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The effect of viewing video clips of paediatric local anaesthetic administration on the confidence of undergraduate dental students

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Abstract

Introduction: Dental treatment for children requires not only technical skills, but also the knowledge and confidence to provide behaviour management to support children of differing ages and stages of development. It is not surprising then, that dental students find treating children especially stressful. Paediatric dentistry training is therefore a vital element of the undergraduate dental curriculum.

Materials and Methods: Eighty-six fourth year undergraduate dental students received standard lectures and seminars about behaviour management techniques for children having local anaesthetic. The students were then randomly divided into groups using cluster randomization. The intervention group received an intervention based around video clips (VCs) demonstrating behaviour management techniques (BMT) for children receiving local anaesthetic The intervention and control groups completed self-administered questionnaires in order to determine their level of confidence in managing local anaesthetic for children.

Results: There was a statistically significant difference in the level of confidence between the groups immediately after the teaching intervention [p=0.003] and at four months [p=0.001] in favour of the video group.

Discussion: Previous studies on the use of video as a teaching aid have reported favourable results in terms of both student attitudes and learning outcomes. The results from this study confirm the benefits of this style of teaching paediatric behaviour skills in the undergraduate dental curriculum, the benefits were maintained at four months.

Conclusion: This study has demonstrated that Video Clips as an additional teaching aid are an effective method in improving students' confidence for BMT when delivering local anaesthetic.

Introduction

Paediatric dentistry can be stressful for the child and parents but also for the dentist providing it [1,2,3]. Dental treatment for children requires not only technical skills, but also the knowledge and understanding of behaviour management techniques [BMT]. The various behaviour management techniques require time, practice and experience and it can be difficult for an undergraduate dental student to master these skills quickly. Understandably therefore, dental students find treating children especially stressful [4,5].

BMT is still taught via didactic lectures in many dental schools, including Leeds. In this setting, it can be difficult for the student to visualise how the techniques work, either singly or in combination, and to learn the communication skills required. Students do not get an opportunity to discuss different techniques and experiment with them in a safe and secure setting. Often, the first time these techniques are used is on the clinic, usually with apprehensive children and their parents.

Audiovisual materials have been widely used as teaching aids in medicine and dentistry [6,7,8]. One of the main advantages of videos is the facility for replay, which allows the students to review part or all of the teaching material as often as necessary [9,10]. The benefits of video for teaching purposes in dentistry have been reported for the development of mechanical skills [11, 12], the simulation of clinical situations [13] and the improvement of interpersonal and communication skills. At least one study involving undergraduate dental students has reported that the use of video enhanced learning, and increased the students' confidence in dealing with anxious children [14]. There is also evidence to suggest that the acceptance of video for teaching in paediatric dentistry by undergraduate dental students is high [15].

Developing skills to manage child patients is an important part of the undergraduate experience. Studies have shown that injections are the most difficult procedures for children to cope with [16] and the most stressful for dental students to undertake [17,18].

In Leeds the undergraduate dental curriculum teaches behaviour management and how to give local anaesthetic [LA] via a series of lectures. The material covered is reinforced during two small group tutorials that take place immediately prior to the students starting their paediatric dentistry clinics. Although discussed at various points during the tutorial and lecture programme there is no dedicated lecture on the BMT related to LA. Feedback from students has identified this gap in the support and materials provided to them in their early and formative stages of undertaking dental care with children. Therefore the students could benefit from further teaching material in the form of video clips [VCs]. The aim of this study was thus to evaluate the effectiveness of VCs as an additional teaching method for undergraduate dental students for BMT strategies when delivering LA to children.

Materials and Methods

Participants

All fourth year undergraduate dental students at the School of Dentistry, University of Leeds were invited to take part in this study.
Ethical approval was obtained from the Education Research Ethics Committee of the Faculty of Medicine and Dentistry (EdREC) at the University of Leeds [reference number: Alkazme dental video 0808]. Each student was given an information sheet outlining the aims and methodology of the project and written consent was obtained from each student.

