

## Unit R074 – How scientists use analytical techniques to collect data

### Making conclusions

#### *Instructions and answers for teachers*

The activity below covers LO3: Know and understand how scientists obtain scientific information

OCR  Science in the Workplace  
Level 1/2 

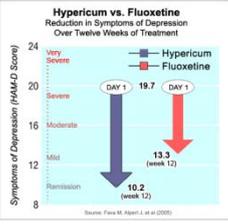
Unit R074 – How scientists use analytical techniques to collect data

Using scientific Information to make a Conclusion

Activity 1

Fluoxetine is a type of anti-depressant drug which is prescribed to many sufferers of depression. St John's Wort (also known as Hypericum) is a herbal alternative of this drug. Some sufferers of depression prefer to use St John's Wort as they think it is more natural and therefore better for the body. However, there remains to be a big debate over the effectiveness and safety of St John's Wort.

A study was carried out to try and find an answer to this debate. Participants of the trial were asked to rate their depression on a scale of 0 – 24 (where 24 was very severely depressed). This was continued over a 12 week period as they took St John's Wort (Hypericum) or Fluoxetine. The results are shown in the following graph.



Treatment	Day 1 Score	Week 12 Score
Hypericum	19.7	10.2
Fluoxetine	19.7	13.3

Source: Fava M, Assenti L, et al (2005)

Associated files:

Identifying and controlling variables (activity)

Activity 1 – approx. 30 minutes



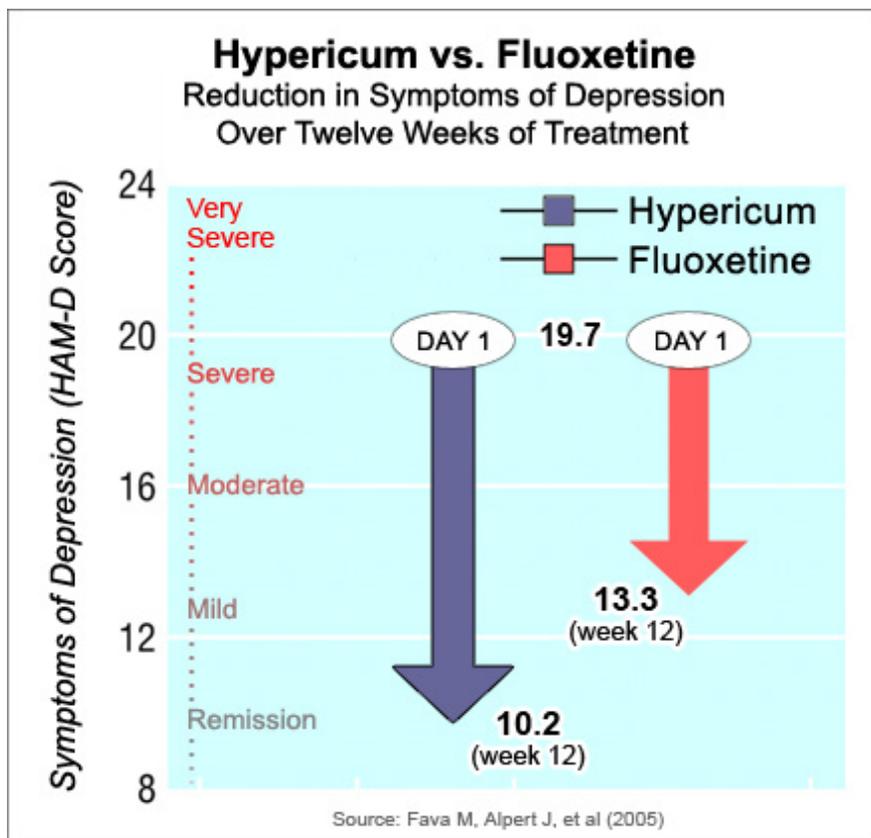
This activity offers an opportunity for English skills development.

In this lesson element learners are given a scenario with some evidence and data. Learners are then asked to consider what conclusions they can draw from the information and importantly, what further evidence/tests/results they need to make the conclusion more reliable.

## Activity 1

Fluoxetine is a type of anti-depressant drug which is prescribed to many sufferers of depression. St John's Wort (also known as Hypericum) is a herbal alternative of this drug. Some sufferers of depression prefer to use St John's Wort as they think it is more natural and therefore better for the body. However, there remains to be a big debate over the effectiveness and safety of St John's Wort.

A study was carried out to try and find an answer to this debate. Participants of the trial were asked to rate their depression on a scale of 0 – 24 (where 24 was very severely depressed). This was continued over a 12 week period as they took St John's Wort (Hypericum) or Fluoxetine. The results are shown in the following graph:



- 1) What conclusions can you draw from this study about the effectiveness of hypericum and fluoxetine on depression? Use figures from the graph to back up your conclusions.

Hypericum appears to have a greater effect compared to fluoxetine in reducing symptoms of depression.

Hypericum starts at 19.7 on day 1 and goes to 10.2 (towards remission) at week 12  
Fluoxetine starts at 19.7 on day 1 and only goes to 13.3 (towards mild) at week 12  
This is a difference of 3.1.

- 2) What further information would you need to know about **this** study for your conclusions to be scientifically valid?

How many people took part in the study?  
What dosage of the drugs were they taking?  
What were the genders of the participants?  
How old were the participants?  
Had they had depression before?  
How long had they been taking this drug for before the trial?  
Were they taking any other medication?  
Any other valid information

- 3) How could you make this study more reliable and valid?

Use the same number of people in each group.  
Use the same number of males and females in each group.  
Use a large sample size.  
Use people with a similar medical background (physical and mental).  
Use the same dosage of drug for all participants.  
Use participants who are not on any other medication.  
Use participants in a similar age range.  
Any other relevant suggestion.

- 4) Do you think that doctors should stop prescribing fluoxetine based on this study? Explain your answer.

No – we don't know how big the study was, or how many males/females there were, or how old the participants were, or what dose they were taking, or how old they were, or if there were on any other medication etc. So we do not know how valid and reliable the data is.

Hypericum is not a licensed drug and therefore it has not been through a drug trial. It will not have been through animal or human tests. So it is not a good idea to prescribe it because we do not know the long term effects of the drug, or if it would interact with other medication etc.

I don't think that fluoxetine has any effect on depression. I think that any improvement is due to the placebo effect.



Ann

I think it does have an effect, the graph shows it does.



Tom

- 5) Explain what is meant by the 'placebo effect'.

When a patient is given a tablet which contains no active medicine in and they start to feel better because they think they are taking a medicine.

- 6) How could you prove/disprove Ann's comment?

Get two groups of people with the same number in each. Each group should contain people of similar ages and the same number of males/females and medical background etc. Give one group a placebo tablet and the other group the fluoxetine tablet. Ask them to monitor their symptoms over a set amount of weeks and compare the results.

Do this as a double blind trial so neither the participants or the doctors know who is getting what, this will eliminate any biased interpretations from either the doctor or the participants

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