



## Research Article

### DEMONSTRATION AS AN EFFECTIVE TOOL IN LEARNING: SAUDI PHARMACY COLLEGE EXPERIENCE WITH INSULIN PEN ADMINISTRATION

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#### ABSTRACT

**Introduction:** Demonstration as a teaching technique has been identified in education. It is important to examine if it is an efficient method of learning. **Materials and methods:** Ten fifth-year Pharm. D. students volunteered to participate in a study of how demonstration affected their skill and communication with insulin pen administration. Students were scored before and after the demonstration using a 25-point checklist. **Result and discussion:** The results were in favour of demonstration with a significant increase of 11.3 points in the score. **Conclusion:** adopting a demonstration technique in the curricula has a positive impact.

**KEY WORDS:** education, demonstration, teaching, insulin pen, Pharm. D.

#### INTRODUCTION

The Pharm. D. programme of the Princess Nourah Bint Abdul Rahman University (PNU), Riyadh, Saudi Arabia is currently seeking accreditation. The newly introduced curriculum needs to be revised by replacing traditional teaching styles with different techniques to keep pace with the leading universities. Instructors must be able to help learners improve their communication skills for encounters with patients. Using different teaching techniques may help students to understand better and eventually benefit patients. Demonstration in teaching has been proposed in simulated patient care laboratory courses within the Pharm. D. programme of PNU. It is clear from class observation and low competency in the objective structured clinical examination (OSCE) for skill and communication that many students face difficulties in the correct way of showing a taught skill. This could be because the faculty staff still follow traditional teaching methods through words or by distributing reading materials. There is no published evidence in the field of pharmacy education in Saudi Arabia. A number of studies have suggested that demonstration and watching portable media positively affects students' skills<sup>1-4</sup> and it would be of special interest to test this in a Saudi university college. Because treating diabetes and adherence to insulin therapy is critical in controlling high blood glucose<sup>5,6</sup>, preparing students to be good pharmacists is key.

Insulin pen administration is an activity outlined in the course "Integrated patient care laboratory CPP 444" in the fifth year of study. This paper investigates the effect of insulin pen demonstration to Pharm. D. students in improving their skills and communication.

The objective of this study is to investigate how demonstration improved the skills and communication of Pharm. D students in insulin pen administration.

#### MATERIALS AND METHODS

The total number of students enrolled in the previously-mentioned course is thirty-four, the sample consisted of ten student volunteers (29%). Before the experiment students had the chance to read about how to counsel a patient about insulin pen administration. A registered pharmacist (RPh) taught students the correct use of an insulin pen in a focused educational session including both discussion and demonstration inside the college's pharmacy. The session lasted for approximately 15 minutes. Students were scored before (pre) and after (post) demonstration using a 25-point checklist for skill and communication by either "DID" or "DID NOT DO" (see Appendix A). The data were analysed using SPSS version 24 (SPSS Inc., Chicago, IL, USA) for descriptive and analytical statistics; the differences between pre- and post-test scores were examined for statistical significance (where the p-value is less than 0.05).

#### ETHICS APPROVAL

For this type of study formal consent is not required and all procedures were in accordance with the ethical standards of the Scientific Research Ethics Committee for Saudi Universities and with the 1964 Helsinki declaration and its later amendments (Institutional Review Board registration number H-01-R-059, Log number 18-0309).

#### RESULT AND DISCUSSION

There was more than 50% improvement in students' skill and communication after the demonstration ( $11.3 \pm 2.869$ ,  $p < 0.001$ ); a summary of students' total score of 25 points in the checklist pre- and post-demonstration is presented in table 1 and figure 1. The statistically significant increase in the scores suggests that the demonstration had a positive impact on students' skill and communication.

Table 1: Summary results for total score of 25 before (PRE) and after (POST) insulin pen demonstration

| Student ID | PRE | POST | DIFFERENCE |
|------------|-----|------|------------|
| 1          | 17  | 25   | 8          |
| 2          | 12  | 23   | 11         |
| 3          | 6   | 24   | 18         |
| 4          | 12  | 24   | 12         |
| 5          | 12  | 24   | 12         |
| 6          | 7   | 18   | 11         |
| 7          | 11  | 23   | 12         |
| 8          | 14  | 23   | 9          |
| 9          | 13  | 21   | 8          |
| 10         | 11  | 23   | 12         |

|      | Mean | N  | SD      | Std. Error Mean |
|------|------|----|---------|-----------------|
| PRE  | 11.5 | 10 | 3.17105 | 1.00277         |
| POST | 22.8 | 10 | 1.98886 | 0.62893         |

|          | Mean  | SD      | Std. Error Mean | 95% confidence interval of the difference |          | t       | df | Sig. (2-tailed) |
|----------|-------|---------|-----------------|---|----------|---------|----|-----------------|
|          |       |         |                 | Lower                                     | Upper    |         |    |                 |
| PRE-POST | -11.3 | 2.86938 | 0.90738         | -13.35263                                 | -9.24737 | -12.453 | 9  | 0.000*          |

