

**Introduction To Physiology
(BMHP5003_LON)
Assessment Two Report
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Content Page

Introduction	p.3
Anatomy and physiology of health condition	p.3-5
Health and lifestyle routine measures	p.5
Health and social care practice	p.5-6
Policies and legislation	p.6
Recommendations	p.6-7
Conclusion	p.7-8
References	p.9-10

INTRODUCTION

Stroke is acknowledged worldwide as the second leading cause of death worldwide and the 4th in the United Kingdom (UK) (Donkor, 2018). With it leading to 4.5 million deaths worldwide and 150,000 in the UK each year, Wolfe (2000) estimated that 1 in 4 men and nearly 1 in 5 women aged 45 years would have had a stroke if they are to live to 85 years of age. Coupland et al., (2017) discusses the origin of the word stroke, which gets its roots from the Greek word 'apoplexia', implying being struck with a deadly blow. The onset of strokes and its pathology make this deduction. It presents with sudden onset of pain, loss of speech, facial weakness, and unresponsiveness. Although the presentation of suddenness is a major factor of stroke, it has been found that it actually takes a while to build up before the abrupt symptoms we then notice. The build-up which leads to symptoms relate or originate from the risk factors of stroke. The aim of this paper is to explain how these risk factors gradually accumulate to a stroke and how it can be prevented or slowed down.

Stroke also known as cerebrovascular accident (CVA) is a sudden interruption in the vascular supply of the brain. These interruptions can take 2 forms namely, ischaemic and haemorrhagic (Grysiewicz, Thomas and Pandey, 2008). The first and most common type with an 85% incidence is an ischaemic stroke where there is a blockage in the blood vessel stopping blood flow (Donkor, 2018). The other is a haemorrhagic stroke causes when a blood vessel bursts, flooding the area and hence reducing blood flow and access to oxygenated blood.

ANATOMY AND PHYSIOLOGY OF HEALTH CONDITION

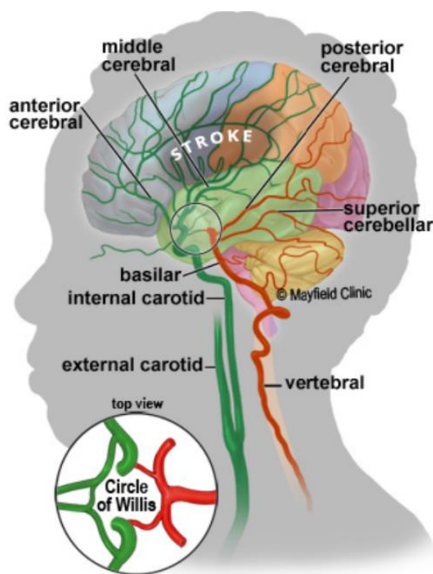
To truly comprehend this, one must first comprehend the pathophysiology of the various types of strokes. Ischaemic strokes occur when a blood vessel supplying the brain is clogged, as previously indicated. Either a blood clot or a fatty deposit can restrict them. In the case of Atherosclerosis, fatty deposits are the most common obstructive factor. Atherosclerosis is described by (Libby, Ridker, and Maseri (2002) as a chronic inflammatory condition that damages the endothelium of medium and large arteries. The build-up of cholesterol plaques within an artery lumen is what causes it. This procedure is invariably preceded by endothelial injury or insult in the artery. When the artery wall is stressed, endothelium damage can develop. Hypertension, cigarette use, and homocysteinaemia are only a few of the stressors involved (Elkind and Sacco, 1998).

When the endothelium is damaged, low-density lipoproteins (LDL) particles are permitted to leak into the intimal layer, where they are oxidised, regardless of the source. When LDL is

oxidised, it becomes a pro-inflammatory antigen, triggering an immune response in which inflammatory cells such as macrophages arrive to combat it.

Foam cells are formed when macrophages infiltrate the artery walls and consume oxidised LDL particles. The first hallmark of atherosclerosis, a fatty stripe, is formed when foam cells accumulate beneath the endothelium. Because fatty streaks are not elevated, they do not impede the lumen and thus do not cause clinical symptoms such as angina. Platelets bind together in an attempt to reduce inflammation and heal any "wounds" caused by damage to the endothelium.

