What are the informational needs of patients with ANCA Associated Vasculitis?

a Mixed Methods Study

By Janice Mooney

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ABSTRACT

Background: The ANCA –associated vasculitides (AAVs) are a group of rare, potentially life-threatening conditions which if untreated can be fatal. Little is known about the information needs of people with AAV.

Objectives: To explore what it is like to be diagnosed with AAV and to find out the informational needs of this group.

Study design: A mixed methods approach using focus groups and one-to-one interviews, then a questionnaire surveying the membership of Vasculitis UK (VUK) and the Vasculitis Clinical Research Consortium (VCRC).

Results: Emergent themes from the first phase were: reaction to diagnosis, need for information on disease management and access to knowledgeable practitioners. There were 314 VUK, 273 VCRC respondents. Respondents rated information on diagnosis, prognosis, investigations, treatment, and side effects as extremely important. Information on patient support groups and psychosocial care was less important. There was no difference in the ratings of information needs based on group, sex, age, disease duration, disease, or method of questionnaire delivery.

Conclusion: Receiving the diagnosis of a rare, potentially life-threatening disease causes anxiety and fear and can impede information retention and recall. People with AAV seek specific information concerning their disease, treatment regimes and side effects, and the results of investigations. Individuals preferred to receive this information from a doctor.

Recommendations: Patients with AAV should be treated in a similar manner to patients with other chronic illnesses in which patient education is a fundamental part of care.

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Publications:

Mooney J,Poland F,Spalding N,Grayson P,Leduc R ,McAlear CA,Richesson RL, Shereff D,Merkel PA,Watts RA (2014) The informational needs of patients with ANCA-associated vasculitis – development of an informational needs questionnaire, Rheumatology 014; doi: 10.1093/rheumatology/keu026

Mooney J, Poland F, Spalding N, Scott DGI,Watts RA (2013) "In one ear and out the other-it's a lot to take in": A qualitative study exploring the informational needs of patients with ANCA Associated Vasculitis, *Musculoskeletal Care, 51-59*

Oral Presentations*:*

East Anglian Rheumatology Meeting Newmarket. September 8th 2011. Topic: "What do people with ANCA associated vasculitis want to know about their illness?"

Arthritis Research UK. Teach the Teachers Workshop. Glasgow 20-23 May 2010.Topic: "What do people with Primary Systemic Vasculitis want to know about their illness?"

West Midlands Vasculitis Support Group Annual Meeting. ,Birmingham October 9th 2009. Topic: "An Exploration of the informational needs of patients with Primary Systemic Vasculitis"

Poster Presentations:

Mooney J,Poland F,Spalding N, Merkel PA ,Grayson P,Sheriff D,Richesson R,Watts RA (2013)The informational needs of patients with ANCA-associated vasculitis–a multinational study, British Society for Rheumatology AGM Birmingham April 2013 Abstract, *Rheumatology*,

Mooney J, Poland F, Spalding N, Merkel PA ,Grayson P, Sheriff D, Richesson R,Watts RA (2013)The informational needs of patients with ANCA-associated vasculitis – a multinational study, 16th International Vasculitis and ANCA workshop. Paris 14-17 April.

Mooney J,Poland F,Spalding N,Scott DGI,Watts RA (2011)What do people with Granulomatosis with polyangiitis (Wegener's) want to know about their illness? 15th International Vasculitis and ANCA workshop. North Carolina 15-18 May

Mooney J,Poland F,Spalding N,Scott DGI,RA Watts (2011) What do People with Primary Systemic Vasculitis want to know about their Illness? British Society for Rheumatology AGM Brighton 2011 Abstract

Mooney J, Watts RA, Poland F, Spalding N, Scott DGI (2009)What are the educational needs of patients with primary systemic vasculitis? 14th International Vasculitis and ANCA workshop. Lund. Sweden June 2009 abstract APMIS;117 (suppl 127):145.

Mooney J, Watts RA, Poland F, Spalding N, Scott DGI (2009) I'm glad you know what these "vague" symptoms are doc: an exploration of the journey for a diagnosis of primary systemic vasculitis. 14th International Vasculitis and ANCA workshop. Lund. Sweden June 2009 abstract APMIS;117 (suppl 127):147.

 Mooney J, Watts RA, Poland F, Spalding N, Scott DGI (2009) What are the educational needs of patients with primary systemic vasculitis? 14th International Vasculitis and ANCA workshop. EULAR Copenhagen Denmark June .

Mooney J, Watts RA, Poland F, Spalding N, Scott DGI (2009)I'm glad you know what these "vague" symptoms are doc: an exploration of the journey for a diagnosis of primary systemic vasculitis. EULAR Copenhagen Denmark June. Abstract

Mooney J, Watts RA**,** Poland F, Spalding N, Scott DGI (2009) What are the educational needs of patients with primary systemic vasculitis? British Society for Rheumatology AGM Glasgow April 2009. Abstract Rheumatology; 48: i42.

Mooney J, Watts RA**,** Poland F, Spalding N, Scott DGI (2009) I'm glad you know what these "vague" symptoms are doc: an exploration of the journey for a diagnosis of primary systemic vasculitis. British Society for Rheumatology, AGM Glasgow April. Abstract Rheumatology;48: i123.

Mooney J, Poland F, Spalding N, Scott DGI, RA Watts (2010)What are the informational needs of patients with primary systemic vasculitis and how is it currently provided? *Ann Rheum Dis*;69(Suppl3):732, EULAR Rome .Abstract

Chapter 1

Introduction to vasculitis

This chapter will provide an overview of what vasculitis is and focus on one particular type, the anti-neutrophil cytoplasmic antibody (ANCA) – associated vasculitides (AAVs). It will focus on the diagnosis, epidemiology and definitions of these conditions.

1.1 What is vasculitis?

Vasculitis means inflammation of a blood vessel wall. This can occur in any blood vessel from arteries, to veins and capillaries, in any organ of the body such as the skin, lungs and kidneys. This inflammation can cause blood vessels to narrow, occlude or rupture. The significance of this depends upon the size and site of the blood vessel involved. There are many different types of vasculitis from mild disease to a much more severe disease presentation of a systemic vasculitis, that is a potentially life-threatening multi-system disease (Watts & Scott, 2010). The vasculitides are often classified according to their blood vessel size of small, medium and large vessels and Jennette and colleagues provide a useful diagram below to illustrate this (Figure 1) (Jennette *et al.*, 2013).
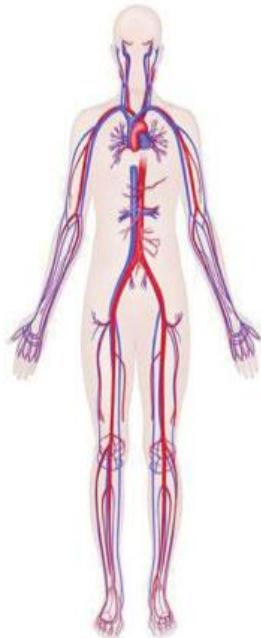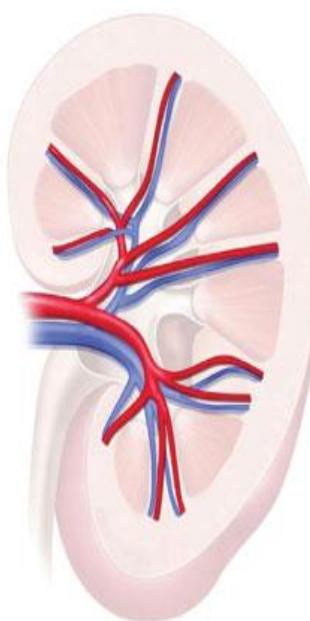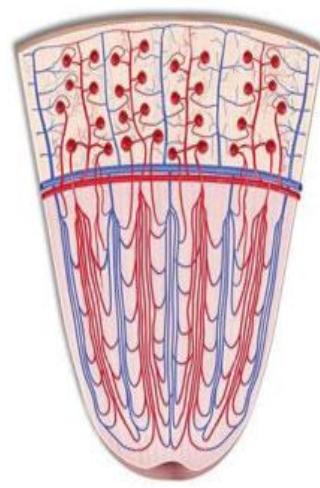
| Large vessels are the aorta and its major branches and the related veins. | The kidney is used to show medium and small vessels. Medium vessels are the main arteries and veins and their initial branches | Small vessels are arteries, arterioles, capillaries,venules and veins |

Figure 1 Types of vessels that are defined as large vessels (A), medium vessels (B), and small vessels (C) in the Chapel Hill Consensus Conference nomenclature system (Jennette *et al.,* 2013).

There are many types of vasculitis affecting different blood vessel sizes: within the small blood vessel group there are three conditions that share common features and they are associated with antibodies in the blood called anti-neutrophil cytoplasmic antibodies (ANCA) (See section 1.7 for further details). These three conditions are Granulomatosis with Polyangiitis (Wegener's) (GPA), Eosinophilic Granulomatosis with Polyangiitis (Churg Strauss) (EGPA) and Microscopic Polyangiitis (MPA) (Figure 2).They are often called the ANCA-associated vasculitides. This thesis focuses on this group of conditions.
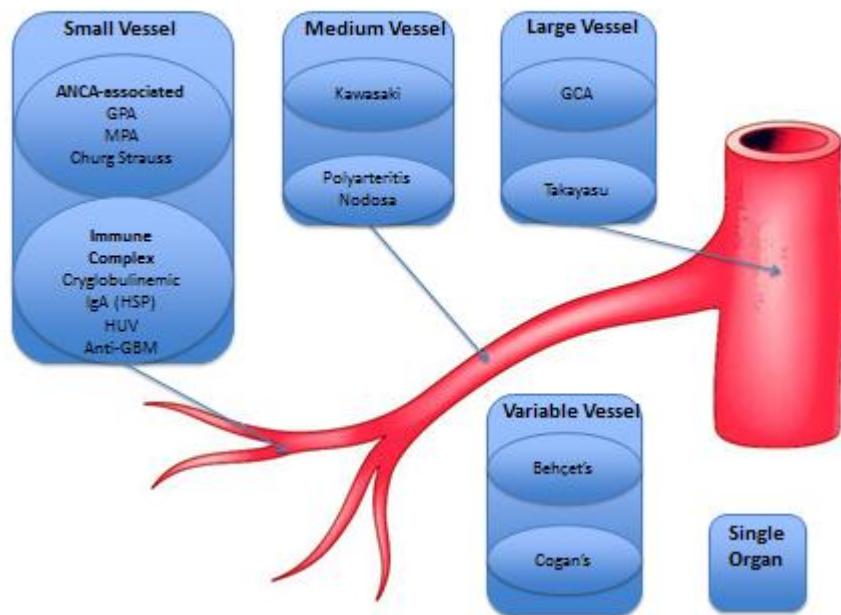
Figure 2 Classification of the vasculitides (Jennette *et al.,* 2013)

1.2 What is ANCA–associated vasculitis?

The ANCA-associated vasculitides (AAV's) Granulomatosis with
Polyangiitis (Wegener's) (GPA), Eosinophilic Granulomatosis with
Polyangiitis (Churg Strauss) (EGPA) and Microscopic Polyangiitis (MPA)
are a group of rare, potentially life-threatening conditions which if untreated
can be fatal. They are characterized by systemic illness, multi-system
disease, with inflammation of blood vessel walls (vasculitis), which can lead
to aneurysm formation, haemorrhage and infarction (Watts & Scott, 2010).
Many organs can be affected such as the kidney, heart, lung, upper and
lower airways and the nervous system. The majority of these conditions are
associated with a certain type of antibody called anti-neutrophil cytoplasmic
antibody (ANCA). The definition of AAV vasculitis is in Table 1. Although
the three conditions are different they share many clinical features and
treatment regimes.

ANCA Associated Vasculitis (AAV)	Necrotizing vasculitis, with few or no immune deposits, predominantly affecting small vessels (i.e., capillaries, venules, arterioles and small arteries), associated with MPO-ANCA or PR3-ANCA. Not all patients have ANCA. Add a prefix indicating ANCA reactivity, e.g. PR3-ANCA, MPO-ANCA, ANCA-negative.
Granulomatosis with Polyangiitis (Wegener's) (GPA)	Necrotizing granulomatous inflammation usually involving the upper and lower respiratory tract, and necrotizing vasculitis affecting predominantly small to vessels (e.g., capillaries, venules, arterioles, arteries and veins). Necrotizing glomerulonephritis is common.
Eosinophilic Granulomatosis with Polyangiitis (Churg Strauss) (EGPA)	Eosinophil-rich and necrotizing granulomatous inflammation often involving the respiratory tract, and necrotizing vasculitis predominantly affecting small to medium vessels, and associated with asthma and eosinophilia. ANCA is more frequent when glomerulonephritis is present.
Microscopic polyangiitis (MPA)	Necrotizing vasculitis, with few or no immune deposits, predominantly affecting small vessels (i.e., capillaries, venules, or arterioles). Necrotizing arteritis involving small and medium arteries may be present. Necrotizing glomerulonephritis is very common. Pulmonary capillaritis often occurs. Granulomatous inflammation is absent.

Table 1 Chapel Hill Consensus definitions (2013) for ANCA associated AAV.

1.3 Granulomatosis with Polyangiitis (Wegener's)(GPA)

Although Heinz Klinger first documented this condition in 1931, it was originally named Wegener's granulomatosis after the German doctor

Friedrich Wegener who provided a detailed description of the condition in 1936 in his thesis "Variants of Periarteritis Nodosa". He described two patients who presented with fever, nasal discharge, arthritis, nephritis and pulmonary vasculitis. Post mortem findings revealed a necrotising granulomatous vasculitis of the upper and lower airways, together with cresentic glomerulonephritis. Godman and Churg in 1954 described the classic clinical features of upper and lower respiratory tract involvement with necrotizing granulomatous lesions, with a focal segmental necrotizing glomerulonephritis and a systemic vasculitis. In 2011 this condition was renamed Granulomatosis with Polyangiitis (Wegener's granulomatosis) (GPA) to better reflect disease pathology (Falk *et al.*, 2011). GPA is defined as a small to medium vessel vasculitis that typically affects the upper and lower airways and kidneys but can affect other organs (Table 1). It is associated with granulomatosis formation in the upper airways and c-ANCA detected against PR3 in approximately 90% of patients (Watts & Scott, 2010).

1.4 Eosinophilic Granulomatosis with Polyangiitis (Churg Strauss)(EGPA)

This condition was first recognized in 1951 by two doctors and was originally named Churg Strauss Syndrome (Churg & Strauss, 1951). They described a syndrome consisting of asthma, allergic rhinitis, granulomas, pulmonary and small vessel vasculitis in 13 post mortem cases. In 2011 this condition was renamed Eosinophilic Granulomatosis with Polyangiitis (Churg Strauss) (EGPA). GPA is defined as a small to medium vessel vasculitis (Table 1). This disease is characterized by asthma, eosinophilia with granuloma inflammation involving the respiratory tract. The history of asthma or sinus disease usually precedes the vasculitis by years. Heart and nerve involvement is common but kidney involvement is rare (Chumbley *et al.*,1997, Lane *et al.*, 2005). It is associated with the antibody anti-neutrophil cytoplasmic antibody (p-ANCA) in 50% of patients (Watts & Scott 2010).

1.5 Microscopic Polyangiitis (MPA)

In 1948 Davson and colleagues reviewed 14 post mortem cases of patients who presented with clinical features of periarteritis nodosa and histology of focal necrotising glomerulonephritis (Davson *et al.*, 1984). They divided the group into two according to renal involvement. Group one included those with severe and widespread glomerular damage (acute renal failure). Group two included those where renal changes were not widespread. They named the group with acute renal failure 'microscopic form of periarteritis'. Today this group is known as Microscopic Polyangiitis (MPA) (Jennette *et al.*, 1994). MPA is defined as a small vessel vasculitis which rarely affects medium and large vessels (Table 1). It typically affects the kidneys but can involve the skin, lungs, digestive system. It is associated with the antibody anti-neutrophil cytoplasmic antibody (p ANCA) and particularly detected against MPO-ANCA in 90% patients (Wiik , 2003). Although this disease shares many clinical features with EGPA, there is less ear, nose and throat involvement in MPA (Molloy & Langford, 2006).