\* p < 0.05

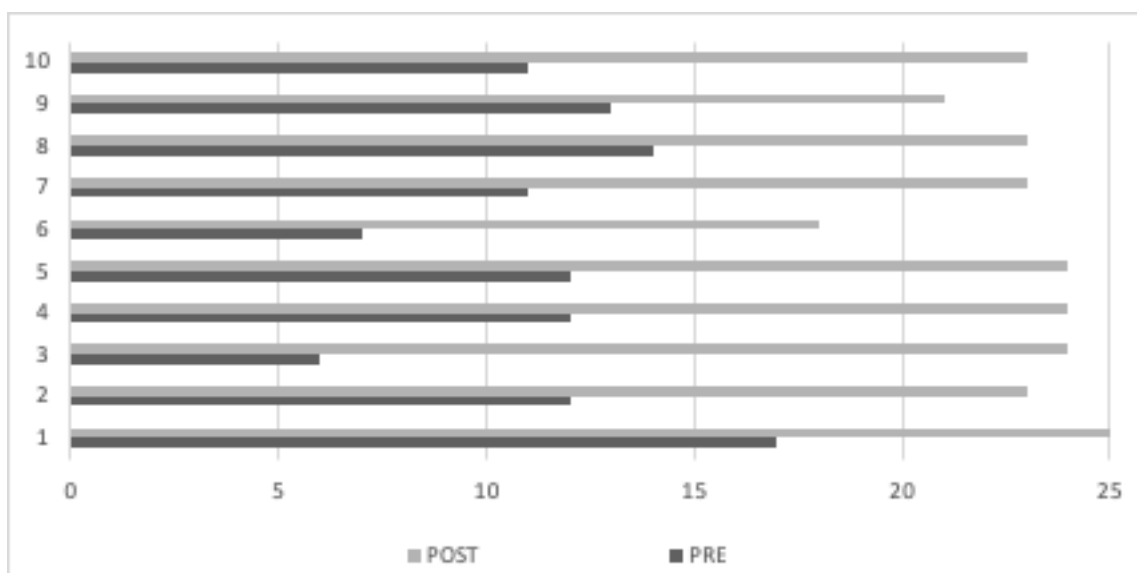


Figure 1: Summary results for each student before and after insulin pen demonstration

Although the number of students involved in the experiment was small (N = 10) and therefore limits the generalisation of the result, the improvement was statistically significant. This will empower adopting demonstration technique in education whenever it is possible. Another limitation is that all students were in their fifth year but it was important to locate the right course for insulin pen administration (cluster sampling). It might be useful to try demonstrating other skills on a larger scale in different courses.

### CONCLUSION

Although demonstration has been identified as a teaching technique, we still follow traditional teaching and students have low competency in showing a taught skill. With this experiment, instructors will be encouraged to apply demonstration in class and help their students understand better and improve skill

competency. To the best of my knowledge, this is the first study in the field of pharmacy in Saudi Arabia to examine demonstration techniques. The evidence suggests that the technique shows promise and is likely to help students achieve better understanding and improved competency compared to traditional teaching methods through words or by distributing reading materials.

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**APPENDIX A: Checklist for appropriate administration of insulin pen**

| CHECKLIST ITEM  | DID | DID NOT DO |
|---|-----|------------|
| <b>SKILL</b>  |     |            |
| 1. Explained that insulin glargine (Lantus Solostar) is used to treat your diabetes or lower your blood sugar   |     |            |
| 2. Instructed you to gather your insulin supplies and wash your hands   |     |            |
| 3. Instructed you to remove the cap from the pen device and inspect the insulin - ensure it is the right kind, clear, and not expired   |     |            |
| 4. Instructed you to clean the pen rip (rubber seal) with an alcohol wipe   |     |            |
| 5. Instructed you to attach the needle to the pen device  |     |            |
| 6. Explained how to prime the pen (i.e. for each new pen, dial to 2 units and press down on the button to release insulin in the air to ensure pen is working properly)   |     |            |
| 7. Explained how to dial to the correct dose  |     |            |
| 8. Identified appropriate injection sites   |     |            |
| 9. Instructed on how to deliver the dose - keep pen straight and insert needles into skin, use thumb to press down on button and count to ten, remove from skin   |     |            |
| 10. Instructed you to remove the needles and dispose of it in the sharps' container   |     |            |
| 11. Explained that insulin may cause hypoglycaemia (low blood sugar below 80 mg/dL)   |     |            |
| 12. Explained how to recognise if you have low blood sugar (example symptoms include sweaty, shaky, hungry, nervous, irritable)   |     |            |
| 13. Explained to you how to treat hypoglycaemia if it occurs: Advised you to consume 15 grams of carbohydrates. Gave at least one example; any of the following are acceptable:<br><br>½ cup or 4 oz regular soda or juice<br>5-6 pieces of hard candy<br>1 tablespoon of sugar or honey<br>1 cup or 8 oz of milk<br>1 serving of glucose gel<br>3-4 glucose tablets. |     |            |
| 14. Explained to you after treating hypoglycaemia, to wait 15 minutes and recheck your blood sugar to ensure that it has risen above 80 mg/dL. If it has not, repeat treatment again. Explained that if the next meal is more than 1 hour away, have a snack after treating a low blood sugar.  |     |            |
| 15. Told you to store the open insulin pen at room temperature.   |     |            |
| 16. Instructed you on missed doses (if you miss a dose, take it as soon as you remember; if it is close to the time of the next dose, skip the dose you missed; do not double up)   |     |            |
| <b>COMMUNICATION</b>  |     |            |
| 17. Introduced themselves to you  |     |            |
| 18. Explained the purpose of the visit or assessment (in this case, to learn more about how to take the insulin)  |     |            |
| 19. Utilised appropriate terminology  |     |            |
| 20. Spoke at an appropriate pace AND with an appropriate tone   |     |            |
| 21. Acted professionally AND was professionally dressed   |     |            |
| 22. Utilised encouraging body language  |     |            |
| 23. Appeared confident in their interaction with you  |     |            |
| 24. Asked you to repeat back information to confirm understanding.  |     |            |
| 25. Asked if you had any questions  |     |            |

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