Development of the VCs

A variety of video clips were recorded:

- Paediatric dentistry specialists talking about delivering local anaesthetic to children
- Paediatric dentistry specialists using BMT and delivering LA to a child patient
- Undergraduate dental students delivering LA to child patients. In these clinical examples not all BMT were successful.

The VCs were recorded when informed consent had been obtained from the staff, students and patient parent/guardians involved.

Pilot study

A pilot study was carried out prior to the main trial to assess how best to use the VCs as part of a tutorial. The VCs were shown to 25 dental hygiene and therapy students. The VCs and tutorial delivery were modified using the feedback received.

Randomisation

In each academic year, students are divided into small groups of between 4 and 8 students each, to rotate through the paediatric clinic. Randomisation was by these groups, using cluster randomisation. Randomisation was carried out by using a random number generator accessed online. Each small group had an equal chance of being selected to the two groups:

- Control group – had the standard lectures and small group tutorials without the video clips
- Intervention group– this group had the standard lectures and small group tutorials with the video clips. The VC's were shown one by one, with students encouraged to discuss what they had seen with their peers and their tutor.

Access to VCs

Once the VC tutorials were completed, the clips were available to students in the intervention group only, via a password-protected server.

Outcome
A questionnaire was used to examine the students' confidence following the teaching interventions [Figure 1]. The questionnaires contained a combination of Likert scale and open-ended questions.
Students in the intervention group were evaluated immediately after the VC tutorial and again four months later. Students in the control group were evaluated before they started on the paediatric clinic, and again four months later.

Statistical Methods
SPSS version 16.0 was used for statistical analysis. Descriptive statistics were used to summarise the data. Comparison of the study and control groups was carried out using the Chi square test. The McNemar test was used for comparison within the groups [p value less than 0.05 considered significant].

Results
Eighty-six fourth year undergraduate dental students were recruited to this study and were randomly allocated to one of two groups, as shown in figure 2. Each group consisted of 43 students. Both groups completed two questionnaires [response rate 100%].

Level of confidence
There was a statistically significant difference in the level of confidence between the intervention and control groups in favour of the intervention group at baseline [p=0.003] and at four months [p=0.001] [Figure 3,4].
The McNemar test showed a statistically significant difference in the level of confidence of the intervention group [p=0.03], in which the level of confidence at four months was higher that the level of confidence at baseline. This was in contrast to the control group, in which there was no statistically significant difference in level of confidence between baseline and four months.

Student evaluation of VC tutorial at baseline and at four months
All students in the intervention group liked the VCs as a teaching method: 100% agreed or strongly agreed to this statement. Only one student felt that the VCs did not cover sufficient behaviour management aspects of delivering LA to children, whereas 72.1% [n=31] and 25.6% [n=11] of the students responded 'strongly agree' and 'agree' respectively to this question.

The frequency of administration of LA to children by UG students during the trial period
Students in both the intervention and control groups were asked how many times they have given LA to children over the four month study period. The results are shown in Figure 5. A Chi-square test showed there was no statistically significant difference between the groups [p=0.38].

Development of skills
Students in the intervention group were asked how the VCs contributed to their skills development in the Paediatric clinic. Data collected showed that the VCs contributed to student's skills development by showing them how to use BMT in the clinic, providing examples of different styles and techniques and increasing their confidence to use these techniques. In the control group, students were asked about how they developed their communication skills with children. Most students reported they developed these skills through practice and experience. Some reported they gained experience through observing their tutors and/or other students in the clinic.

Discussion

This study investigated the use of VCs as an additional teaching aid to enhance the confidence of undergraduate dental students prior to giving LA to children. Previous studies on the use of video as a teaching aid have reported favourable results in terms of both student attitudes and learning outcomes [6, 8,14], in the training of technical skills [11,12] and the improvement of behavioural skills [14].

The use of randomised controlled trials in education is rarely reported [19], however in an already crowded dental curriculum the use of a new teaching intervention should be thoroughly researched prior to their implementation. Although individual student randomisation is the gold standard, this was not feasible due to the complex nature of the students' timetables. Therefore a cluster randomisation was used. Each student still had a random chance of being allocated to either the study or the control group.