1.6 What causes AAV?

The exact cause is unknown but AAV is considered an auto-immune disease. The immune system is the body's own defence mechanism against foreign invaders and infection (Vamvakopoulous *et al.,* 2010). In AAV the immune system starts to attack normal blood vessel cells mistaking them as foreign causing inflammation of blood vessels. It is thought that an environmental trigger interacting within a genetically pre disposed person (in their genes) activates the development of an auto-immune disease. For most patients the environmental factors are unknown but some drugs such as allopurinol, amphetamines, cocaine, propylthiouracil, hydrallazinethiazide, sulfonamides, penicillins and thiazide have been associated in some patients (De Lind van Wijingaard *et al.*, 2008). While farming, exposure to hydrocarbon or silica have been suggested as possible environmental triggers (Lane *et al.*, 2005, De Lind van Wijingaard *et al.,* 2008), the genetic risk factors are still poorly

understood and there may be genetic differences between the three diseases.

1.7 What is ANCA?

ANCA (anti-neutrophil cytoplasmic antibodies) are antibodies that are found in the blood stream. Antibodies fight off viruses, infections and foreign invaders and make them harmless. In autoimmune diseases, the immune system develops antibodies against various tissues within the body thereby reacting against them as if they were a foreign invader. In AAV these antibodies stick to parts of the white blood cell instead of attacking the foreign invader. ANCA antibodies can be divided into two kinds: p-ANCA, which are antibodies found in EGPA and in other vasculitides, and c-ANCA, which are antibodies mostly seen in GPA. It is not clear whether ANCA antibodies cause vasculitis, but a positive result can be very helpful to aid diagnosis.
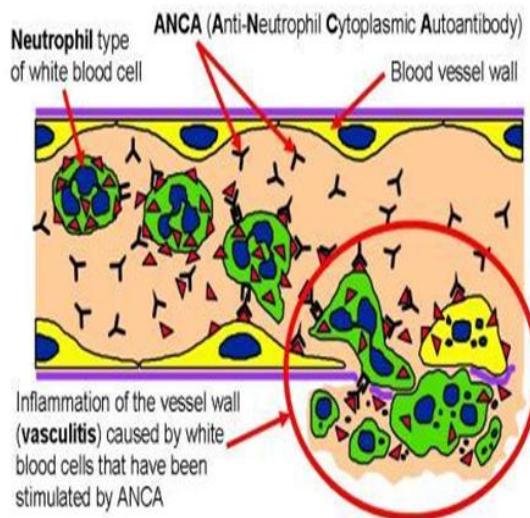
Figure 3 Indirect immunofluorescence pattern of cytoplasmic anti-neutrophil cytoplasm antibody (c-ANCA) from a patient with Wegener's Granulomatosis from Miller et al., (2010)

1.8 Epidemiology

The European Union's definition of a rare disorder is a condition which affects fewer than five people in every 10,000 (European Commission, 2008) or affects fewer than 200,000 people in the United States (The Orphan Drug Act, 1983). Prevalence and incidence are used to measure disease frequency. Prevalence is the total number of a population that is affected with a specific disease at a given time (Last, 2001). Incidence is the number of new cases occurring within a particular time frame (Last, 2001).

The prevalence of AAV in Norfolk in December 2008 was GPA 146 per million, MPA 36 per million (Watts *et al.*, 2012) and EGPA 46 per million (unpublished). Thus the AAVs are rare with an estimated annual incidence of 20/million in Europe (Ntatsaki *et al.*, 2010). In Norfolk the annual incidence of GPA was 11.3 per million, MPA 5.9 per million and EGPA 1-2 per million (Watts *et al.*, 2012). This translates to approximately 1,200 people developing AAV per year in the UK, with an overall incidence of 2.5 per 10,000 in the whole of the United Kingdom (UK).

There appears to be a difference between populations as GPA is the most common with an annual incidence of 10 per million in Northern Europe compared to 5 per million in Southern Europe (Watts & Scott, 2013). In New Zealand, GPA is more common in the South than the North and in Japan, MPA is much more common than GPA despite similar overall incidences (Fujimoto *et al.*, 2011). This had led to speculation that there is a north south latitude divide. The AAVs are more common in Caucasians, with slightly more men than women affected with a peak age of onset 6574years. AAV is rare but over the last ten years there has been an increase in prevalence which could be due to increased recognition and better treatment. The next chapter will provide further background information on diagnosis, management, prognosis of AAV and a review of the relevant literature.

Chapter 2 Diagnosis and management

This chapter examines how ANCA-associated vasculitis is diagnosed, the prognosis, treatment and management.

2.1 Diagnosis

It is often difficult to diagnose these conditions as early presentation is often non-specific, with a wide spectrum of clinical presentations and the clinical features can mimic many diseases (Hellmich&Goss, 2005, Berden *et al.*, 2012). Patients can present acutely unwell with multi-system disease or with gradual deterioration with a range of the following signs or symptoms: rash, fever, lethargy, joint pains, reduced mobility, abdominal pain, shortness of breath, coughing up blood, respiratory distress, acute renal failure, sudden deafness, sinusitis, eye problems and peripheral nerve involvement (Figure 4). It is often only when infection and malignancy are excluded that a vasculitis may be suspected (Mooney & Scott, 2009).
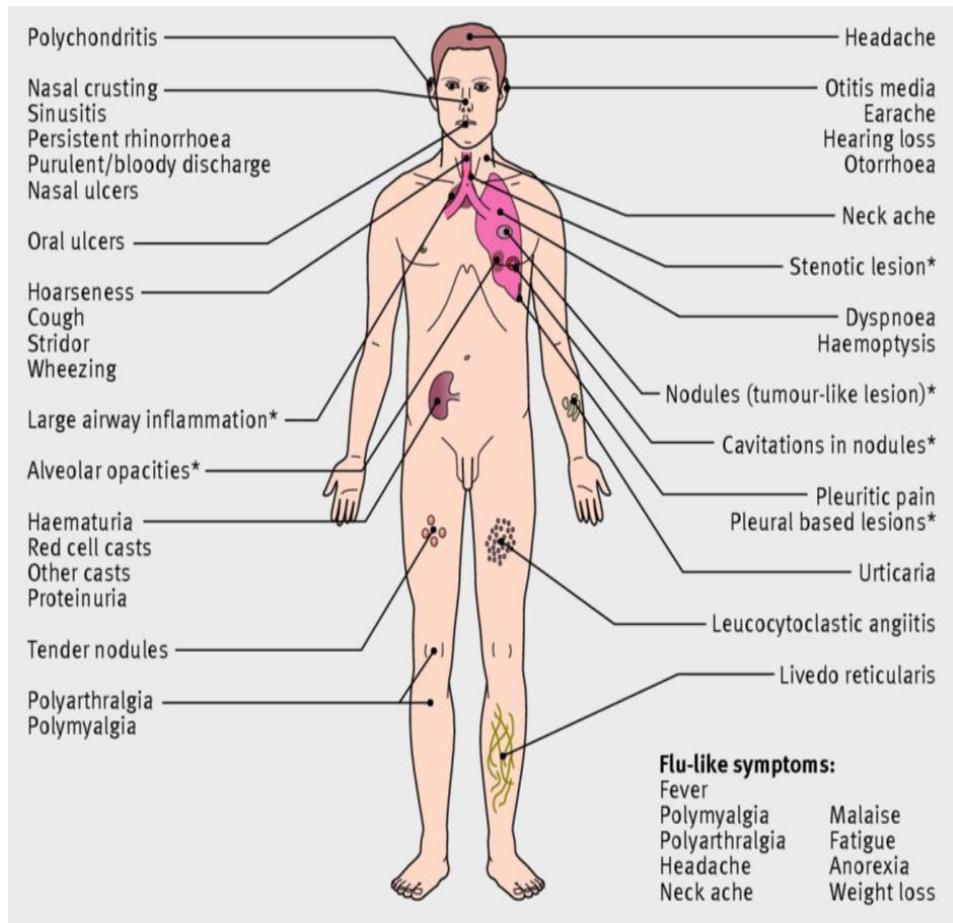
Figure 4 Clinical Features of ANCA associated vasculitis. From Berden *et al.*, (2012) Diagnosis and management of ANCA associated vasculitis. BMJ; 344:e26

2.2 Common Clinical features

Although AAV can present with an array of clinical features, the three diseases share many common clinical features. Lane and colleagues studied the first symptom at presentation and found systemic features are very common such as fever, malaise, weight loss and myalgia in all three conditions (Lane *et al.*, 2005). Ear nose and throat symptoms were the most common symptom in GPA (35%), respiratory was the most common in EGPA (33%) and renal was the most common for MPA (33%) (Figure 4).
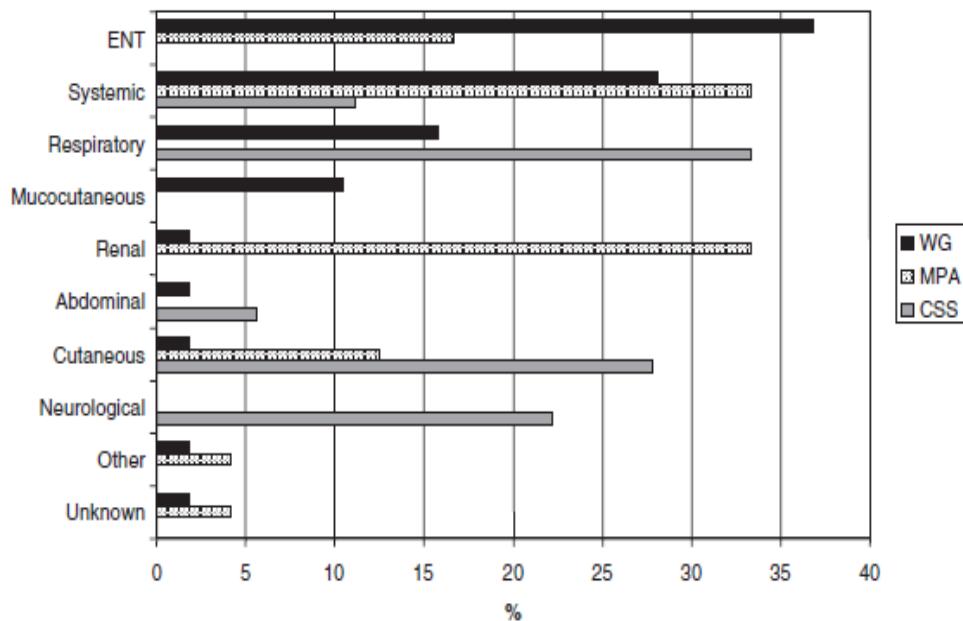
Figure 5 First symptom of vasculitis (Lane *et al.,* 2005:p103)

2.3 Investigations

Although, it can be difficult to diagnose AAV, blood tests, urinalysis, x-rays and tissue biopsies are all used to aid diagnosis, exclude differential diagnosis and assess organ involvement and disease severity. Blood tests such as full blood count can indicate anaemia, urinalysis to detect for haematuria and proteinuria and raised creatinine is useful to assess kidney function/ impairment. Chest radiography may reveal pulmonary infiltrates, nodules or cavitating lesions (Berden *et al*., 2012). ANCA serology may be positive in the majority of patients at diagnosis but 5-10% of patients will be ANCA negative. Also many other conditions can have a positive ANCA such as Systemic Lupus Erythematosus (SLE), Rheumatoid Arthritis (RA) and inflammatory bowel disease. These are sometimes complex and invasive investigations, such as tissue biopsy and all need to be done rapidly because of the urgency of the situation. A tissue biopsy showing vasculitis from the kidney, nerve or other organ will confirm the diagnosis and is considered the gold standard in diagnosis (Miller *et al.,* 2010).

1.Systemic multisystem disease	
Infection	Subacute bacterial endocarditis
	Neisseria meningitides
	Rickettsiae
Malignancy	Metatastic carcinoma
	Paraneoplastic
Other	Sweet syndrome
	Connective tissue disorders
2.Vessel occlusion	Cholesterol crystals
Embolic	Atrial myxoma
	Mycotic (infection)
Thrombotic	Antiphospholipid syndrome
	Procoagulant states
	Calciphylaxis
Other	Ergotism
	Radiation
	Degos syndrome
	Severe Raynaud's phenomenon
	Acute digital loss (atheromatous)
3. Angiographic appearances	
Aneurysmal	Fibromuscular dysplasia
	Neurofibromatosis
Occlusion	Coarctation of the aorta

Table 2 Mimics of vasculitis (Watts & Dharmapalaiah, 2012)

2.4 Diagnostic delay

Diagnostic delay is common (Huyard, 2009, Jayne, 2009). It is recognized that AAV is difficult to diagnose due to the wide spectrum of clinical presentations that may mimic many diseases (Berden *et al.*, 2012). Patients may have consulted several different doctors and had many investigations and tests before a diagnosis is reached. A study of 30 EGPA patients found that a delay in diagnosis was associated with more severe disease, more hospital admissions,higher use of steroids and patients

required increased immunosuppressive therapy (Sokolowska *et al.,* 2012). It is important that AAV is considered as a possible differential diagnosis and referral to medical experts in the field is considered when patients present with a multi-system disease, as a delay in diagnosis and treatment can affect the patient's outcome (Sokolowska *et al.*, 2012).

2.5 Approaches to therapy/ management

Treatment should commence as soon as the diagnosis is made to avoid irreversible organ damage. Guidelines have been published for the management of AAV (Lapraik *et al.*, 2007, Mukhtyar *et al.*, 2009, Ntataski *et al.*, 2103). The aim of treatment is to induce remission, preserve organ function, and reduce mortality and toxicity of medication. Treatment is mainly split into three phases:

1) Induction of remission
2) Maintenance
3) Long-term follow up.

2.6 Medications used in AAV

There are many medications used to treat AAV from cytotoxic agents such as cyclophosphamide to immunosuppressive drugs such as azathioprine, leflunomide, methotrexate, mycophenolate mofetil (MMF) and steroids. Medications are vital to patient survival but are associated with increased risk of serious toxicity. The medications are discussed below.

2.6.1 Cyclophosphamide

Cyclophosphamide is a cytotoxic agent which works by preventing cell division causing cell death (Monach *et al.,* 2010). It can be given orally or intravenously (IV) in pulses. Oral dose is 2mg/kg daily, maximum dosage 200mgs daily. IV dosage is 15mg/kg, maximum dosage 1500mgs, given as two to three weekly pulses. Dosage should be adjusted for age and renal function. Side effects are bone marrow suppression, haemorrhagic cystitis,

increased risk of infection, bladder cancer, infertility and malignancy (Monach *et al.,* 2010, Mahr *et al.*, 2013).

2.6.2 Steroids

Steroids are powerful immunosuppressants. They are very effective at controlling inflammation. They are produced by the adrenal cortex and exactly how they suppress inflammation is unknown. They can be administered orally, intramuscularly, intravenously and by intra -articular injection. Dosage varies according to the treatment phase: for induction therapy 1mg/kg is used and for maintenance remission the dosage is tapered. There are many side effects associated with steroids such as thinning of the skin, moon shaped face, cataracts, osteoporosis, diabetes, hypertension, weight gain, dyspepsia, peptic ulceration, bruising, impaired healing , proximal myopathy, avascular necrosis of the femoral head, increased risk of infection and psychosis (Turnbull & Harper, 2009).

2.6.3 Methotrexate

Methotrexate is a cytotoxic agent that is used to treat some cancers, however it is used in very small dosages to treat many rheumatic conditions. It is thought to act principally during cell division, preventing synthesis of deoxyribonucleic acid (DNA) and cell replication (RCN, 2013). The exact immunosuppressive action in inflammatory joint disease remains unclear, although it is thought to be as a result of the inhibition of lymphocyte proliferation (SPC, 2014). This medication can be prescribed orally or subcutaneously, however it must only be taken once weekly, dose range 7.5mgs - 25 mg. Methotrexate suppresses the immune system and requires regular blood monitoring for potential side effects. Minor side effects include nausea and mouth ulcers, more serious side effects include bone marrow suppression, elevated liver enzymes and methotrexate induced pneumonitis. It is teratogenic so must not be given to those who are pregnant or those contemplating pregnancy. This includes both males and females.