Platelets and endothelial cells secrete growth factors such as platelet derived growth factor (PDGF), fibroblast growth factor (FGF), and transforming growth factor beta (TGF) (TGF beta). Smooth muscle cell growth and migration from the tunica media to the tunica intima are stimulated by these substances. Smooth muscle cells proliferate and encourage extracellular matrix formation, resulting in a fibrous cap covering a lipid core in the centre, forming a plaque. Under a microscope, the lipid core is made up of cholesterol crystals that resemble slit-like gaps. The lipid core is separated from the blood vessel lumen by the fibrous cap.



Fatty streaks can appear as early as adolescence, but they don't necessarily progress to plaques. Foam cells inside the lipid core die over time, releasing matrix metalloproteinases (MMPs). These enzymes start gnawing away at the fibrous cap, causing it to thin out and eventually explode. The atheroma is now exposed to the blood vessel lumen when this happens. Platelets respond as expected by producing a fibrin clot at the rupture site. Unfortunately, these can clog the artery's lumen even more, or they can detach and go to the brain, obstructing blood arteries.

(Mayfield, 2022)

There are modifiable and non-modifiable risks of atherosclerosis. The non-modifiable ones include age, family history, and African descent and the modifiable are hypertension, type 2 diabetes mellitus, smoking and dyslipidaemia (Meschia and Brott, 2017).

A haemorrhagic stroke occurs when blood from an artery suddenly bursts or leaks into the brain. This results in the brain cells in the area not receiving enough oxygen and hence not functioning properly or at all. Risk factors for haemorrhagic strokes include head injuries,

cerebral aneurysm, hypertension, blood vessel abnormalities, bleeding disorders, tumours and drug abuse.

HEALTH AND LIFESTYLE ROUTINE MEASURES

There are many lifestyle habits that put a person at higher risk of stroke for example, eating high saturated fats diet, getting no exercises, over drinking alcohol and tobacco use. (CDC, 2022)

For the purposes of this report, we will focus on smoking as the one of the main risk factors of stroke.

Smoking has been identified as the most preventable cause of death in society. It has been established as the most easily modifiable cause of vascular conditions including stroke. Studies revealed a 6-fold increase in risk in smokers compared to non-smokers (Pan et al., 2019). Tobacco smoke contains thousands of harmful chemicals which are transferred from your lungs during smoking into the blood stream. These chemicals change and damage cells and affect how your body works. These changes affect the circulatory system and increase the risk of stroke. Smoking can also affect the body's cholesterol levels, by reducing the levels of 'good high-density lipoprotein (HDL)' cholesterol and increasing the 'bad low-density lipoprotein (LDL)' cholesterol. Higher levels of LDL cholesterol increase the risk of stroke. Carbon monoxide and nicotine found in cigarettes are also known to make the heartbeat faster raising blood pressure levels and making the blood more prone to clots. Together these effects increase the risk of developing atherosclerosis of the carotid artery. (Shah and Cole, 2010). This demonstrates smoking as a key risk factor for ischaemic stroke, however it has also been determined as a risk factor for haemorrhagic strokes as well. There is a strong association with smoking and artery wall damage which increases the formation of aneurysms which grow and eventually rupture (Kurth et al., 2003).

HEALTH AND SOCIAL CARE PRACTICE

In theory stroke can be easily prevented by encouraging lifestyle changes of individuals or patients. Health care professionals have been provided the knowledge and guide by the UK government and organisations dedicated to prevention, care treatment and rehabilitation services of stroke.

The stroke association have created a detailed leaflet to prevent stroke which health care professionals can use and follow.

Health care professionals can encourage these lifestyle changes.

- Encourage smoking cessation
- Alcohol moderation

- Healthy eating and diet
- An active lifestyle and,
- Reduction in stress (Stroke Association, 2016)

POLICIES AND LEGISLATIONS

The National health service along with the stroke Association implemented The NHS long term plan for 10 years to identify stroke as a critical medical issue.

In this they acknowledge that 90% of stroke cases could be prevented by addressing the key risk factors.

The “accurate identification of potential stroke” patients is a critical stage to reducing mortality rates. The model presented a stroke pathway health care professionals need to take after determining a person is at risk of stroke.

