Diary and Unstructured notes | 0.0382\* | 0.0039\* |
| Decision Diary and Standard case study template | 0.0500\* | <0.0001\* |
| Unstructured notes and standard case study template | 0.9849 | 0.0040\* |

*Table 3 Comparing total number of observations and total number of reflective comments made between forms to determine any statistical difference between the forms. \* p value ≤0.05, conclude that a significant different does exist*

When comparing observations and reflections made between the different classifications (Table 4) e.g. difference in observations between males and females in each form, the majority of the p values are greater than 0.05 concluding no significant difference. The only p value less than 0.05 was in the comparison of observations made in males and females in form B, the unstructured notes sheet. It concluded that a significant difference did exist between males and females when using the unstructured notes sheet.

|  |  |  |  |
| --- | --- | --- | --- |
| Grouping variable | Form | Observation score p values | Reflection score p values |
| Gender (Male/Female) | Decision Diary | 0.334 | 0.373 |
| Unstructured notes | 0.020\* | 0.706 |
| Standard case study | 0.165 | 0.861 |
| Year Group (Third/Fourth/Fifth year) | Decision Diary | 0.620 | 0.268 |
| Unstructured notes | 0.076 | 0.682 |
| Standard case study | 0.246 | 0.811 |
| Species (Small animal/Farm animal/Equine) | Decision Diary | 0.608 | 0.609 |
| Unstructured notes | 0.178 | 0.879 |
| Standard case study | 0.380 | 0.478 |
| Case Type (Routine/ Emergency/ Medical/ Surgical) | Decision Diary | 0.936 | 0.496 |
| Unstructured notes | 0.184 | 0.520 |
| Standard case study | 0.922 | 0.847 |

*Table 4 statistical test results determining difference in number of observations between different variables (gender, year group, species and case type) in each form and statistical difference in number of reflective comments identified between different variables in each form. \*p value ≤0.05, conclude that a significant different does exist.*

**Discussion**

Comparison of the decision diary to existing formats of documenting during CEMS showed the students found the diary improved insight into the decision-making process and increased reflective comments, making it a more accessible skill.

The decision diaries had the highest frequency of observations and reflective comments and the results were statistically significant, supporting the claim that decision diaries increase student’s clinical reasoning insight during CEMS. Surprisingly, the unstructured notes sheet had a higher frequency of reflective comments than the standard case template. The standard case template used in the study was taken from a popular veterinary journal. The results from the study suggest that with more descriptive prompts as in the decision diary, clinical reasoning can be increased dramatically.

Distribution of both observation and reflection was found to be the same between third, fourth and fifth year students. This was surprising, as the majority of third year students had not completed CEMS placement previously, but all fourth and fifth year participants had. This difference in experience was expected to affect the usefulness of the decision diary, but it did not. The implication is that fourth and fifth year students do not learn to communicate about decision-making during their placements, and thus find the decision diary as helpful as those students starting CEMS for the first time. The lack of this skill, even those familiar with a CEMS environment, emphasises the need for a clinical reasoning resource. It also suggests that the diary could be utilised throughout CEMS rather than being targeted just at ‘first-timers’.

There was no significant difference in observations or reflections recorded between the species of animal recorded (small animal, farm animal and equine). The majority of the cases were however, small animal; this is unsurprising as for most students, small animal CEMS placements are the easiest to obtain. There was also no significant difference in the type of case recorded (routine, emergency, medical or surgical).

This study was limited by the small number of participants that volunteered to take part despite the incentives offered for participants – particularly lacking male participants. Selection bias might impact this study – as those that volunteered may have been more dedicated than others to improving their CEMS experience, however this was likely minimised by the offer of a cash voucher incentive. The participants also came from the same vet school, so using students from other schools would increase the generalisability of these findings.

To assist CEMS providers that wanted to enhance their reflective skills and increase transparency of their own thought process, surgeons could be asked to identify areas that students struggle to reason through and formulate a ‘thinking routine’ from their own approach to the problem. This could be taught as a continuing professional development session which would be of benefit for both the student and veterinary surgeon.

The results of this study have met the aims of suggesting ways to improve how clinical reasoning is taught to veterinary students. With the use of decision diaries, students can access the skill better. The transition into practice may be the toughest point in their careers, and it is veterinary educator’s duty to ensure students are well equipped with the necessary skills to strive as graduates. Veterinary schools as well vets in practice must look at how best to integrate clinical reasoning into the curricula as well as during clinical EMS placements with the aim of improving clinical reasoning abilities of new graduates and providing a positive start to their careers.

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