2.6.4 Azathioprine

Azathioprine is a disease-modifying anti rheumatic medication used to treat many rheumatic conditions. It works by interfering with DNA synthesis, causing cell death or inhibiting cell division. It is given orally and can take up to 12 weeks to work. Side effects include liver function abnormalities, haematological, rash, mouth ulcers, nausea, loss of appetite, increase risk of infections (Oliver, 2009).

2.6.5 Mycophenolate mofetil (MMF)

Mycophenolate mofetil is used to prevent rejection of organ transplantation. It is used to treat Rheumatoid Arthritis (RA) and AAV. It works by suppressing T and B cell multiplication. The dose of MMF is gradually increased over a four week period. Starting dose: 500 mg/day orally for the first week, increasing by 500mg a day for second week (1gm), third week increase by 500 mgs daily to 1.5 mgs/day, fourth week take 1 g (two tablets) twice a day. The maximum dose is 3 gms daily. It takes up to 12 weeks to work. Side effects: no major organ toxicity associated but can cause nausea, vomiting, abdominal cramps, haematological disorders and sterile haematuris. Women should not get pregnant whilst taking MMF and should be advised to use effective contraception (Oliver, 2009).

2.6.6 Leflunomide

Leflunomide is an oral disease-modifying anti-rheumatic medication used to treat many rheumatic conditions. It works by inhibiting pyrimidine synthesis (Saleem & Conaghan, 2010). A loading dose of 100mgs daily is given for three days, then 10-20- mgs maintenance dose daily. Due to poor tolerability the loading does is often not given. Side effects liver impairment, bone marrow suppression, nausea, diahorrea, mouth ulcers and hypertension.

2.7 Disease assessment

An assessment of the severity of the disease and the organs involved is vital as this determines the immunosuppressive regime (Mukhtyar *et al.*, 2009 Ntataski *et al.*, 2103). There is a validated commonly used instrument designed to assess disease activity and severity in AAV, The Birmingham Vasculitis Activity Score (BVAS)(Luqmani *et al.*, 1994). This tool scores the clinical features present over the last four weeks in nine organ systems, systemic, mucous membranes and eyes, cardiovascular, abdominal, skin, renal, chest, ear nose and throat and nervous system. Each feature is given a score and organ involvement is weighted, with a maximum score of 63. This instrument has been used extensively in clinical trials in AAV. The severity of AAV has been categorized into five groups namely localised, early systemic, generalised, severe and refractory (Table 3) by The European Vasculitis Study Group (EUVAS) (Mukhtyar *et al.*, 2009). It is vital to identify those patients with severe and life-threatening disease requiring urgent treatment ass the more severe the disease, the greater risk to life and of permanent organ damage. The kidney is the most common organ affected in 70% patients (Jayne, 2009).

Category	Definition
Localised	Upper and/or lower respiratory tract disease without any other systemic involvement or constitutional symptoms
Early systemic	Any, without organ-threatening or life-threatening disease
Generalised	Renal or other organ-threatening disease, serum creatinine <µ500 mol/l
Severe	Renal or other vital organ failure , serum creatinine >µ500 mol/L
Refractory	Progressive disease unresponsive to glucocorticoids and cyclophosphamide

Table 3 EUVAS categories of disease severity (Mukhtyar *et al.*, 2009).

2.8 Induction of remission

Cyclophosphamide and steroids are commonly used to induce remission. A study into which route, either oral or intravenous, was the safest and most effective found that both regimes were equal in time to remission (De Groot *et al.,* 2009). However, the oral group received nearly double the total dose of cyclophosphamide than pulsed group 15.0 g v's 8.2 gms. Overall the IV route appeared safer, with fewer episodes of leucopoenia 28/59 and less severe infection 7/10. Oral cyclophosphamide was associated with more severe and life-threatening adverse drug reactions 31v's 19 but had fewer relapses (De Groot *et al.*, 2009).

There is agreement that cyclophosphamide use should be limited to 3-6 months and a cumulative dose > 12g in the induction remission phase to minimize the risks of side effects (Lapraik *et al.*, 2007, Mukhtyar *et al.*, 2009). For those patients with non-organ threatening or non-life threatening disease, methotrexate (oral or parenteral) and glucocorticoid is a less toxic regime to cyclophosphamide (De Groot *et al.*, 2005, Mukhtyar *et al.*, 2009, Ntataski *et al.*, 2103).

2.9 Maintenance

Once remission is achieved, azathioprine, methotrexate or leflunomide and steroids are used as maintenance therapy. Pagnoux *et al.,* (2008) compared azathioprine to methotrexate in maintaining remission in EGPA and MPA patients who had achieved induction of remission with IV pulsed cyclophosphamide. In an open label prospective multicenter trial,126 patients were randomized to either receive azathioprine 2.0 mgs kg daily or methotrexate 0.3 mgs / kg once a week increased to 25mgs per week for one year. There were no statistically significant differences between the side effects and relapse rates of both drugs. However, there were more relapses in the methotrexate group 13 v's 6. How long maintenance therapy should be continued for is uncertain and most clinical trials continued immunosuppression for 12-18 months (Bosch *et al.*, 2007).

There are few clinical trials using mycophenolate mofetil (MMF) as remission induction therapy. One randomized controlled trial compared pulsed cyclophosphamide to MM in 35 newly diagnosed AAV patients. In the MMF arm 14/18 patients achieved remission compared to 8/13 patients in the IV pulsed cyclophosphamide group. There were no differences in side effects between the two groups. The results are inconclusive as the dose of cyclophosphamide used was lower than traditionally used in clinical practice (Ntatsaki *et al.,* 2010). A study comparing MMF to azathioprine as remission maintenance therapy in 175 patients with AAV found that the MMF group had higher relapse rates 44(55%) compared to 3(38%) in the azathioprine group (Hiemstra *et al.,* 2010). As yet there is limited evidence for MMF use compared to other immunosuppressants such as azathioprine or methotrexate. In patients who have no active vasculitis, no relapses and are ANCA negative, withdrawal of methotrexate and azathioprine should be considered (Bosch *et al* ., 2007).

2.10 Relapse

The AAVs are relapsing conditions with 50% of patients experiencing a relapse at five years (Smith *et al.*, 2012). Relapse has been defined as 'disease which has been previously well controlled and which has become active' (Ntatsaki *et al* ., 2013). Whether the relapse is minor or major will determine the treatment regime. Minor relapse (no threat to organs) can be treated with an increase in immunosuppressive drugs or steroids. Major relapse (threat to organs) will need either cyclophosphamide or Rituximab (Ntatski *et al.*, 2013).

2.11 Rituximab

Guidelines have been published for the management of AAV (Lapraik *et al.*, 2007, Mukhtyar *et al.*, 2009, Ntatsaki *et al.*, 2013) and up until 2012 there was general consensus that cyclophosphamide and steroids are the first choice for induction of remission. However, the introduction of a new drug called rituximab which was used to treat patients with refractory disease

and those who were unable to take conventional therapy, provided another therapeutic option. However, the exact place in the treatment pyramid for rituximab is not certain and many questions remain unanswered as yet. For example which patients should receive rituximab and what is the best therapeutic dose (Jayne, 2010). In 2010 the results of two randomized clinical trials in ANCA-associated vasculitis using Rituximab were published. Rituximab is an intravenous biological agent that depletes B cells from the blood steam. The RAVE study (Stone *et al.*, 2010) compared Rituximab v's cyclophosphamide as induction remission and found that it was at least as effective as cyclophosphamide. However, Rituximab was superior in achieving remission in those with relapsing disease (67% v's 42%). The RITUXVAS study compared Rituximab with cyclophosphamide for induction remission and found that they were comparable (76% v's 82%) and with similar serious adverse events (Jones *et al.*, 2010). The role of Rituximab is not clear at present as long-term data are needed to establish its safety profile. The NHS Commissioning Board (2013) has authorised its use in relapsing disease, those who are intolerant of cyclophosphamide, in patients who have received the maximum cumulative dose and in women of child bearing age. For maintenance therapy azathioprine, methotrexate or leflunomide can be used. Once remission is achieved azathioprine continues to have the safest profile for maintenance therapy (Ntatsaki *et al.*, 2011).

2.12 Survival

The introduction of modern immunosuppressive therapy has resulted in a marked improvement in prognosis of these conditions (Bhamra & Luqmani, 2012). The natural history of untreated (AAV) is of a rapidly progressive, usually fatal disease. Prior to the introduction of corticosteroids in GPA, Walton observed a mean survival of 5 months, with 82% of patients dying within one year and more than 90% dying within two years (Walton, 1958).The median survival in GPA was only 12.5 months using corticosteroids alone, with most patients dying of sepsis or uncontrolled disease (Hollander & Manning, 1967).There was further improvement to around 20% following the introduction of corticosteroids and

cyclophosphamide (Fauci *et al.*,1973). Data from Lane *et al.*, (2005) suggest a 5 year survival of 76% for GPA, 68% for EGPA and 45% for MPA. This is supported in a review of mortality by Phillip & Luqmani (2008) who found a 5 year survival rate of 75% for GPA, 68%-100% for EGPA, 45%- 75 % for MPA. A retrospective review of 445 GPA patients in Germany in 2011 found a reduction in mortality (Holle *et al.*, 2011). In a recent review of the long-term outcome of the EUVAS trials the one year survival was 88%, two years 85% and 78% at five years (Flossman et al., 2011). This is supported with data from the Norfolk Vasculitis Register which shows an increase in survival of 88% at one year and 78% at five years over a 20 year period from 1990- 2010 (Figure 6) (Watts *et al* .,2013)

Survival Functions
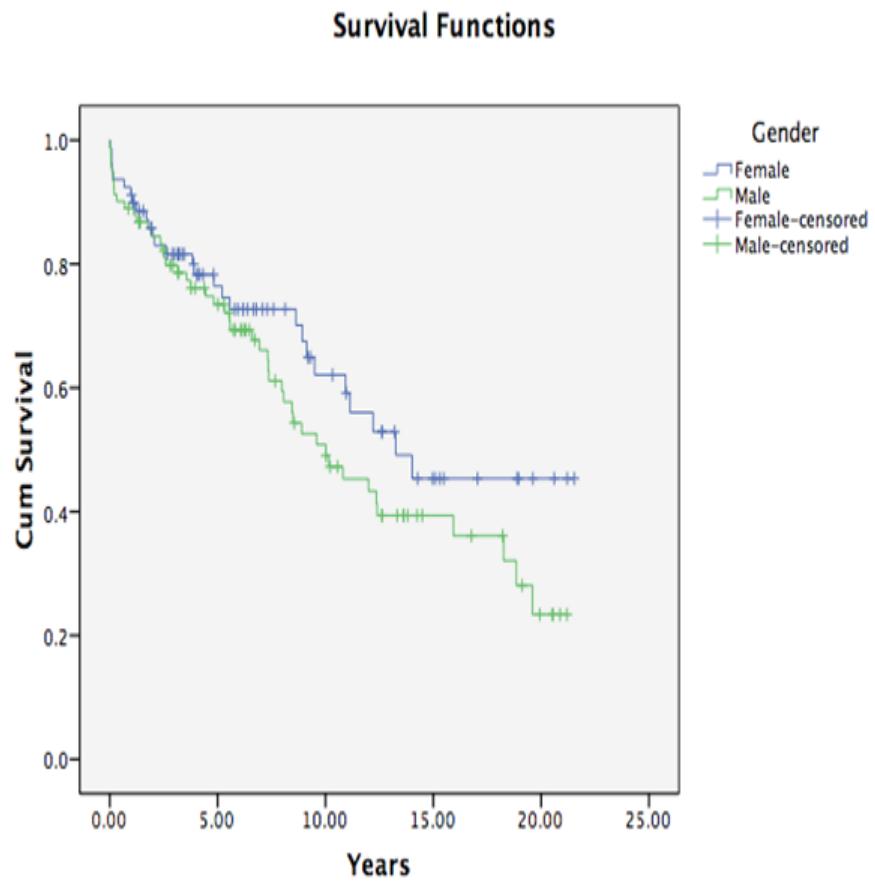
Figure 6 NORVAS Survival data Watts *et al., (2013)*

2.13 Long-term follow up

Due to the complex nature of these conditions, they are unlikely to be managed solely by general practitioners, junior doctors or doctors with little knowledge or experience in vasculitis. It is recommended that they should be managed in conjunction with medical experts in the field, following guidelines that incorporate disease-specific outcome measures (Mukhtyar & Luqmani, 2007, Mukhtyar *et al.*, 2009, Ntatsaki *et al.*, 2013). These patients require regular and careful follow up to assess organ function and damage, early detection of disease relapse, management of co-morbidities and detection of drug toxicity and side effects of medication (Appendix A). The complexities and challenges of the management of AAV are shown in figure 7 (Bhamra & Luqmani, 2012).
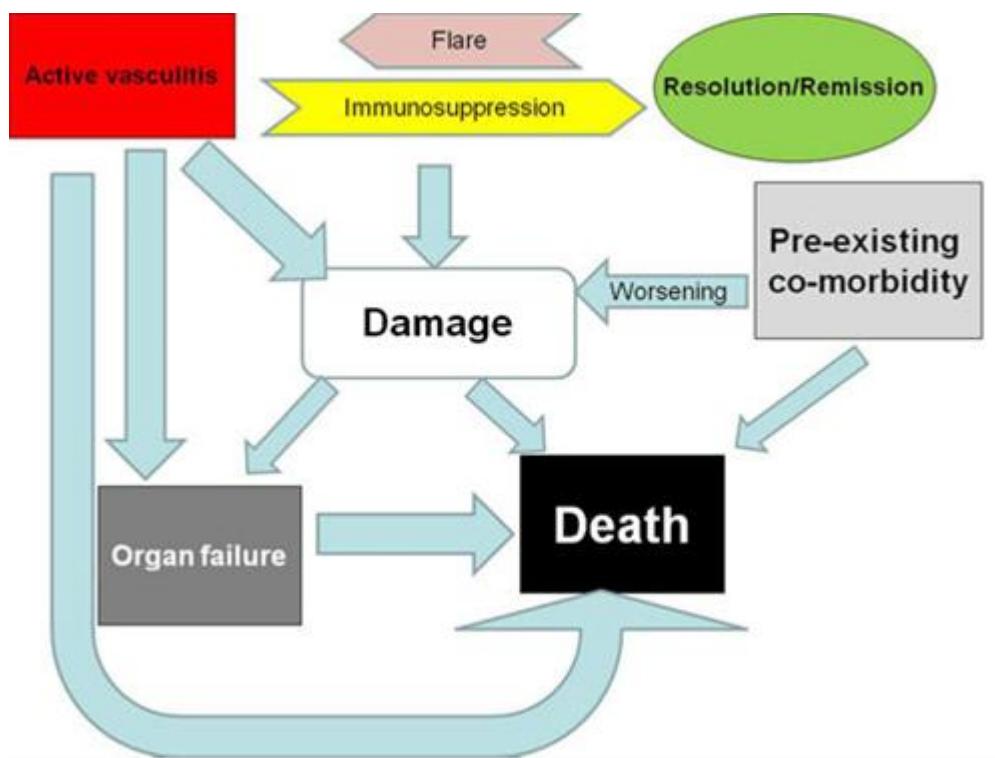
Figure 7 Relationship between disease activity, therapy comorbidity and damage, organ failure, and death in vasculitis from Bhamra & Luqmani, (2012:496).

2.14 Disease assessment and monitoring

The diagnosis of AAV is significant and these patients will require long-term follow up and monitoring. Despite improvements in survival there is still considerable risk associated with treatment.of those who present with severe disease and the elderly (Phillip & Luqmani, 2008). Little and colleagues studied 524 newly diagnosed AAV patients and found a mortality of 11.1% in the first year (Little *et al.*, 2010). The major causes of death were active uncontrolled vasculitis, infection secondary to therapy in the early stage of disease and cardiovascular disease during the chronic follow up phase (Luqmani *et al.*, 2011). Even if patients survive the first year, they are at lifelong risk of relapse. Relapse occurs in up to 46% of patients treated with cyclophosphamide typically in the first year after stopping therapy (Gordon *et al.*,1993, Jayne *et al.*, 2003; de Groot *et al.*, 2005) and 50% of patients with renal involvement relapsing by five years (Booth, 2003, Little *et al.*, 2010).