Although the policy acknowledges the key risk factors it does not provide guidelines on how health care professionals are to discourage

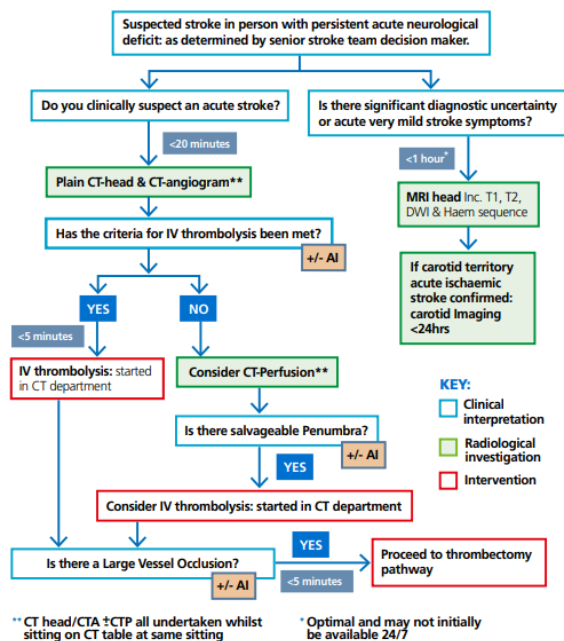
these risk factors until a person has been diagnosed with a high risk of stroke. In addition, the policy is heavily focussed on the after care of stroke and gives little guide to the preventions of stroke through lifestyle changes.

(NHS, 2021)

RECOMMENDATIONS

An article in nursing time explained how specifically nurses have been supporting patients to reduce the risk of stroke. To implement the recommended lifestyle changes listed in the paragraph above they used the theoretical model of planned behaviour which is recommendable for all health care professionals. (Nursing times, 2018)

Figure 2: National Optimal Stroke Imaging Pathway



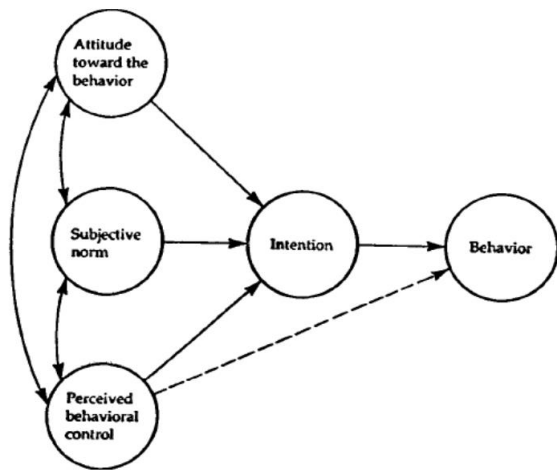


FIG. 1. Theory of planned behavior

The theory's intention is to explain that people can exert self-control over their behaviours and therefore lifestyle behaviours can change. The theory uses five constructs that collectively represent a person's control over their behaviour. These are their attitude towards the behaviour, the subjective norm, the perceived behavioural control, intention, and the behaviour. (Ajzen, 1991)

Firstly, using the tobacco and dieting as the focus of this section. Health care assistants can evaluate the five constructs and tailor

these specifically to their patients. The NHS statistics showed that 24% of pupils were ok with trying a cigarette to see what it was like. (NHS Digital, 2019) Understanding the leniency to these key risk factors is important to structuring a care plan. The UK has the highest proportion of cigarette smokers which shows that social norms can encourage such behaviours for the public. The classic way to break these habits and lifestyles is to implement campaigns to deter smoking. Educating individuals on the effects of smoking and changing attitudes to change the social acceptance of the habit. A health care worker can implement a daily care plan that can help the individual control their smoking habits to break their perceived control over the behaviour.

In regard to dieting, health care workers can set more healthy meal plans for patients at risk of stroke. The stroke association recommends eating more fruit and vegetables, eating more fibre, food that contain health protein, cutting down fatty and sugary food and watching your salt intake. According to the model the reoccurrence of these behaviours will lead to a healthy change in lifestyle. As social norm can impact a way a person perceives a behaviour, the health care worker setting the same example in this case also eating healthy will encourage the said social norm and perception.

Health care workers can also recommend daily exercise to those prone to stroke. The perception of exercise and working out may not be attractive to certain individuals however in using the model set up, health professionals can implement activities that are active without labelling it as exercise. Therefore, activities with higher regard such as dancing can be encouraged. (Stroke Association, 2016)

CONCLUSION

Stroke can be easily prevented by lifestyle changes in the public. Health care professionals have a duty to implement strategies that can change individual lifestyles to stop the

prevalence of stroke. The government can take a more forthcoming approach in stroke prevention as much as stroke aftercare has been encouraged and thought of. 90% of stroke can be prevented from encouraging good and healthy lifestyle changing it is clear from this statistic alone where the attention should be focussed. Therefore, setting the right care plans will be detrimental to the prevention to stroke.

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