Questionnaires were used in this study as they provide a straightforward and standardised way of evaluating an educational intervention. Self-administered questionnaires were used and were given to the study subjects by the researcher. This ensured a high response rate. Students were left to fill in the questionnaires with minimal explanation by the researcher in an attempt to reduce interviewer bias.

At baseline there was a significant difference in the level of confidence between the video and no video groups, in favour of the video group. This demonstrates that there was an immediate effect from this simple intervention. The video clips and tutorial addressed the students concerns about how to manage behaviour during delivery of LA to children, which in turn, affected their confidence positively. This is likely to enhance their early experiences in treating child patients, which is positive both for the child and for the dental student.

The findings at four months showed that the level of confidence in the intervention group was maintained over the control group. This suggests that deep learning was achieved and shows that the teaching intervention was still effective in improving students' skills and confidence four months later. It may also demonstrate that there was a synergistic effect of the VCs with exposure

to clinical practice, thereby supporting learning and enhancing the clinical experience. The students themselves reported that the VCs contributed to their skills development by showing them how to use BMT in the clinic, including the use of different styles and techniques. Many also commented on how viewing the VCs increased their confidence.

There was no statistically significant difference in the level of confidence of the control group after four months. Although they have had a further four months of attending the Paediatric Clinic, the level of confidence of these students remained the same. This is despite the fact that they had similar levels of clinical experience in delivering LA to a child as the intervention group [as demonstrated in Figure 5]. This may suggest that without the VCs and associated tutorials, deep learning about use of behaviour management techniques and how to apply them to clinical situations did not take place. Students in the control group reported that their skills development took place via practice and clinical experience but also by observing their tutors and other students. This is not very satisfactory as some students may then have a very different or much more limited experience of using certain techniques than their peers. Use of the VCs can enable standardisation of teaching across a large group of students, which clinical experience alone perhaps cannot provide.

When students in the intervention group were asked if they liked the VCs as a teaching method, all students responded positively. A similar finding was reported in a previous study, which reported very high acceptance of video for teaching in paediatric dentistry by undergraduate dental students [15]. The questionnaires were completed anonymously in the hope that this would encourage the students to response truthfully to the questions.

Students in the control group were asked if they would like to see a video clip on BMT and LA – all responded positively. Despite being on the paediatric clinic treating children for four months the student in the control group were still lacking confidence and felt they could benefit from more teaching about BMT and delivering LA . All students in the year group were allowed access to the VCs after the completion of the study, and tutorials were arranged for the students that had been assigned to the control group. In this way, students in the control group were not significantly disadvantaged.
It is a fact of every undergraduate student's experience that clinics can be cancelled, or a patient fails to attend their appointment. Thus their time on the clinic is precious, and any intervention, such as these short VCs, that can enhance and optimise their experience should be implemented where possible.

Conclusions

Video clips delivered with small group tutorials are an effective method to improve students' confidence in using BMT to deliver LA to children. Students who received the VC tutorial enjoyed this method of teaching, and the

information and confidence they generated was maintained to the end of the study period despite only having no difference in opportunities to subsequently deliver local anaesthetic to children as the control group. Students who did not receive the tutorial showed a high desire to view the VCs and participate in the tutorials. The University of Leeds and other dental schools should consider this style of education especially in teaching communication skills associated with technical procedures such as giving local anaesthetic.