2.15 Side effects of therapy

There are significant side effects of therapy such as increased risk of infection, hypertension, osteoporosis and diabetes associated with steroids, haematological and skin malignancies (Knight *et al.*, 2004, Phillip & Luqmani, 2008, Bhamra & Luqmani, 2012, Mahr et al., 2013). In the first year after diagnosis infection rates of 25% have been reported (Little *et al.*, 2010) compared with 12-72% in long-term follow up (Vamvakopoulous *et al.*, 2010). Increased risk of infection is associated with the elderly, leucopenia and declining renal function (Harper & Savage, 2005). All immunosuppressants and cytotoxic therapies used in AAV can cause bone marrow suppression (Appendix A) and steroid use is also known to increase the risk of infection and osteoporosis. A study of 99 AAV patients found that 21% developed osteoporosis, 8.2% new onset diabetes, 29% gained >10kgs in weight, 2.5% developed a peptic ulcer and 2% developed a steroid induced cataract (Boomsma *et al.*, 2002).

The adverse effects of cyclophosphamide therapy are well known with 46% of patients developing a serious infection, 57% will become infertile and 43% will suffer haemorrhagic cystitis (Geetha & Seo, 2012). Long-term use of cyclophosphamide also increases the risk of bladder cancer by 33 fold, lymphoma 11 fold and non -melanoma skin cancer 10 fold (Geetha & Seo, 2012). A large study of AAV patients found that 57% of women reported infertility, (Hoffman *et al.*, 1992). The WEGET study reported 5% gonadal failure, 0.5 % impotence and 4/35 males were infertile and amenorrhoea in 3/ 8 women (Seo *et al.,* 2005). Other treatment related side effects were diabetes 6.7%, hypertension 5-10%, cataracts, osteoporosis and muscle weakness / atrophy (Seo *et al.*, 2005).

2.16 Osteoporosis

Osteoporosis is a condition in which the bones become weak and are susceptible to fracture. There are several risk factors for osteoporosis: female, low body weight, the elderly, smoking, post-menopausal women, prolonged use of steroids, amenorrhoea and history of fragility fracture. AAV is a risk factor for osteoporosis due to the inflammatory response, exposure to high dose steroids and renal impairment (Turnbull *et al.*, 2009). Prophylaxis treatment against osteoporosis is now standard practice for patients with AAV (Jayne, 2009).

2.17 Disease activity / damage

In the assessment of any patient with AAV it is important to distinguish active disease from disease damage (Bhamra & Luqmani, 2012). Damage due to vasculitis is irreversible such as kidney impairment and saddle nose deformity and does not need immunosuppression. Active disease however does require immunosuppression and this will depend on whether it is a minor or major relapse. There is a validated tool, the Vasculitis Damage Index (VDI), which is used to monitor long-term outcome (Luqmani *et al.*, 1994, Exley *et al.*,1997). This tool records organ damage that has occurred since diagnosis or has become worse, including damage due to drugs. It

focuses on eleven organ systems and each item of damage is scored one point with a total score of 68.The higher the score the more organ damage.

Despite improvements in survival, damage to organs is irreversible: for example 20% of patients will develop end stage renal disease (Jayne, 2009). Up to 80% of patients with EGPA will have permanent damage to the ear, nose and throat (Seo *et al*., 2005). The WEGET trial of 180 patients with EGPA found that at the end of the first year 25.6% had hearing loss, 18.9% nasal blockage, 5-10% suffered pulmonary fibrosis, renal impairment and peripheral neuropathy as measured by the VDI (Seo *et al*., 2005).

2.18 Co/morbidities: Cardiovascular risk

Patients with AAV are at increased risk of cardiovascular events than the general population (Suppiaha *et al*., 2011).This is thought to be due to endothelium activation and damage but the actual process unknown. It may be due to the interaction of ANCA with neutrophils and the endothelium (Mukhytar *et al*., 2009). High dose steroids are needed for inducing remission but are associated with hypertension, diabetes and fluid retention which can contribute to increased risks for cardiovascular disease. The inflammation of arteries may also contribute another risk factor for cardiovascular disease. Prevention and management of cardiovascular disease is recommended and cardiovascular risk assessments should be performed yearly (Ntatsaki *et al*., 2013).

2.19 Structured clinical assessment

The aims of management are:
1) To assess disease severity and activity
2) To monitor any relapse
3) To measure the extent of disease damage
4) To evaluate the response to therapy
5) Early detection of drug toxicity
6) To assess functional impairment

7) To provide psychosocial support and education to patients

Adapted from Luqmani *et al.*, (1997)

To achieve this it is recommended that a structured clinical assessment is performed for all AAV patients including blood tests, histology, radiology, use of disease assessment tools, measures of function, psychosocial status and quality of life (Flossman *et al* ., 2007, Miller *et al.*, 2010). These are complex multisystem diseases which relapse and remit needing careful assessment and monitoring (Appendix B).

2.20 Monitoring treatment

Medications are vital to patient survival but are associated with increased risk of serious toxicity. Therefore, patients need to be monitored carefully with regular blood and urine tests so that early treatment toxicity is recognized. Patients will therefor require information about their medicines and possible side effects at each stage of their treatment phase so that they can be involved in their care. It is essential that patients are fully informed of the reason and need for the medication, possible side effects and the monitoring process. They should receive information on which signs or symptoms to look out for and what to report to the doctor or nurse so that prompt treatment or early recognition of toxicity occurs. They will require education on how to help prevent some of the risks associated with treatment, such as refraining from smoking, avoiding sunbathing and wearing sun block (Turnbull & Harper, 2009, Ali *et al.*, 2014).

2.21 Impact of the disease

Modern therapies have changed the AAV from conditions with a poor outcome (death) to chronic diseases that relapse and remit. Relapse occurs in up to 46% of patients treated with cyclophosphamide typically in the first year after stopping therapy (Gordon, 1993, Jayne *et al.*, 2003; de Groot *et al.*, 2005). At five years the risk of relapse is 38%-50%, patients with anti-pr 3 antibodies, cardiovascular disease and a creatinine < 200 are

associated with an increased risk of relapse (Walsh *et al.*, 2012, Smith *et al.*, 2012).

2.22 Quality of life

The diagnosis of AAV has a physical, psychosocial and financial impact on patients' lives (Cotch, 2000, Newall *et al.*, 2005, Carpenter & DeVillis, 2011). The physical impact and permanent damage from the disease can cause a range of problems from hearing loss, blindness, shortness of breath, saddle nose deformity and nerve damage (Langford, 2005, Seo *et al.*, 2005, Walsh *et al.*, 2011, Herlyn *et al.*, 2011).Disease related complication such as stroke, myocardial infarction, kidney failure, cancer, blindness, stomach ulcer and seizures have been reported in 10% patients (Herlyn *et al.*, 2011). Medications used to treat AAV are associated with serious toxicity and side effects. Some of these side effects such as moon shaped face, weight gain and hair loss are known to cause upset to patients (Hoffman *et al.*,1992, Seo *et al.*, 2005, Herlyn *et al.*, 2011).

When Hoffman *et al.*,(1998) assessed the effects of GPA on health and function in 60 patients using a questionnaire, 80% patients reported reduced levels of daily activities and 78% patients needed long-term immunosuppression medication. A study of 51 patients with AAV (GPA, EGPA, MPA) found that 25% were depressed, 43% were anxious and they had reduced levels of physical and social functioning (Koutantji *et al.*, 2003). Moderate depression was reported in 10% of patients and severe in 4% and 16% of patients were classified as having moderate anxiety. Additionally, AAV patients had three times more depressive symptoms and were one and a half times more anxious compared to cancer patients. This study had a small sample size recruited from one hospital with a short disease duration of 3.4 years. There were differences in the three disease types: the GPA group were significantly younger than the MPA group and had more functional impairment than the EGPA patients. There were statistically significant differences between symptom severity between the different diseases, with GPA patients reporting more symptom severity than

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EGPA patients (p>0.05) and MPA (p>0.001) and EGPA patients expressing greater symptom severity than MPA (p>0.05). The results may not be generalizable to the wider vasculitis population and those with long standing disease. Boomsma *et al.*, (2002) compared GPA patients with systemic lupus erythematosus (SLE) patients and found that in both groups 68% had reduced levels of daily activities. The SLE group reported somewhat more depression 47% compared to the GPA group 33%. The exact reasons for this are unclear but SLE predominately affects young females and depressive symptoms may impact on an individual's ability to work and social participation.

A study of AAV patients and their spouses found that patients had reduced health-related quality of life both physically and emotionally, in contrast to spouses who reported no reduction (Carpenter *et al.*, 2009). A population based casecontrol study by Basu *et al.*, (2010) in Scotland found that people with AAV had significant impaired physical health and suffered twice as much fatigue, but not mental health compared to the general population. This is supported by Hajj-Ali *et al.*, (2011) who found that EGPA patients suffered significantly greater frequency of fatigue and depression. A questionnaire survey of 264 people with AAV asked them to rank from 0-5 the impact of the disease on their life. Respondents ranked the highest items fatigue (3.5), no energy (3.4), weight gain (3.1) musculoskeletal pain (3.0) and sinusitis (3.0), additionally 19% reported anxiety (Herlyn *et al.*, 2010). A large multicentre cross sectional study of 410 AAV patients found that high CRP, poor sleep, pain, being female, non-engaging behaviour and denial are associated with fatigue (Basu *et al.,* 2013). Fatigue is often linked to active disease but this study demonstrated no correlation with the BVAS. A German study of 122 vasculitis patients found that just health-realted quality of life was reduced compared to the general population and just under half reported mild depression and 19% severe depression (Brezinova *et al.*, 2013). A large study of 692 vasculitis patients including AAV found that vasculitis patients believed that their condition had affected their functional ability and emotional well –being (Grayson *et al.*, 2013).

A study of 346 newly diagnosed AAV patients found that they had reduced physical functioning compared to the general population and that neurological involvement at presentation is associated with reduced heath related quality of life (Walsh *et al.*, 2011). Although this was a large study pooling the results of four clinical trials, those patients who failed to complete the Short Form 36 (SF36) had more severe disease and were acutely unwell. This underrepresentation of this group may have biased the results. Health related quality of life was found to be reduced in GPA patients measured by the SF36 (Tomasson *et al.,* 2012). Another study found that just over half (33) of young GPA patients (<40 years) were admitted to hospital as a consequence of their disease and more than 50% of patients had consulted a doctor at least once a week and over 90% had consulted a doctor at least once a month (Reinhold –Keller *et al.*, 2002).

2.23 Financial Impact

Only a few studies have looked at the financial impact of AAV. Hoffman and colleagues (1998) found that 26% of GPA patients had reduced income one year after diagnosis. A small study by Reinhold –Keller *et al.*, (2002) found that 27% of young GPA patients (<40 years) employed at diagnosis had to give up work due to disability within 39 months. This is supported by Boomsma *et al.*, (2002) who found that 23% of GPA patients had reduced income and 25% of patients were in receipt of disability benefits. A further study reported that just over half (54%) of patients with GPA stated that they had lost between 25%-75% of their income, with 14% retiring on ill health grounds (Abdou *et al.*, 2002). A recent large study of 405 AAV patients found that 25% were unemployed as a result of their illness (Basu *et al.*, 2014).

One author has estimated the annual costs for hospital admissions for AAV in the USA to be $150 million per year but this did not take into account costs associated with outpatient visits and medications (Cotch, 2000). There appear to be differences in the financial concerns expressed by patients in the USA compared to the UK and Germany, with more USA patients concerned about finances (19%), compared to 10% in the UK and

6% in Germany (Herlyn *et al.*, 2010). A possible explanation may be the differences in the health care systems: in the UK health care is free but in many other countries patients need to have purchased health care insurance or pay for care themselves. Furthermore, disability and employment benefits vary from country to country. The true financial impact for patients in many countries is largely unknown.

AAV can have a significant effect on an individual's quality of life. The majority of studies in AAV have used outcome measures designed by doctors which assess disease activity and damage but there is a dearth of research into patient-reported outcome measures. Patients and doctors may have different views on the impact of AAV. There is limited data available on the impact of AAV from a patient's perspective. This area of research has received little attention until now and there is general agreement that vasculitis outcome measures should also include what is important to patients (Merkel *et al.*, 2009). A study of patient-reported outcome measures of 246 vasculitis patients from the UK, Germany and the USA identified several aspects of the disease that are not covered in the existing disease outcome measures used in clinical trials (Herlyn *et al.*, 2010). Patients ranked fatigue, reduced energy and musculoskeletal symptoms as the most important factors associated with the disease. Although the majority of patients in this study had AAV (81%), it included 19% of patients with other types of vasculitis and it is not known if these conditions truly represent similar conditions to AAV. For example Giant Cell Arteritis is almost in a category of its own, is relatively common, easy to diagnose and relatively easy to control and affects mainly the elderly.

It is clear that the impact of a diagnosis of AAV is significant and patients will need information and advice in order to help them manage their disease. It is vital therefore that patients receive education and counseling to help them to self-manage and participate in informed decision making (Mukhtyar & Luqmani, 2007). There is no research into what it is like to receive the diagnosis of AAV or what the informational needs of this group are. Whilst there are tools available for assessment of disease activity, such as the Birmingham Vasculitis Activity Score (BVAS)(Luqmani *et al.*,

1994), and damage, the Vasculitis Damage Index (VDI) (Luqmani *et al*.,1994, Exley *et al.*,1997), as yet there is no instrument available to assess patients' informational needs in AAV. This chapter examined the literature on the impact of AAV on individuals' lives physically, psychologically and financially. The next chapter will focus on patient education in long-term inflammatory conditions.

Chapter 3 Patient education

The previous chapters illustrated that the impact of a diagnosis of AAV is significant and patients will need information and support in order to help them cope with and manage their disease. This chapter will provide an introduction to patient education and the different methods of delivering it. The AAVs as already described are long-term inflammatory conditions and as there is little knowledge about education programmes in AAV, this chapter therefore will focus on the evidence base for education programmes in other similar long-term inflammatory conditions.

3.1 Patient education

Patient education has been defined by Lorig (1996) as:

'any set of planned educational activities designed to improve patients' health behaviours and / or health status. The purpose is to maintain or improve health, or, in some cases, to slow deterioration' (Lorig, 1996:13).

Although this definition might be considered broad, it defines patient education as having to be planned. It fails to account for any opportunistic learning that occurs during routine clinical practice in the context of consultations and also any learning that patients have undertaken. In 1998 The World Health Organisation added the term 'therapeutic' to patient education and defined it as:

"Therapeutic patient education should enable patients to acquire and maintain abilities that allow them to optimally manage their lives with their disease. It is therefore a continuous process, integrated in health care. It is patient-centred; it includes organized awareness, information, self-care learning and psychosocial support regarding the disease, prescribed treatment, care, hospital and other health care settings, organisational information, and behaviour related to health and illness. It is designed to help patients and their families understand the disease and the treatment,

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cooperate with health care providers, live healthily, and maintain or improve their quality of life" (WHO, 1998:9).

This definition is much broader and acknowledges that it is not just planned education, that it is a continuous patient centred process and covers a range of activities that focus upon informing patients and their families about their condition. However, it assumes that patients with complex conditions like AAV will be able to understand complex immunology, pathophysiology and pharmacology of their condition and furthermore that health care professionals are able to relay this information in a simple form that patients can understand. In order to do this health care professionals need to have sufficient knowledge of AAV and be able to explain it in simple terms avoiding the use of jargon.

Lorig and colleagues highlight the fact that self-efficacy is a vital component of patient education if patients are to achieve better health outcomes (Lorig *et al.*,1999). Self-efficacy is the confidence in one's own ability to be able to carry out a specific activity or achieve a change in mental state. The aim of patient education is to provide patients with the skills and knowledge to feel confident to be able to monitor and manage their disease, to improve or maintain their quality of life.

