Key Stage 4– Mythbusting Alzheimer’s

Notes for teachers

At a glance

Alzheimer’s Disease (AD) is a form of dementia. It is a disease that affects the brain, causing the abnormal build-up of proteins, which damage neurons in the brain.

In this activity students are presented with three different claims about possible risk factors for AD. They have to critique the evidence in order to decide which risk factors are more likely.

Learning Outcomes

- Students understand what risk factors for a disease are
- Students use a checklist to critique a claim

Each pair of students will need

- Copy of student worksheet page 1
- Copy of student worksheet page 2, 3 or 4
- Copy of student worksheet page 5
**Possible Lesson Activities**

1. **Starter activity**
   - Ask the students if they know what dementia is, what the symptoms are. They may have experienced a family member with the disease, so sensitivity is called for here. Discuss the fact that dementia is a collection of symptoms caused by diseases that affect the brain. It is important to point out that it is not an inevitable part of ageing, it is caused by disease so could be prevented or treated but currently there is no cure.
   - Introduce Alzheimer’s disease as one form of dementia. You may wish to play the class a small part of the video that shows a person with AD (see weblinks below). Ask the class how the person’s symptoms such as forgetting things are linked to the causes of the disease.
   - Play the animation 'Discovering Life-Changing Dementia Treatments', which outlines the causes of AD and the work going on in Oxford to help discover treatments.

2. **Main activity: Reliability checking**
   - Give each student a copy of page 1 of the student worksheet and ask them to read through it. This outlines current thinking about risk factors for AD (these are factors that increase the risk of developing AD).
   - Ask them why they think some risk factors (such as age and genetics) are accepted by scientists, but others are not. For examples, a claim is that red meat causes AD. This is based on a general association between types of diet and AD, but there is absolutely no way that we can test the hypothesis that red meat alone causes AD, since people who eat lots of red meat may eat less vegetables or have a less varied diet, or may consume more processed food or more carbohydrates- you can’t control for these things. Discuss the importance of evidence collected by scientific research.
   - Ask the class to work in pairs and give each pair a copy of either page 2, 3 or 4 of the student worksheet. Each page contains information about a different claim for a risk factor of AD. They will also need page 5, which is a reliability checklist. For high achieving students, you may wish to ask the students to work alone or give them more than one claim to consider.
   - The students then read through the information and use the checklist to tick of signs that the evidence used to support the claim is reliable.

An example of the type of answers required is shown below.
Reliability checklist  Claim I am checking: Being overweight is a risk factor for Alzheimer’s disease

<table>
<thead>
<tr>
<th>Thing to check</th>
<th>✓ or X</th>
<th>Reason I think this</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the claim based on scientific research carried out by qualified scientists?</td>
<td>✓</td>
<td>The study was carried out by researchers.</td>
</tr>
<tr>
<td>Was the evidence published in a peer-reviewed scientific journal? (This shows that the study was designed, conducted, and analysed correctly)</td>
<td>✓</td>
<td>The information states ‘in a recent study published in a scientific journal’. It does not say if it is peer-reviewed though.</td>
</tr>
<tr>
<td>Is the evidence based on a large sample of observations (e.g. 10,000 patients) or just a few isolated incidents?</td>
<td>✓</td>
<td>The sample size was 1400 adults. They also studied an additional 191 brains.</td>
</tr>
<tr>
<td>Does the evidence suggest causation and not just correlation? In other words, does the data suggest that changes in one factor actually cause changes in the other?</td>
<td>✓</td>
<td>There is a correlation – the participants who had a BMI of 25 or over, at the age of 50, were more likely to develop Alzheimer’s nearly 7 months sooner than participants who were at a healthy weight. By studying the brains they could see that plaques were more prevalent in people who were overweight.</td>
</tr>
<tr>
<td>Are the claims in the article supported by multiple lines of evidence (e.g. from several studies)</td>
<td>X</td>
<td>No similar studies are mentioned.</td>
</tr>
<tr>
<td>Is there no sign of bias e.g. check if the researcher or funder might benefit from reporting the finding</td>
<td>?</td>
<td>It is not clear who the researchers were working for.</td>
</tr>
<tr>
<td>Can the scientists give a scientific explanation of the findings?</td>
<td>X</td>
<td>There is no explanation as to why being overweight increases your risk for developing AD.</td>
</tr>
</tbody>
</table>

- You may wish students to view the source of the information (as given as the URL on the student sheet pages) or to do their own internet research for other evidence to support their claim.
- Students work alone to write a conclusion about how reliable they think the claim is, and why they think this.
  - Claim 1 is a reliable claim, although there is no explanation as to why being overweight can increase your risk of developing AD.
  - Claim 2 is not a reliable claim. The evidence is based on a small sample size and there is no support for causation. It might just be that the brains of people with AD naturally take up more aluminium because of the damage.
  - Claim 3 is a reliable claim. It is based on a scientific study with a large sample size, the researchers could give a possible explanation for the results and it is supported by evidence by other studies.

3. Plenary
- Ask each pair to share how many ticks they awarded for their claim and gather the class results to show which claim is the most reliable.
- As a class, discuss how studies such as this one can help researchers at the Alzheimer’s Research UK Oxford Drug Discovery Institute to find effective treatments. For example, if we know more about what causes AD then drugs that prevent the plaques forming can be developed.
Weblinks

https://www.oxfordsparks.ox.ac.uk/content/discovering-life-changing-dementia-treatments

Oxford Sparks animation

https://www.youtube.com/watch?v=b9PhQ9yMu8Y

Kids meet a woman with dementia. She talks about her symptoms.

https://www.alzheimers.org.uk/

The website for Alzheimer’s society, which contains information about the disease.


An interactive which explains how risk factors change the likelihood of developing AD