Conflicts of Interest: The authors declare no conflicts of interest

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~~Figure 1: Study Flow Chart~~

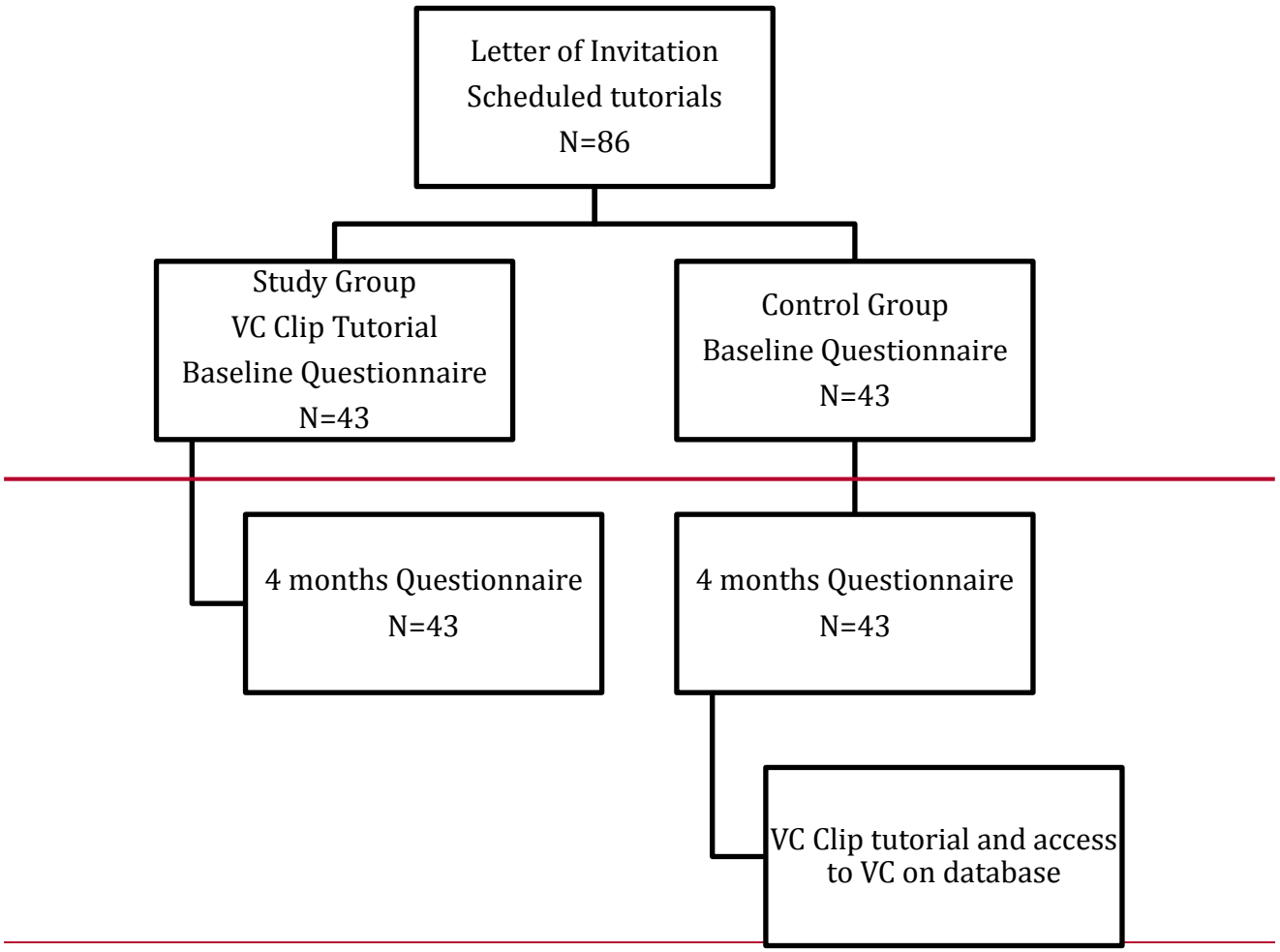


Figure ~~2~~1: Questionnaire given to study group at baseline straight after the video clip tutorial

1. The Video Clip [VC] was clear to watch

Strongly agree □ Agree□ Uncertain□ Disagree□ Strongly disagree□

2. The VC covered sufficient behaviour management aspects of delivering local anaesthetic to a child patient

Strongly agree □ Agree□ Uncertain□ Disagree□ Strongly disagree□

3. I feel confident in delivering local anaesthetic to a child patient

Strongly agree □ Agree□ Uncertain□ Disagree□ Strongly disagree□

4. It was helpful to view different styles and imagery used in the clinic to find which one you felt comfortable with

Strongly agree □ Agree□ Uncertain□ Disagree□ Strongly disagree□

5. List the different styles for managing behaviour you are aware of for delivering local anaesthetic

6. Which style and imagery do you think you will use to give the local anaesthetic [or the name of the staff member who explained it]?