3.2 Traditional patient education

Patient education is delivered in many ways from giving information, supplying written materials, structured one-to-one education, group education and the use of behavioural approaches such as cognitive behavioral therapy (CBT).Traditionally, patient education was provided by doctors on a need to know basis, or in response to patients' questions. This didactic approach was a one-way process and patients were seen as passive recipients and not involved in decision making about their care (Hoving *et al.,* 2010).

3.3 Patient education programmes

In the 1990s patient education programmes emerged and there was a move to active involvement of patients in shared decision making (Charles *et al.,* 1999, Entwistle & Watt, 2006). Education programmes are now well established in chronic conditions such as diabetes, chronic obstructive pulmonary disease (COPD), asthma and rheumatoid arthritis (RA) and have been shown to have positive outcomes for patients (Davies *et al.,* 2008, Gallefoss, 2004, Barlow *et al.,* 2000, Albano *et al.,* 2010). A structured group diabetes education programme compared to usual diabetes education demonstrated a greater reduction in smoking, weight loss, depression, blood lipids and an increased understanding of diabetes (Davies *et al.,* 2008). Patients with COPD randomised to group education versus usual care showed a reduction in general practitioner (GP) visits and a decrease in the use of reliever medication (Gallefoss, 2004).

3.4 Patient education in rheumatic disease

Patient education is routinely provided for a number of rheumatic conditions as part of standard care. Structured patient education programmes are often facilitated by members of the multi-disciplinary team and cover areas such as diagnosis, disease management, coping and self-management (Hammond, 2004, Hurley & Beane, 2008). Patient education is a key component of the role of rheumatology nurse specialists (Phelan *et al.*, 1992, Ryan & Hill, 2004, Carr, 2001, Ryan *et al.*, 2010, Oliver & Leary, 2012).

3.5 Which method of patient education is effective?

Much of the evidence of patient education in rheumatic conditions comes from patients with rheumatoid arthritis and osteoarthritis (OA). Rheumatoid arthritis is a symmetrical, chronic, debilitating, inflammatory arthritis which is treated with drugs that suppress the immune system. Osteoarthritis is a syndrome of joint pain with functional limitation (Conaghan *et al.*, 2008) and reduced quality of life (NICE, 2008). It is treated with paracetamol, topical

non-steroidal anti-inflammatory drugs (NSAIDs), oral NSAIDs and sometimes with joint replacement surgery.

3.5.1 Written materials

Written information leaflets are frequently used to inform patients about their illness, treatment and management. The Arthritis Research UK (ARUK) (formerly the Arthritis Research Campaign (arc)) has produced written patient information materials for a number of musculoskeletal conditions, medications used to treat these conditions and information on how to live with arthritis, amongst many others. They are available in most rheumatology departments and can be down loaded from the ARUK web site. These are routinely used to supplement verbal information given to patients during consultations. These materials have been designed by doctors for patients and are in the main written clearly and without jargon.

3.5.2 The effectiveness of written materials

Studies have evaluated the effectiveness of written materials in inflammatory arthritis (Maggs *et al.,*1996, Barlow & Wright,1997,Hill & Bird ,2002, Walker *et al.,*2007). Maggs and colleagues studied the effect of a written educational leaflet for patients with inflammatory arthritis *(*Maggs *et al.,*1996*).* One hundred and fifty patients (118 RA, 20 inflammatory arthritis and 20 with other types of arthritis) were randomised to one of three groups. Group one had routine follow up, group two received routine follow up and an educational booklet and group three received routine follow up, an educational booklet plus educational teaching individually from a health care professional, lasting 30-60 mins. The two groups that received the booklet increased their knowledge but the group that received routine care did not. Participants given the educational teaching did no better than those who received the booklet. There was no improvement in health outcomes in any group but the duration of the study was short (six weeks) and this is probably too soon to see significant changes. The educational teaching intervention could be considered costly and time-consuming. Similarly, face

to face teaching is influenced by an individual's personality and motivation to learn (Golay *et al.*, 2007).

Barlow and Wright conducted a randomised control trial evaluating the effectiveness of the ARUK written information leaflet on RA (Barlow *et al.*1997). Fifty three patients received the ARUK leaflet compared to 55 who did not, and both groups received standard care. After three weeks the group who received the leaflet statistically increased their knowledge (p<0.001) and had reduced pain and depression compared to the control group. Although the study demonstrated positive results, this was over a very short time period. A subsequent study to compare the effects over six months was conducted with 84 patients from the original study. Results demonstrated that knowledge was statistically maintained (p<0.01) at six months (Barlow & Wright,1998). Hill and Bird (2003) conducted a randomised controlled trial comparing the effectiveness of a written drug information leaflet plus verbal information to RA patients. Patients were randomised to receive the drug information leaflet or the drug information leaflet plus a verbal explanation. At 24 weeks both groups had statistically improved their knowledge of the medication (p<0.001), however there was no statistical difference in knowledge gain between the two groups (p=0.109). In this study 12% of patients had difficulty reading, therefore the use of written materials may not be the most appropriate method for those with low reading levels.

3.5.3 Low health literacy

A study in Glasgow found that one in six RA patients attending rheumatology out-patient clinics were illiterate (Gordon *et al.*, 2002). A recent review reported that the prevalence of low health literacy in musculoskeletal conditions is between 7%-42% (Loke *et al.,* 2012). Low health literacy may impair an individual's ability to understand written educational material. Health literacy is defined as:

"the degree to which individuals have the capacity to obtain, process and understand basic information and services needed to make appropriate decisions regarding their health " (Nielsen-Bohlman *et al.*, 2004:6).

Tools are available to estimate the readability of health information,with the two most commonly used being the Flesch Reading Ease scale (Flesch, 1948) and the Flesch-Kincaid Grade (Kincaid *et al.*,1975). They calculate how easy or difficult passages are to read, based upon word and sentence length. The Flesch Reading Ease scale scores from 0-100, 0 being unreadable and 100 most readable. The Flesch-Kincaid Grade calculates the reading level using USA school grade levels as the measure (Friedman & Hoffman-Goetz, 2006). A grade of six is considered suitable for patient education materials and this is the equivalent of year seven or first year of secondary school in the UK (Doak *et al.*,1996)

 A recent American study evaluating the readability and suitability of patient education materials used in osteoarthritis, rheumatoid arthritis, systemic lupus erythematosus and vasculitis found that most materials were written at readability levels above the recommended sixth-grade reading level and have only adequate suitability (Rhee *et al.*, 2013). This study evaluated credible web-based and written materials from different organisations such as the American College of Rheumatology (ACR), Mayo Clinic Health Information, National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS), Up-to-date Basics, Up-to-date Beyond the Basics, Vasculitis Clinical Research Consortium (VCRC), and the Vasculitis Foundation. A total of five to six resources for each condition were evaluated. The Flesch-Kincaid Grade was used to measure readability. The mean readability scores were 0A 9.5, RA 10, SLE 9.9 and vasculitis 12.5. When the scores were re-calculated after taking out disease names, drug names, web links and illustrations, all the scores did improve slightly 0A 8.2, RA 8.6, SLE 8.9 and vasculitis 10. However, collectively all the materials are still above the recommended reading level of grade six, with vasculitis scoring the most difficult at 12.5. Individually, only one source, Up-to-date Basics, met the recommended reading age for OA, RA and SLE

(4.8). The Vasculitis Foundation resource had the highest reading age of 12.5.

Suitability of the materials was measured using the Suitability Assessment of Materials (SAM) created by Doak *et al.*,(1996). This is a validated tool to assess the content, literacy required, graphics, layout and typography, learning stimulation and motivation of materials. There are 21 questions which are scored superior (2 points), adequate (1 point), or not suitable (0 points). Therefore, the highest score possible is 42 and the lowest 0. The given score is divided by the total possible score to obtain a percentage. A score of 0–39% is considered not suitable, 40–69% is considered adequate, and 70–100% is considered superior (Doak *et al.*,1996). The mean suitability scores were 68% for 0A, 56% for RA, 57% for SLE and vasculitis 45%. The lowest suitability score was for the VCRC material on vasculitis 32%. The range of scores for readability and suitability may reflect the different complexities of the conditions studied, with OA considered not as complex as the others. This study also only evaluated a small number of educational materials for each disease.

There is a dearth of research into the most effective way to teach patients with low health literacy skills (D'Eath *et al.*, 2012). Health care professionals need to think about the methods they use to teach patients with poor reading skills. A pictorial mind map in which information is presented diagrammatically with key words and images has been used in patients with RA (D'Eath *et al.*, 2012). A randomised controlled trial of the ARUK printed leaflet for RA, compared to a mind map and the ARUK leaflet, found that both formats significantly increased knowledge. However, there was no significant difference between the leaflet and the mind map, compared with the leaflet alone (D'Eath *et al.*, 2012).The mind map did not improve the knowledge of the 15% of patients with low health literacy. One explanation may be that although the mind map has pictures and words, it can still be perceived as complex by individuals. Whilst written leaflets are easy to produce and relatively cheap, they may not be applicable for people with poor reading skills. People with low health literacy therefore may benefit

from other educational strategies where individual verbal education is critical.

3.5.4 Educational interventions

Reimsma and colleagues studied the effect of an educational intervention alongside routine follow up by a rheumatology specialist nurse (Reimsma *et al.*,1997). Two hundred and sixteen patients with RA were randomised to one of three groups: group one received educational materials plus an arthritis passport with individual support from a nurse; group two just had the educational materials; and group three received standard care. The arthritis passport is an individual record of all encounters and activities with health care professionals and contains information on medications, results of blood tests and an individual management plan. At six months there was no difference in knowledge, disease activity, self-efficacy or behaviour change in any of the three groups. One possible explanation might be the fact that patients had long standing RA (average 13 years), where established behaviour is difficult to change. Another reason is that the group may have been very knowledgeable about their condition and self-management. Although the nurses in this study received training in delivering the educational intervention, many nurses find it challenging to cover everything in a routine follow up appointment due to time constraints. Also, the intervention was originally designed for use in group settings and therefore may not be transferrable for use in one-to-one education.

3.5.5 Internet

In the UK approximately 77% of people have access to the internet (Office of National Statistics, 2011). It is increasing being used as a medium for accessing health information. A study in Glasgow found that 43% of patients attending rheumatology outpatient clinics had access to the internet and 27% had used it to access medical information (Gordon *et al.*, *2002)*. In Germany 56% of patients had access to the internet and 27% used it to find health information (Ritchter *et al.*, 2004). A study by Hay *et al.,*(2008) found that 87.5% of American patients used the internet to find

information about their symptoms prior to their first outpatient appointment in rheumatology. However, only one in five discussed this with the doctor: reasons given were that patients did not want to challenge the doctor, with several respondents reporting that information on the internet was confusing and unreliable.

A survey carried out in 1998 revealed that only 16% of 1912 rheumatology websites were directed at patient education (Tench *et al.,*1998). Van der Vaart and colleagues (2011) explored what patients wanted from a hospital based rheumatology web portal. A total of 227/ 484 patients completed a questionnaire survey, response rate of 47%, female 143 (63%), mean age 52 years, 44% of the respondents had RA, 50% other rheumatic conditions and 6% did not know their diagnosis. Of these, 87% had access to the internet, over half (53%) used it daily and 22% once a week. The most common reason patients used the internet was to find information about their disease 82%, lifestyle issues 63%, medications 62%, treatments 49%, care providers 35%, support groups 34% and law regulations 32%. Approximately two thirds of patients stated that if the web portal was available, they would use it to find information on their disease, treatment and for care and support. Younger patients and women were more likely to use e-consultations. This study had more elderly patients and this may have influenced the results.

A survey of rheumatology health care professionals to determine computer use for education reported that 40% had used it to educate patients and 97% had used it at some time for personal education (Nicolaou *et al*., 2012). This maybe an under-representation as it was based upon their perception and not actual use. Although many patients use the internet to access information, it is not known if the services provided are what patients want (Wilson & Lankton, 2004). Many websites have been developed with no input from patients and without knowing what patients require (Pagliari, 2007).

3.5.6 Group education

Group education is one method of providing patient education. There have been a number of studies evaluating the effectiveness of group education. Hawley (1995) conducted a review of 34 randomised control trials using psychoeducational interventions in rheumatology. Sixty percent of participants were recruited from outpatient clinics, 52% had RA and 8% OA, with the rest recruited from the community where the diagnosis was unclear. The majority of interventions used in the studies were self-management or cognitive behavioural therapy (CBT). The four main outcome measures used were knowledge, health and psychological status and behaviour. The psychoeducational interventions demonstrated a small improvement in pain, depression, self-efficacy, coping abilities, self-management and knowledge. The studies using self-management demonstrated an increase in self-efficacy at three months compared to controls. At the end of three months the CBT group demonstrated an improvement in coping skills. Due to a lack of homogeneity in the groups and the wide variety of interventions used it is difficult to make direct comparisons and determine the most effective intervention. None of the studies reported a reduction in drug toxicity, employment status or morbidity.

A Dutch study compared group education in RA patients, with and without partners plus booster sessions (Riemsma *et al.,* 2003). The education programme consisted of a five sessions once weekly for two hours for eight patients, plus or minus their partner, led by specially trained rheumatology nurses, followed by a refresher sessions at three, six, and nine months. Two hundred and eighteen RA patients plus partners were randomised to one of three groups. Group one (79) received the educational intervention with their partner; group two (79) received the educational intervention without their partner and group three (80) were just provided with a written copy of the self-help educational materials. Those in the education group without their partner demonstrated higher scores for coping with their symptoms and reduced fatigue, compared to those in the group with their partner. The benefits at six and twelve months were only

seen for self-efficacy and fatigue. Including partners in the group education appeared to have a negative effect of increasing fatigue and patients not adopting coping strategies. The exact reasons for this are unknown.

A Swedish randomised control trial evaluated the effect of using a problem-based learning approach to educate people with rheumatic conditons (Arvidsson *et al.,* 2012). Paricipants were randomised to either the experimental group or the control group. There were 54 participants in the experimental group, 11 men, 27 women, mean age 56.4 years,148 participants in the control group ,33 men and 91 women , mean age 55.2 years who received usual care. The experimental group was divided up into seven small tutorial groups of 7-8 participants. The tutorials lasted one and a half hours delivered ten times over a one year period. At one year the experimental group had increased empowerment and reduced fatigue compared to controls. There were no differences between the groups for pain and self-care ability but two thirds of the experimental group had made lifestyle changes. There was a high dropout rate in the experimental group (13) compared to the control group (17). Although problem-based learning may be a useful approach to patient education it is labour intensive and expensive. More research is needed to evaluate this approach in the future.

Grønning *et al.,* (2012) evaluated the benefits of combining both individual and group education in an open randomised controlled trial of inflammatory arthritis patients. One hundred and forty one were randomised to either usual care (70) or the educational intervention (71). The educational intervention was three group education sessions lasting three hours, alternate weeks in groups of 8-10 with mixed conditions, supported with a 45 minute individual education session at the end of the programme. The intervention group demonstrated an increase in their global wellbeing $p < 0.01$ and small effect for self-efficacy in managing their symptoms. None of the participants showed a reduction in their learning needs at the end of the programme as measured by the The Educational Needs Assessment Tool (ENAT) developed by Hardware and colleagues (Hardware *et al.*, 2004).This was a surprising finding as most education programmes increased patients' knowledge. There is a possibility that the ENAT was not

an appropriate measure as it asks "how much do you want to know now".
Although the patients still had educational needs at the end of the study,
one explanation is that patients want to stay updated. Another explanation
could be that the usual care group received a high level of care. A
weakness of this study is that it did not measure patients' knowledge before
or after the intervention. Also, the study had a high rate of non-recruitment
with only 141 /536 were recruited (26.3%) but the reasons why so many
patients declined are not reported. Therefore it is not known if the study
group are representative of the population studied.

3.6 Self-management programmes

Self-management is crucial to enable patients to cope with and make
decisions about their condition on a daily basis. Barlow (2002:178)
describes self- management as the:

> 'individual's ability to manage the symptoms, treatment, physical and
> psychosocial consequences and life style changes inherent in living with
> a chronic condition'.

Self-management programmes have been developed with the aim of
providing people with the skills to be able to live with and manage their
chronic condition. The Arthritis Self-Management Program (ASMP) was
developed in the USA by Kate Lorig and colleagues (Lorig *et al.,* 1998).The
programme is delivered in six weekly small group sessions lasting 2- 2.5
hours by trained lay educators. The topics include self- management
techniques, disease information, exercise, depression, how to
communicate with health care professionals and families, how to deal with
pain fatigue, isolation, symptom management and goal setting.

A long-term evaluation of participation in the ASMP demonstrated
continued improvement in self-efficacy, some use of self- management
techniques and reduced anxiety and depression (Barlow *et al .,*2009).
There was a 44% response rate 125/282, 87% female, mean age 65 years,

disease duration mean 19 years, 48% RA, 485 OA others not specified. Over an eight year period, maintained improvements were seen for self-efficacy, anxiety and depression, pain and fatigue. In contrast there was a decline in physical function, with an increase in the health assessment questionnaire (HAQ) score from baseline 1.5 to 1.7. There was no difference in visits to health care professionals over the time period. The sustained improvements cannot be attributed soley to the programme as there was no control group and they would have received ongoing health care over that timeframe.The programme has been evaluated in the UK and Canada showing no improvement (Barlow *et al.,* 2000, Solomon *et al*., 2002). This could be due to the fact that studies carried out in the USA cannot be directly transferrable to the UK or Canada because of the different cultures and health care organisations.

A review of self-management programmes in rheumatology of OA, RA and fibromyalgia included 27 studies (Iverson *et al*., 2010). Seven of the studies included all conditions OA (50-75%), RA (15-35%), fibromyalgia (15-17%), eight only OA, five inflammatory arthritis and seven fibromyalgia. Of the seven studies including all diseases, six evaluated the Arthritis Self-Management Programme (ASMP) in various different formats from group provision, mailed format and internet delivery. The final study evaluated the personalised programme delivered in home visits by health care professionals 'I'm Taking Charge of My Arthritis' (ITCA) (Nour *et al.* 2007). The other studies were run by peers or were self-directed. All the ASMPs included CBT aiming to change behaviour, apart from the ITCA. At one year five studies demonstrated improvements in self-efficacy, four in function, two in pain and one in mood. African-Americans enrolled in the ASMP were shown to benefit least (Goeppinger *et al*.,2007) and non-Hispanic white individuals gained the most, either taking part face-to-face or on the internet (Lorig *et al*.,2004).

3.7 Systematic Reviews

Niedermann and colleagues conducted a systematic review of patient education in RA (Niedermann *et al.,*2004). The review focused on two

types of education programmes. Those that solely used education to increase knowledge and improve function and those that used a psychoeducational approach of teaching intervention activities with behavioural techniques to improve coping and bringing about a change in behaviour. Eleven randomised control trials were included, seven educational, four psychoeducational and one included both. The seven educational programmes demonstrated an increase in knowledge and adherence to medications and exercise regimes at six months and at one year but did not show any improvement in health status (Bradley *et al.,*1987 ,Brus *et al.*,1998,Taal *et al.*,1993,Lindroth *et al.,1997,* Helliwell *et al.*,1999, Hammond *et al.*,1999, Scholten *et al.1999*). The four psychoeducational programmes showed an improvement in coping short term, with two of them having a positive outcome on physical and psychological wellbeing (Bradley *et al.*,1987, Parker et al.,1995, Kraaimaat *et al.*,1995, Parker *et al.*,1998). The authors concluded that there is evidence that education can improve patients' knowledge both in the short and long-term and that pyschoeducational progammes can increase coping especially pain short term but probably not long-term.

A Cochrane review of 31 randomised control trials of patient education programmes in RA found that there were statistically significant short term results, namely a 12% reduction in disability, anxiety and depression and patient global assessment, a 9% reduction in joint counts, a 5% reduction in psychological status and a 4% reduction in pain (at 3 months) but this was not sustained long-term (at one year) (Riemsma *et al.*, 2009). A criticism of many of the studies was the lack of detail of the educational intervention, the wide variety of outcome measures used and a lack of disease-specific programmes. Also, access to patient education programmes can be difficult due to the time commitment and it is possible that only motivated patients attend. The majority of studies included individuals with long standing disease and did not examine adherence to therapy as an outcome measure of the educational intervention. They concluded that research into education programmes should be disease-specific and tailored to meet individual patient's needs.

A systematic review to evaluate the effectiveness of patient education in several different chronic illnesses including rheumatic conditions found variable results (Lagger *et al.*,2010). The review included 35 meta-analyses which reported on a total of 598 studies. They found that 64% of studies demonstrated an improvement in health status, although 30% showed no effect and 6% of studies reported deteriorating health outcomes. The authors concluded that the majority of the study interventions were poorly described, the content of the educational sessions was not able to be replicated and the control group was not adequately described. In their opinion therapeutic patient education is complex and many of the study results may be understated. This is due to the fact that it is impossible not to give information as part of routine care in any control group in a patient education programme.

An international analysis by Albano *et al* .,(2010) of patient education programmes in rheumatology for RA from 2003-2008 demonstrated positive results in 28/37 studies, namely a reduction in pain, disability, fatigue and disease activity scores. The other nine studies showed no improvement in reducing anxiety and depression or improving coping skills. Of the 22 studies evaluating the effect on psychosocial improvement, 11 demonstrated an improvement in function/ pain and other symptoms, six an improvement in coping, four a reduction in depression and reduced anxiety in another four. Although positive results were reported in most studies, six studies reported no improvement and two studies worsening effects. Only three studies examined the economic effect with conflicting results one study showed a reduction in GP visits (Chui *et al.*, 2004) whereas the other two reported no better use of the health care system (Siu *et al.*, 2004, Nour *et al.*, 2006).

The studies used a variety of educational strategies, with group education the most popular 20 (54%) of these six used problem solving techniques 13 (35%) and one used self- learning with printed materials including a mind map 1(2%) (Walker *et al.*, 2007), one-to-one education 5 (13%), 3 (8%) counselling, printed leaflets, 2 (5%) telephone coaching, 1 (2%) web, 1 (2%) video and one computer instruction (2%).

3.8 Adherence

Medications are the mainstay of treatment for inflammatory rheumatic conditions and are vital to patients' survival with AAV. However, 50% of patients with a long-term condition do not adhere to medicines (Horne & Weinman, 1998, Osterberg & Blashe, 2005). The definitions used to describe whether patients are taking medications as prescribed have changed from 'compliance' to 'concordance' and now 'adherence'. Compliance was the term commonly used up until the 1990s (Nunes *et al.*, 2009).

Compliance is:

 ' a willingness to follow or consent to the wishes of another person, whereas adherence is the action of sticking to, supporting or following a person or an idea' (Buchmann, 1997:3).

The problem with the term 'compliance' was that the literature tended to ignore the patient's perspective or saw their view as a problem. Compliance assumes that the patient is obedient, unquestioning of medical instructions and that it is irrational not to follow orders (Stimson,1974).

'Concordance' replaced the term 'compliance' in 2003 (Medicines Partnership, 2003). Concordance is a new approach to the prescribing and taking of medicines. Concordance is:

'an agreement between a patient and a health care professional that respects the beliefs and wishes of the patient in determining whether, when and how medicines are to be taken. Although reciprocal, this is an alliance in which the health care professional recognise the primacy of the patients' decisions about taking the recommended medications'. (www.concordance.org)

Adherence is defined by the NICE guidelines (2009:4) as:

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'the extent to which the patient's behaviour matches agreed recommendations from the prescriber'.

Non- adherence is a behaviour that can be intentional or non-intentional. Non-intentional is when patients forget to take medication, may not have enough money for medications or forget to renew a prescription. Intentional non-adherence is when patients feel better so stop their medication, do not take their medication because they are worried about side effects and are frightened of the risks associated with that medication.

Non –adherence is linked to a patient's beliefs, attitudes and fears about medications. Donovan & Blake (1992) found that fear of side effects was the most common reason for rheumatology patients not taking medications. A questionnaire study investigating the beliefs and attitudes of RA patients taking medications found that half of patients had strong concerns about potential long-term effects, 47% were worried about side effects, 56% about dependence and 50% reported that they had experienced side effects (Neame & Hammond, 2005). Despite two thirds of them agreeing that medications were essential for health. Patient involvement in decisions regarding treatment is vital, particularly medication as Bitten *et al.*,(2000) found that not exploring the patients' thoughts and preferences led to misunderstandings and non-adherence with medication.

3.8.1 Education to improve adherence

Education interventions to improve adherence to medications have produced mixed results. Hill conducted a randomised control trial of a patient education programme to improve medication adherence in 100 RA patients (Hill *et al.*,2001). Forty nine patients were randomised to routine care and 51 to the education intervention. The intervention consisted of seven 30 minute sessions with a rheumatology nurse practitioner using a self-efficacy approach. Patients were provided with information on RA, drug treatment, coping strategies and pain control. They also received a written information leaflet on D penicillamine. The patients in the routine care

group also received the same leaflet. The educational intervention demonstrated a small statistical improvement in medication adherence 86% v's 76% at six months but no improvement in clinical outcome. This study used a pharmacological marker to measure adherence. One criticism of this study is that the intervention is costly and time-consuming and therefore not generalizable.

A systematic review of persistence and non-adherence of biological therapy in RA patients was carried out (Marissa *et al.*, 2011). Fifty two studies were included, 38 from Europe, 11 from the USA and 3 from other countries. In 25/38 studies in Europe, 66% patients were still taking medication at one year. In eight out of eleven USA studies that reported persistence 44 -62% patients were still taking medication at one year. In two of the other three studies persistence was 76% at the end of one year. Only four USA studies measured adherence with rates of 41- 68%. The methods used to measure persistence and adherence were not clearly defined in most of the studies and if reported varied considerably across studies. The majority of studies reported < 75% persistence at one year. Rates for individual drugs ranged from 42%-89% in Europe and 44 -62% in the USA. Another systematic review of medication adherence by Harold & Andrade (2009) in inflammatory arthritis patients found wide-ranging results. Self-reported adherence rates were between 30-99% compared to adherence rates of 18-26% measured by pharmacy dispensing. The high reported rate for self-reported adherence could be due to bias recall and overestimation by patients. The studies varied enormously in design, making direct comparisons difficult: the majority of studies included only one medication for a short time frame and some studies used medications that are not used now such as D penicillamine and salicylates. Patient education programmes designed to improve adherence with medications have been criticised, as often the patients are not given the authority to make changes to medications as this is seen as the responsibility of the doctor or nurse (Albano *et al.*, 2010).

3.9 Which is the most effective patient education method?

Patient education is a key component of the management of many chronic diseases (Barlow *et al.,* 2000, Reimsa *et al.,* 2009, Albano *et al.*, 2010). Provision of high-quality information and education can empower patients to become active partners in the management of their condition (Coulter, 1997, Opie, 1998, Spalding, 2003), reduce anxiety, and improve satisfaction with care (Marcusen, 2010).

The evidence presented above for the effectiveness of patient education programmes has shown mixed results. Patient education is complex and it is difficult to separate out the effects of the intervention. There are other difficulties in assessing the effectiveness of the studies in that many of the interventions cannot be directly compared since there is no consensus on the specific outcome measures that should be used. A variety of educational interventions have been used. Many of the outcome measures assess clinical outcomes such as disease activity, inflammatory markers and disability, all of which are influenced by medications taken by patients (Li, 2007). Also, patients will seek information independently from a variety of sources and receive education as part of routine care.

Patient education is generally accepted as worthwhile and something that should routinely be carried out. It is often mentioned in clinical guidelines, however it is unclear as to the best method of providing patient education. There is little research into the effectiveness of one-to-one education in rheumatology (Hammond & Niedermann, 2010). One-to-one education is influenced by many factors: the setting, personalities, social and educational background, prior knowledge, anxiety levels and motivation to learn. The strongest evidence is for written materials from whatever source, as this improved knowledge in most studies. The evidence to support either individual or group education programmes in addition to written materials is variable. Cognitive behavioural therapy has shown to improve pain, adherence and disease knowledge (Hawley,1995), educational behavior interventions demonstrated a small improvement in pain, depression, self-efficacy, coping abilities and self-management (Hawley,1995, Albano *et al.,*

2010). A weakness of the research into patient education is that it fails to acknowledge the process of adult learning, how patients understand the messages and how they acquire the skills and knowledge to be able to manage their disease competently (Albano *et al.*, 2010). Similarly, most studies have not tested the readability or suitability of the educational materials used. Many of the studies of patient education in rheumatology may not be applicable to AVV, due to the inherent differences in the conditions studied.

Furthermore, there is a self-selecting bias in patients recruited to educational interventions: they tend to be female, elderly and well educated (Hawley,1995), making it difficult to identify who would most benefit from an education programme, the exact nature of this and the timing of it. Overall provision of high quality information can improve knowledge, however what is less clear is the impact of knowledge levels on disease outcomes. It is also important to develop educational materials from a patient's perspective. According to Li we first need to understand the patient's information needs in order to improve the educational strategies and outcome measures used (Li, 2007). Ormandy (2010:99) describes a patient information need as:

"the recognition that their knowledge is inadequate to satisfy a goal, within the context / situation that they find themselves at a specific point in time.'

For the purpose of this thesis, information need is defined as "information that patients require during their disease pathway". The next chapter will focus on a review of the literature on what it is like to receive a diagnosis of AAV and identification of the informational needs of this group of patients.

Chapter 4 Literature review

It is clear that the impact of a diagnosis of AAV is significant and patients will need information and education to help them to self- manage and participate in informed decision-making. The aim of this chapter is firstly to review the literature on what it is like to receive a diagnosis of AAV; secondly, to identify the information needs of this group, including educational interventions and self-management behaviours. Lastly, toidentify gaps in knowledge and provide justification for this study.

4.1 Literature search

An electronic search of the literature was undertaken. The databases searched were; EMBASE, Medline , Cumulative Index to Nursing and Allied Health Literature (CINAHL), PsycINFO, PubMed, The Cochrane Library, Web of Science and Web of Knowledge. Search terms used were: patient information, patient education, educational needs, information needs, self-management, AND ANCA associated vasculitis, primary systemic vasculitis, vasculitis, Wegener's granulomatosis, microscopic polyangiitis, Churg Strauss syndrome, experience of receiving a diagnosis of ANCA-associated vasculitis, without language bars from 1990- 2013. The reason 1990 was chosen as the start date was because until the 1990's most patients died relatively quickly.   A hand search was also undertaken of the references in papers and abstracts from conference proceedings such as the ANCA workshop , the British Society of Rheumatology, The Americam College of Rheumatology and The European League Against Rheumatism were considered. The literature was monitored over the period of the study and another intensive literature review took place in January 2014 and the same search strategy was used.

Inclusion criteria	Exclusion criteria
Published between1990 and 2014	Comment/ editorial
Abstract or full text published in English	No focus on AAV
Quantitative and qualitative studies	Case reports
Patient education / patient information	
Receiving a diagnosis of AAV	
Information needs	
Sources of information	
Self-management	

Table 4 Inclusion and exclusion criteria for reviewed papers

The initial search revealed 107 citations. All citations were reviewed to determine if they met the inclusion criteria above. A total of 95 papers were excluded and these included 50 case reports, 29 duplications, 12 papers with no focus on AAV, one editorial, one personal opinion, one patient page and one patient summary (Figure 8).

Key search terms

Key words: :"patient information"," patient education"
, "Vasculitis", " self-management", " ANCA
associated vasculitis" , "Wegener's granulomatosis
", "microscopic polyangiitis ", "Churg Strauss
syndrome" " experience of receiving a diagnosis" ,
without language bars

107 citations
Apply criteria to title and abstract

Reason for exclusion
Duplication n=29
Editorial n=1
Personal opinion=1
Patient Page=1
No focus on AAV=12
Case reports 50
Patient summary=1

Total included for review 12
2 papers: Evaluation of Patient Education
Programmes
2 abstracts: knowledge of treatment side
effects and one web page
2 self-management
6 Medication

Figure 8 Results of literature search

The literature search revealed that there were no papers describing the
experience of receiving a diagnosis of AAV. A total of 10 papers and two
abstracts met the inclusion criteria for review. There were two papers
describing an evaluation of a patient education programme for vasculitis in
Germany. Two papers were found on the subject of self –management and
six papers regarding medications. One abstract described a vasculitis web
page and one reported patients' knowledge of side effects of therapy.