7. It was helpful to see how staff dealt with the child's behaviour when giving local anaesthetic

Strongly agree □ Agree□ Uncertain□ Disagree□ Strongly disagree□

8. It was helpful to see how students dealt with the child's behaviour when giving local anaesthetic

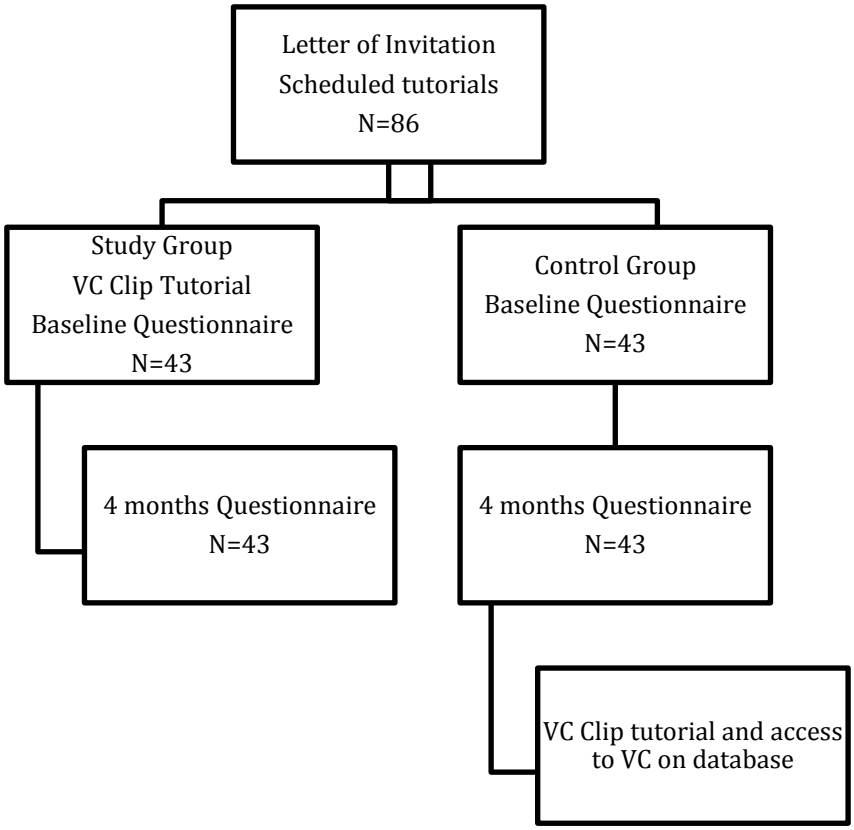
Strongly agree □ Agree□ Uncertain□ Disagree□ Strongly disagree□

9. I liked the video clips as a teaching method

Strongly agree □ Agree□ Uncertain□ Disagree□ Strongly disagree□

10. Would any other parts of the paediatric course benefit from the use of video clips? If so, which other parts of the course would benefit from this?