4.2 Results

As shown in figure 8 there were two studies conducted in Germany evaluating a patient education programme for AAV. Herlyn and colleagues developed an education program for use in an in-patient hospital rehabilitation setting (Herlyn *et al.,* 2002). The programme consisted of five ninety minute lectures on diseases, therapies, side effects, coping strategies, nutrition and physiotherapy delivered by the multidisciplinary team of doctors, nurses, psychologist and nutritionists. The lectures were given daily over a two week period in groups of 10-15 patients. Patients were also provided with handouts of the slides. An evaluation of the programme was undertaken using a knowledge questionnaire at four weeks. The questionnaire consisted of 16 questions, with a minimum score of 0 and a maximum of 45. The SF36 was used to measure quality of life. An initial evaluation of the programme at the end of four weeks demonstrated a statistically significant improvement in knowledge overall from 24 points at baseline to 28 at four weeks (53.3%- 62.2%). Improved knowledge was also seen in the areas of medical (18 v's 21) (40%-46.6%) and nutrition (4v's 6) (8.8%-13.3%). Although improvements were seen, these could be considered small as the patients already had a satisfactory overall knowledge of vasculitis at baseline. Their knowledge of nutrition was poor at baseline and after the intervention. The actual numbers of participants are not given, making it difficult to interpret these findings. At four weeks participants reported statistically improved health-related quality of life in some domains of the SF36, namely social functioning, emotional role functioning and psychological care. There was no difference in pain, general health status or physical functioning. This could be partly explained by the short time frame and the fact that we do not know if these patients were receiving treatment for induction of remission, maintenance or relapse, and it can take up to 3-6 months to achieve disease remission with treatment. The article is written in German with the abstract translated in English. The rehabilitation setting is a specialist vasculitis center to which patients are referred and treated as in- patients. They have dedicated resources available to look after AAV patients and have a captive audience. Very few clinicians looking after patients with AAV will have access to this

type of service provision. Most patients in the UK are managed as oupatients apart from during the initial acute illness. Therefore, this type of inpatient education programme may not be transferrable to other settings. The content was designed by doctors, health care professionals and patients. The programme is delivered by ninety minute didactic lectures and this method has been cited by patients as one of the least preferred methods of education (Neville *et al.*, 1999). Ninety minutes could be considered a long time for patients to remember and process information. A problem with group education is that it is difficult to check patients' understanding and some patients may feel embarrassed to ask questions in a group setting. The groups included many different types of vasculitis and it is not known if they were educated in disease specific groups. Interpretation of this paper is very difficult for several reasons: the knowledge questionnaire has not been validated, there was no control group and the mention of small numbers of participants but no exact figures are given.

Furthermore, this educational programme was delivered in an inpatient setting and it is not known if the programme was delivered on an out-patient basis whether the results would be comparable. It could also be considered costly. This type of educational delivery may not meet all the needs of the group. The length of disease duration is not known and this may have influenced the results. Patients with long-standing disease may be more knowledgeable than those who are newly diagnosed. Currently, patients are staying in hospital for shorter periods and there are reduced opportunities to spend time educating patients so this method may not be the most suitable for the UK.

This inpatient programme was updated in 2003 to include five multi-disciplinary modules (Herlyn *et al.*, 2003). Module one is delivered by a doctor covering vasculitis, immunology and diagnostic procedures. Module two includes information on treatment, side effects and monitoring run by either a doctor or nurse. In module three a psychologist deals with acceptance, stress and coping strategies. A physiotherapist provides information on mobility and prevention of osteoporosis. Lastly, a dietician

provides advice on diet and inflammation and what a healthy diet is. The delivery was changed to include a 20 minute lecture, followed by group discussions and interaction between patients. A longitudinal evaluation of this programme was carried out in a prospective pre and post design study (Herlyn *et al*., 2008). Assessments were carried out before the programme, at four weeks, six months, and 12 months after participation. One hundred and two patients participated in 10 groups from 2001-2006. The majority were female (70%), mean age 55 years (range 23-87), mean disease duration 3 years (range 3months- 3 years) GPA 30, EGPA 16, small vessel vasculitis 12, MPA 9, leucocytoclastic vasculitis, 10, GCA 10 and 16 unclassified. The results showed a statistically significant increase in patients knowledge in three domains: treatment and side effects (p>0.0001), diet (p>0.0001) and physiotherapy (p>0.0003). There was also an increase in health-related quality of life. There appeared to be no increase in knowledge in the areas of disease, immunology and diagnostic procedures. This could be due to the fact that these are complex areas to cover and one 20 minute session may not be enough time to cover this. Or it could be due to the fact that patients were taught in small groups of 10-15 patients, where it is more difficult to test individuals' understanding, particularly of complex theories. A strength of this education programme is that it included some elements of CBT, 100 patients were involved in the design and psychosocial aspects were included. It also demonstrated improved results from the earlier study. It is not known if one-to-one teaching methods would have produced different results. Inpatient education programmes could be considered costly and the majority of education programmes are now delivered in an outpatient or community setting.

4.2.1 The Internet

The internet is increasing being used as a medium for accessing health information. One abstract was found of an online questionnaire survey of visitors to a web page for vasculitis education (Uhlfelder *et al*.,1999). Three hundred and four visitors to the website completed online questionnaires, 205 (67.1%) had vasculitis and 77 (25.3%) were family members of

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patients with vasculitis. The majority of responders were female 188 (64.6%), male 103 (35.4%), mean age was 44years (range 16-83 years), mean age at time of diagnosis was 43.3 years. Twenty-five (10.0%) were from Maryland or surrounding states, forty-two (16.8%) were from 21 different countries outside of the U.S.A., including Canada, India, Vietnam, Italy, Brazil, and Australia. No visitors were from the UK. Visitors' diagnoses, central nervous system vasculitis 3.5%, leukocytoclastic vasculitis 8.2%, RA vasculitis 5.3%, Behcet's 3.6%, Henoch-Schönlein purpura 3.6%, giant cell arteritis 3.0%, and hypersensitivity vasculitis 3.0%. This study collected basic information on self-reported disease types but only a few respondents reported having AAV, 10.5% had PAN, and 6.7% GPA. Surprisingly 78 (25.6%) visitors were unsure of their diagnosis. Although respondents used the website to access information, it is not known if the information posted on it was information that the respondents were looking for (Wilson & Lankton, 2004). This website may have been developed without knowing what respondents want from an internet site (Pagliari, 2007). There is limited detailed information in the abstract to derive any meaningful conclusions. The sample is biased towards females and younger people.

4.2.2 Self-management

A vasculitis self-management scale (VSMS) was developed by Thorpe and colleagues (Thorpe *et al., 2007).* It is a 43 item questionnaire covering eight adherence behaviours (medication adherence, following advice from health care providers, infection avoidance, diet, exercise, symptom monitoring , prompt reporting of symptoms and side effects and adjusting activities). A total of 205 patients with self-reported AAV and small vessel vasculitis completed the questionnaire. There was a good response rate of 75%, internal consistency of the subscales as measured by Cronbach's alpha was found to be >0.70 for all subscales apart from the adjusting activities.

Thorpe and colleagues used the VSMS to examine the self-management behaviours of 202 patients with self-reported AAV in the USA (Thorpe *et al.*, 2008). Patients were asked to rate their perceived difficulty on a scale

of 0-6 (0= no difficulty, to 6=extremely difficult) in performing the self-management behaviours described above and their experience of the barriers to carrying out these activities on a 5 point scale (1=no barriers to 5 =all of the time).

Approximately half the respondents were female, 93% white, mean age 55 years, mean disease duration 6 years and mean of 15 years education. Seventy two percent had GPA, 8% MPA, 5% EGPA and the remainder had renal vasculitis and the mean number of medications prescribed was 6.7 (range 0-18). Patients ranked taking medications (mean 5.9) and attendance at follow up visits as extremely important (mean 5.7) and they felt that they had little difficulty in performing these activities (medications mean 1.5 and follow up visits 2.0). However, they reported having several difficulties regarding medications, they had difficulty adhering to complex medication regimes, understanding when to take their medication and were slow to report symptoms and medication side effects (Thorpe *et al.*, 2008).They believed that medication side effects would go away and they did not want to trouble their doctor about these. They reported having difficulty accessing their doctor and would just wait until their next appointment. One explanation for the reluctance to report medication side effects may be attributed to a lack of understanding or a lack of information. This is worrying as some treatment side effects are serious and one aim of educating patients is early recognition of side effects of medication. This study also found that patients had difficulty following exercise regimes and only followed advice if they thought it was important. The findings may not be generalisable as this was a convenience sample, biased towards patients with kidney involvement and longer disease duration. Even so, this study provides a valuable contribution to the understanding of some of the difficulties patients experience and insight into their health beliefs. Further research is needed to discover what type of information and knowledge patients need to help them self-manage their condition.

4.2.3 Medications

Medications are crucial to patients' survival in AAV and Carpenter and colleagues studied the effect of conflicting information on medication adherence in 228 vasculitis patients of whom 59% had AAV (Carpenter *et al.*, 2010). The data collected was part of the Assessing Social Support in Symptom Treatment (ASSIST) study which is a longitudinal observational study which examined the medication management of vasculitis patients (Carpenter *et al.*, 2010, Carpenter *et al.*, 2013). Respondents completed two online questionnaires three months apart, 232 / 253 patients (92%) completed the baseline questionnaire and 228 (98.2%) at three months. The questionnaire included several subscales of which one was the Vasculitis Self-Management Survey (VSMS) medication adherence subscale. The scale has six questions which asks respondents to rate their medication-taking behaviour over the last four weeks on a five-point Likert scale from 1= none of the time to 5 all of the time. A further question asks respondents to rate the percentage of medication taken exactly as prescribed from 1= 0-24% and 5= 100%.

The difficulty subscale The Self- Efficacy for Appropriate Medication Use Scale (SEAMS) was used to assess how confident they were in taking their medications using a three point Likert scale (1= not confident, to 3= very confident). The Beliefs about Medicines Questionnaire (BMQ) was used to test respondent's beliefs about whether their medication would have an effect on their disease now and in the future, using a five point Likert scale (1= strongly disagree, to 5 = strongly agree). As there is no published conflicting medications scale in the literature, a conflicting medications scale was created to find out if respondents had ever received any conflicting information from two sources (two doctors or a doctor and the internet). Lastly, respondents were asked to rate four items relating to their specialist vasculitis doctors' encouragement regarding medication adherence. Questions asked were: how often their doctor supported them in taking their vasculitis medication, if they provided them with new information about vasculitis treatments, if they were they given advice on how to deal with side effects side of medication and if they were they given

enough support to take drugs as prescribed. This was rated on a four point Likert scale (1=does not do this, to 4=does this a lot). The questionnaire took one hour to complete.

A total of 228 respondents participated ,70% female, 91% white, mean age of 51 years, disease duration 6.4 years and college education of 15.6 years. This study found that just over half of vasculitis patients reported receiving conflicting medication information (51.3%) and were less adherent than those who did not receive contradictory advice. They reported several areas where there was often a conflict of information, seriousness of side effects of medications (35.5%), types of side effects (35%) and length of treatment (30.7%). In this study a large number of respondents were experiencing a flare or relapse (28.4%), therefore this group would be seeing their doctor more frequently and their medications would be assessed and most likely changed or an increase in dosage advised. The frequency of conflicting information was a surprising finding as there are significant seriou side effects of therapy such as increased risk of infection, infertility, bone marrow suppression, haemorrhagic cystitis and cancer. However, a recent study of the opinions of 50 vasculitis experts found that doctors differed greatly in what information they gave patients about the risks and side effects of rituximab and cyclophosphamide (Cozmuta *et al.*, 2013). One area where they differed in opinion was whether to disclose to patients the possibility of rare side effects such as multifocal leukoencephalopathy and serious mucocutaneous reactions.

There are a few limitations of this study: the conflicting medications scale has not been validated, there are other respected sources of medication information such as nurses and pharmacists and this was not tested. Recall bias is a weakness of this study as 15% of respondents could not remember if they had received any conflicting information. The accuracy of receiving conflicting information was not assessed. When asked how confident they were that their medications would work, this group had high expectations of their medicines being effective (4.4 /5) but this was linked to decreased medication adherence. The reasons for this are not fully understood but a possible explanation given by the authors is that

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individuals who believe their medications will work are more likely to remember instances where they have forgotten to take them. Doctor support was associated with better medication adherence but did not correlate to patients' expectations of medications. This study reports high conflicting information, twice as many from a previous study in rheumatology (Lim *et al.*, 2007). However, it does not report if there was a difference between conflicting information received between doctors or between doctors and the internet. Using the internet may increase the risk of conflicting information as the sources may not be reliable or up to date. The sample was biased towards female and white and respondents had a self-reported diagnosis of AAV. Although 228 respondents completed the study and the response rate is reported as 98%. This needs to be interpreted with caution as a total of 683 were invited to take part, of which only 67/ 361 mailed respondents participated. The very low mail response rate represents a selection bias, therefore the results may not be generalisable to AAV patients.

A study by Carpenter *et al.*, (2011a) examined the sources of information which patients with vasculitis used to find out about medication and assessed their perceived credibility. This was an online survey and part of the ASSIST study, 232 of 253 patients (92%) completed the questionnaire, 81 % self-diagnosed AAV, 70% female, mean age 51 years, average disease duration 6.5 years. Males and females cited doctors as the most used information source, followed by the internet. Nurses and support groups were used less frequently. The least used sources were family and friends. There were gender differences with males reporting that they would use their spouse/ partner much more than females mean (3.11 v's 1.62). Males were more likely to seek information from nurses than females (2.65 v's 2.14). The group was highly educated with 66% males and 58% females being college graduates. It is not known if the same results would have been obtained with less well educated patients. Also, non-internet users may have different opinions regarding sources of information and possible concerns about the credibility of internet sources. The quality of information on the internet is variable and quality was not judged in this study. A weakness is the recall bias of medication sources used over a one

year period. The sample is biased towards females 69% and is predominately white 91%, 59% had AAV but with a self- reported diagnosis of vasculitis. This study needs to be replicated using a postal survey to compare results.

Using the same sample population as the ASSIST study described earlier, Carpenter and colleagues examined the effect of medication-related support on the quality of life of patients with vasculitis in remission and relapse (Carpenter *et al.*, 2011b). Health-related quality of life was measured using the SF 36 questionnaire. In this study 28.4% were experiencing a relapse and 71.6% were in remission. Medication support was measured by asking four questions: how often their doctor or partner helped them with taking their medications, gave additional information about their drugs, offered advice on how to deal with side effects and provided support to take their medications as recommended by their doctor. This was graded as 1=does not do this to 4=does this a lot. Both groups reported equally moderate amounts of support from their doctor and partners (mean=2.1). Those experiencing a relapse had reduced quality of life in seven out of the eight domains, apart from physical role limitations. Greater doctor support was associated with better quality of life in six domains of the SF36 apart from the bodily pain and energy domains. Similar results are seen with partner support. The reasons why support did not influence pain and energy is surprising as one might expect analgesic medication to influence symptoms such as pain. However, we do not know if the pain was related to their vasculitis or whether the patients were taking any analgesia. A recent study of 410 AVV patients found that 74.8% reported high levels of fatigue and this was associated with several factors, of which disturbed sleep and pain were the most important (Basu *et al.,* 2013). A raised inflammatory marker (CRP) was also linked to fatigue. Fatigue is a multi-faceted phenomenon and more research is needed to explore the reasons for fatigue so that strategies can be developed to help patients manage this difficult symptom.