Figure 2: Study Flow Chart



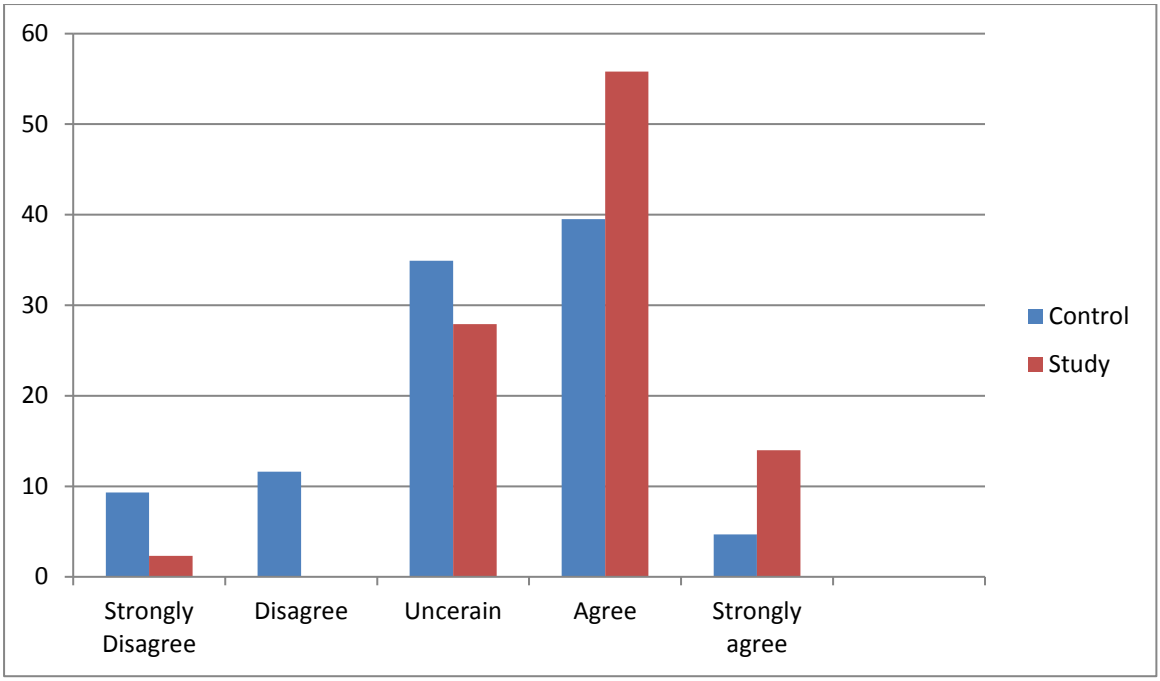


Figure 3: Level of confidence at baseline

Comparison of the level of confidence between no video clips (control) and video clips (intervention) groups at baseline as reported by 4th year UG dental students using a self-reported questionnaire. A chi-square test showed a statistically significant difference in the level of confidence between the control and intervention groups at base line [p=0.003] in favour of the intervention group.

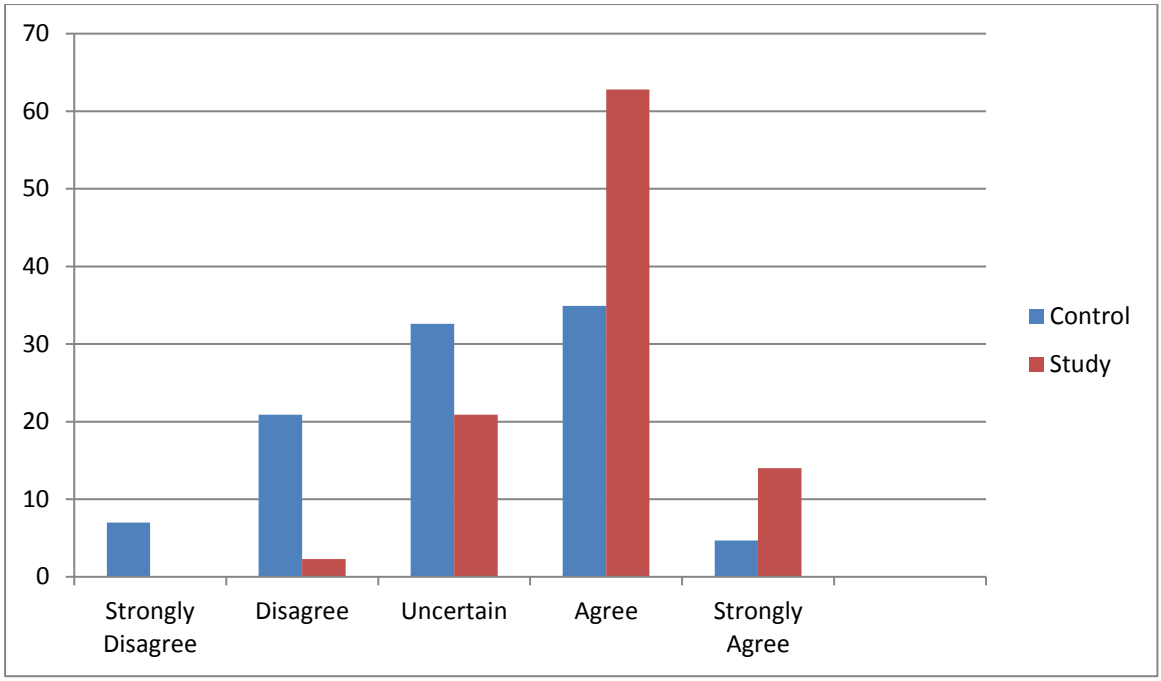


Figure 4: Level of confidence at 4 months

Comparison of the level of confidence between video and no video groups at 4 months following the video clip tutorial for the video group and no additional teaching intervention in the no video group. A Chi-square test showed there was a statistically significant difference between the control and the intervention group at four months [p=0.001] in favour of the intervention group.

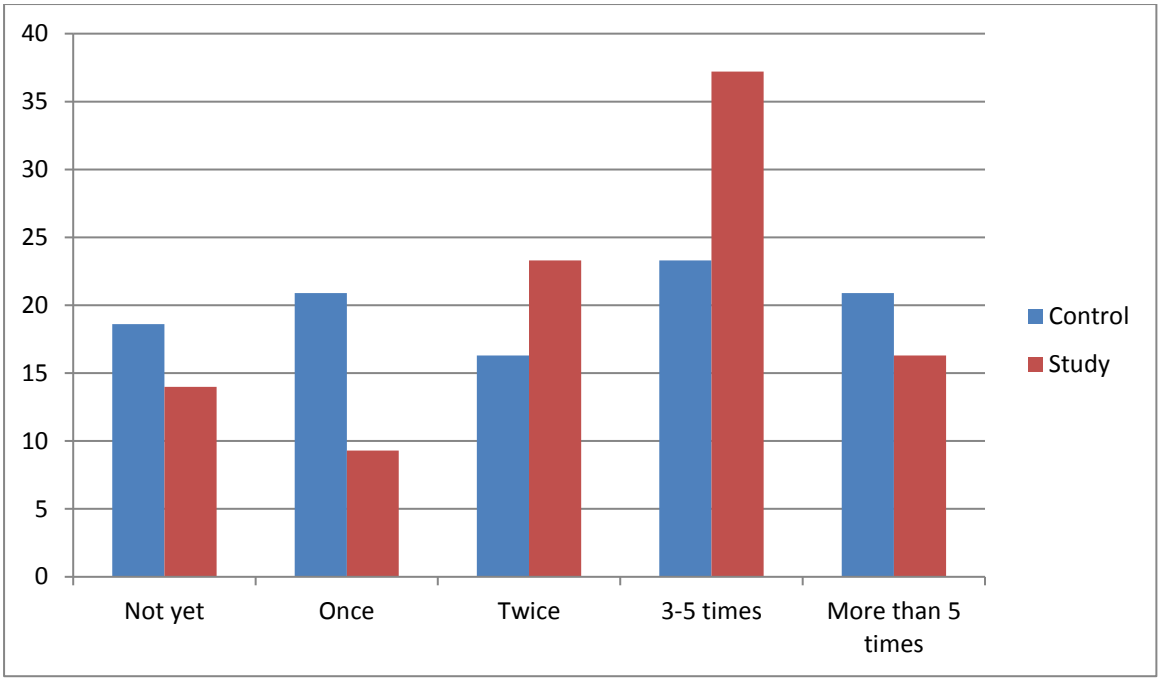


Figure 5 Comparison between students in video and no video groups about how many times they have given LA to children in the four months since starting on the paediatric clinic. A Chi-square test showed there was no statistically significant difference between the groups [p=0.38].