Again, using the same sample population as the ASSIST study described earlier, Carpenter and colleagues examined what sources vasculitis

patients used to find out information about their vasculitis medications (Carpenter *et al.*, 2012). Participants were asked how often they consulted pharmacists, doctors and the internet to seek information about their medications. This was rated on a five point Likert scale (1= never, 2= rarely, 3=sometimes, 4=often and 5= always). Using two questions from the McCroskey and Teven Credibility Scale respondents were asked to rate how knowledgeable these sources were on a scale of 1-9 (1= not at all knowledgeable to 9=extremely knowledgeable) and how expert the source was from 1-9 (1= not at all expert to 9= extremely expert). A total of 232 /253 respondents participated (91.7% response rate), of the sample 96 had used a pharmacist for information, 217 had used the internet, 87 had used all three, unfortunately the paper does not give numbers for how many used a doctor. But they do report that doctors were the most frequently used source of medicines information, followed by the internet and lastly pharmacists.

Pharmacists were only used occasionally as a resource for information and this was statistically significant (p=0.004). This is a surprising finding as pharmacists have a wealth of knowledge about medicines. However, in this study a third of respondents used a mail pharmacy service thus reducing the opportunities for exchange of information.

Respondents believed that the doctor was the most credible source of information (mean 7.83), followed by the internet (mean 7.09) and pharmacists were seen as the least credible (mean 6.44). Just over a quarter of respondents were experiencing a flare or relapse therefore this group would be seeing their doctor more frequently and their medications would be assessed and most likely changed or an increase in dosage advised and this could have influenced the results. A possible explanation that the internet was viewed as a more credible source than pharmacists could be due to the fact that 58.8% of participants reported using credible vasculitis websites such as the Vasculitis Foundation and the Churg Strausss Syndrome Association and 34.8% used well-known vasculitis hospital centres' websites. Moreover, these websites have a wealth of information written by vasculitis experts for patients. The results need to be

interpreted with caution as the views of non-internet users may be different. A weakness is the recall bias of medication sources used over a one year period. The sample was predominantly females and white ,with a self-reported diagnosis of vasculitis. This study needs to be replicated using a postal survey to compare results.

4.2.4 Medication adherence

Pepper and colleagues tested the Informational – Motivation Behavioral Skills (IBM) model of adherence originally developed to test medication adherence in individuals with human immunodeficiency virus (HIV) on 172 vasculitis patients (Pepper *et al.,* 2012). In this model, adherence information (information on when to take drugs, dosage and side effects) and motivation (attitudes and beliefs to medication, support and confidence to take it) are key influences that impact adherence. They wanted to know if depressive symptoms and motivation to be adherent had any influence on support and adherence behaviour. They also investigated, whether doctors or partners had any effect on adherence. The sample population was from the ASSIST study of 232 respondents but 42 were excluded because they did not have a partner and a further 18 because of missing data.The Self-Efficacy for Appropriate Medication Use Scale (SEAMS) was used to assess how confident individuals felt they were in taking their medications as recommended.

Depression was measured using the Centre for Epidemiological Studies Depression Scale (CES-D). The four-item Morinsky scale was used to assess adherence. The sample was biased towards female 70% and Caucasians 94%, and respondents reported low disease severity and medication regimes as not complex. Good support from doctors was associated with a better self-efficacy and improved adherence but how much support participants received from doctors is not known. However, good partner support was only associated with better adherence. Respondents had known their doctor for approximately two years and their partners 24 years. A weakness of the study is that adherence to medication was not formally tested via pill boxes and the measure used was self-report. How often participants were reviewed is not clear. The respondents

in the study had low disease activity and could be considered in remission, therefore may not be taking many medications or following complex regimes and thereforemay not be representative of many vasculitis patients who are taking complex medication regimes, including immunosuppressants, steroids and prophylactic medication for cardiovascular disease, osteoporosis and infection.

A recent study examined what factors are associated with medication non adherence in vasculitis patients (Carpenter *et al*., 2013). They used the same sample population as the ASSIST study described earlier. They recruited 106/228 patients, exploring whether demographic, depressive symptoms, support and experience of side effects influenced non-adherence. In addition, they wanted to find out if this was related to any particular medication. Depression was measured using the CES-D, the VSMS assessed adherence and medication support was evaluated as previously described (Carpenter *et al*., 2011b). Patients were asked to report if they experienced side effects (yes/no) to eight medications, steroids, cyclophosphamide, azathioprine, methotrexate, ciclosporin, co-trimoxazole, mycophenolate mofetil and rituximab. A total side effect score was calculated by the number of yes responses (0-8). Sixty percent of respondents had GPA, 12.7% EGPA, 7.9% MPA and one fifth of respondents other types of vasculitis. The majority of patients were taking steroids 173 (75.9%), followed by co-trimoxazole 83 (36.4%), then azathioprine 74 (32.5%), cyclophosphamide 63 (27.6%), methotrexate 58 (25%), mycophenolate mofetil 42 (18.1%), rituximab 27(11.6 %) and a small number 11(4%) ciclosporin. The group perceived their disease severity as moderate (mean 4.2) and their medication regime as not complex (mean of 3) as measured on a scale from 1-10. Over half (55%) of the respondents experienced depressive symptoms.

Nearly all respondents (97.7%) experienced side effects due to steroids and a significant number with cyclophosphamide (79.4 %), approximately half with azathioprine (47.3 %) and only 25.3 % with co-trimoxazole. Patients reported to be most adherent to azathioprine (mean 1.8/ 5) and steroids (mean 1.69/ 5). This could be attributed to the fact that they

recognised that medications are vital to their survival. However, those patients who experienced side effects from any of the drugs were less adherent than those patients who did not experience side effects.

Several factors were associated with medication non adherence, being female, younger age, experience of side effects and low mood. It is difficult to interpret the findings from this study as it is not clear from the figures cited how many patients were taking more than one medication and whether patients were prescribed oral or intravenous cyclophosphamide. The route of administration of cyclophosphamide may have influenced the results: as patients have to attend day unit facilities regularly to receive intravenous cyclophosphamide and those taking oral do not, it could be considered more difficult to be non-adherent when receiving intravenous therapy. The small numbers taking some of the medications also make it difficult to generalise the findings. It is not known if the side effects experienced by respondents were mild or serious, as patients may legitimately stop taking medication due to recognised side effects and may have been instructed to do so. Unfortunately, the researchers did not measure adherence with individual drugs. Despite this, this study raises awareness that vasculitis patients are just as likely to be non-adherent as other groups of patients and health care professionals should discuss patients' medications with them and address any concerns that they might have.

4.2.5 Patients' knowledge of side effects

One abstract was found relating to patients' knowledge of medication side effects in AAV (Brown *et al*., 2012). A total of 700 questionnaires were distributed to the membership of Vasculitis UK , 347 were returned of which 306 had AAV, GPA 241(79%), EGPA 41(13%), MPA 15 (5%) and other 9(3%).There were 190 females (62%), males 38%, mean age 61.7 (range 15-87), medication use was oral steroids 96%, oral cyclophosphamide 49% , intravenous cyclophosphamide 41%, AZP 69%, MMF 28% and rituximab 14%. Knowledge of side effects of treatments, osteoporosis (20.9%), weight gain (19.3%), increased risk of infection (10.5%), increased risk of

cancer (7.5%) (skin 6.5% and bladder 3.9%). A small number were aware of the need for skin protection (13%). There are some limitations to this study: the respondents had a self- reported diagnosis of AAV, the sample was biased towards GPA and an unvalidated questionnaire was used. However, this study does demonstrate that respondents had poor knowledge of the side effects of medications used to treat AAV, indicating there is a need to educate patients on the risks associated with medications used to treat AAV.

4.3 Gaps in Knowledge

Research in AAV has concentrated on the areas of epidemiology, disease outcomes, classification systems, drug trials, adherence to medication, self-management behaviours and quality of life. The subject of patient education has been evaluated in one inpatient education programme in a tertiary referral centre in Germany (Herlyn *et al.*, 2002, Herlyn *et al.*, 2008). However this was not a randomised controlled trial. A tool has been developed and used to assess the self-management behaviours of AAV patients (Thorpe *et al.*, 2007, Thorpe *et al.*, 2008). However, as yet there is no self-management programme specifically for AAV patients. Several studies have explored medications in relation to conflicting information, credibility of information sources, medication support and adherence (Carpenter *et al.*, 2010, Carpenter *et al.*, 2011a, Carpenter *et al.*, 2011b, Pepper *et al.*, 2012., Carpenter *et al.*, 2012, Carpenter *et al.*, 2013). Whilst these studies provide valuable new data on the subject of medications and provide some insight into patients health beliefs, all of these studies used the same sample population of the ASSIST study. These studies need to be replicated in a wider population, to include equal numbers of men and women, equal numbers of participants in remission and relapse and include participants taking complex medication regimes.

The educational needs of patients with AAV have not been fully addressed. Whilst there are examples of printed leaflets for vasculitis from ARUK, the leaflet is generic and not disease specific (ARUK , 2011). There are examples of excellent written patient education materials produced by

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patient organisations e.g. Vasculitis UK and the Vasculitis Foundation. However, the majority of these materials are written at readability levels above the recommended sixth-grade reading in the USA and year seven in the UK (Rhee *et al.*, 2013).The valuable role and contribution that patient organisations provide for patients has received little research attention and is an area for future research.

No study has explored the patients' experience of receiving a diagnosis of AAV and we know very little about the informational needs of this group. There may well be significant unmet needs for these patients. Understanding what it is like to be diagnosed with a rare condition can help clinicians prepare patients better for receiving the diagnosis and improve the patient experience. In November 2013 the UK Government launched its "Rare Disease Strategy", unveiling five key areas for improvement across the whole patient journey: empowering patients, recognition and prevention of rare diseases, early diagnosis and treatment, co-ordination of care and the role of research (DH, 2013). If we are to achieve the first aim of empowering patients, first we need to understand what patients want to know about their illness so that information and education can be tailored to meet their needs and priorities, so that they can truly participate in shared decision-making and make informed choices. The next chapter will discuss the methodology and methods of the proposed study.

Chapter 5 Methodology and methods

The earlier chapters identified the limitations of current knowledge, in that no study has explored the patients' experience of receiving a diagnosis of AAV and that we know very little about the informational needs of this group. The aim of this chapter is to examine the methodology and methods which will be used to explore the patients' experience and informational needs. The first part will identify the aim of the research, the research questions and purpose of the study. The second part will describe the research methods used in the study and provide a rationale for the chosen method. Lastly, to identify how the data were analysed and describe the methods used to ensure trustworthiness and rigour.

5.1 Aim of the research

The aim of this study was:
1) To understand the patient's experience of being diagnosed with AAV
2) To develop a Vasculitis Informational Needs Questionnaire
3) To survey the membership of Vasculitis UK (a patient support group) and The Vasculitis Clinical Research Consortium (VCRC) (an online registry with self-reported AAV) to find out the informational needs of people with AAV.

5.2 Research questions
The research questions were:

1) What is the experience of receiving a diagnosis of a rare potentially life threatening condition such as AAV?
2) What are the informational needs of patients with AAV?
3) How do patients with AAV prioritise their informational needs?
4) How is information provided to patients and by whom?
5) What sources of information are preferred?

6) Are there any differences in the informational needs of patients in the UK and USA?.

5.3 Theoretical/Philosophical Orientation

Research has a complex system of terminology, concepts and meanings, with a wide range of different methods and approaches. It is represented by an overarching research perspective which is referred to as a paradigm; a paradigm is an agreed set of shared beliefs and practices that guide the research (Morgan, 2007). The paradigm influences the research approach, as it is used as a framework to guide the study question, the study methods and data analysis. Researchers belong to one of three paradigms: quantitative, qualitative or mixed methods (Biesta, 2010, Freshwater & Cahill, 2012, Greene & Hall, 2010).

The positivist paradigm is used in quantitative research. Positivists believe that only one reality exists (ontology) and they aim to find out the truth (Lincoln & Guba, 1985, Creswell & Plano Clark, 2007). The epistemology (how we came to know) of the positivist paradigm is based upon the deductive methodology of the scientific approach (O'Hear, 1989). It is objective, it separates facts from values, numerical data is used, hypotheses are tested, results are generalisable and the researcher and participant are independent (Robson, 2002).

Conversely, the Interpretive/constructionist paradigm that underpins qualitative research opposes the idea of the scientific approach. It is driven by a philosophy that in order to comprehend this world one must interpret it through the lived experiences of those in it (Polit & Beck, 2004). A theory is built upon what individuals perceive exist, data collection is narrative (Teddlie & Tashakkori, 2009).

The pragmatic paradigm is used in mixed methods research: the philosophy is that many different approaches can be used to answer the research question. It values both objective and subjective data

(Cherryholmes, 1992, Tashakkori & Creswell, 2007). As a method it collects and analyses both quantitative and qualitative data in the same study. Numerical and narrative data are used because they are best suited to answer the complexity of research questions.

5.4 Study design

In planning the design of a research study, it is crucial to think about the best method of data collection in order to answer the research question. As no study in the UK or abroad has explored the patients' experience of receiving a diagnosis of AAV, or identified the informational needs of this group of patients, a mixed methods approach was chosen as the study design.

5.5 Mixed methods

Greene and colleagues identify mixed methods as an approach to answering research questions using a combination of qualitative and quantitative methods to collect data for analysis (Greene *et al.*, 1989). The qualitative method collects the spoken word and   aims to discover rich experiential data from the patients' experiences in order to provide an in-depth understanding of their views. The quantitative element collects numbers and allows for comparisons to be made, hypothesis to be tested and results are generalisable (Robson, 2002). As more researchers began incorporating qualitative and quantitative methods into their research design, many different names were given to this method of research over the years. It has been called "quantitative and qualitative " methods (Fielding & Fielding, 1986), it has been referred to as " integrated " or "combined" research by Steckler and colleagues (Steckler *et al.,*1992), "hybrid" research (Ragin *et al.*, 2004) and "combined research" (Cresswell, 1994). All of these authors acknowledge the two different methods in their terminology and some have considered a broader view of how these methods are combined in a study. It was clear that more thought was needed to clarify exactly what mixed methods research was and the categories for describing the mixed method design (Bryman, 1988, Greene

et al.,1989, Cresswell,1994,Tashakkori & Teddlie, 1988, Morgan, 1998). To help clarify the different terminologies used, authors began to provided definitions of what mixed methods are (Creswell & Plano Clark, 2007, Burke *et al* ., 2007,Tashakkori & Creswell, 2007).

Tashakkori & Creswell, (2007:4) defined mixed methods as:

 "research in which the investigator collects and analyses data, integrates the findings and draws inferences using both qualitative and quantitative approaches or methods in a single study"

Creswell & Plano Clark (2007:5) provide a similar definition of mixed methods research as:

 'a research design with philosophical assumptions as well as methods of inquiry. As a methodology, it involves philosophical assumptions that guide the direction of the collection and analysis of data and the mixture of qualitative and quantitative approaches in many phases of the research process'.

Burke and colleagues analysed 19 different mixed research definitions in the literature and provided this statement of what mixed methods research is:

"Mixed methods research is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration" (Burke *et al.*, 2007:123).

All of these definitions are broadly similar and a criticism of mixed methods research was that it was often not clear how these methods were combined, the reasons for choosing them in a study and the sampling method (Fielding & Fielding, 1986, Bryman, 1988, Cresswell, 1994,

Onwuegbuzie & Collins, 2007). It is important to justify the mixing of qualitative and quantitative research in the same study. Greene *et al.*, (1989:) distinguishes five categories for carrying out mixed methods research:

1.   Triangulation: the data can be used from different methods to confirm, confound or corroborate findings;
2.   Complementary: use one method to explore, illustrate or enrich the results from another;
3.   Development: when the results from one method are used to guide and inform the development of another;
4.   Initiation: to discover any contradictions or new understandings, used to modify any research questions;
5.   Expansion: to use different methods to expand the depth and breadth of the research.

Bryman (2006) analysed 232 mixed method articles and applied Greene *et al's* (1989) categories for carrying out mixed method research, finding that the majority used were complementary (28.9%), followed by expansion (25.4%) then development (10.3%), triangulation (7.8%), initiation (0.4%) and in over a quarter (27.2%) no reason was given. From this analysis he added to Greene's list that mixed methods can also be useful in obtaining diversity of views, illustrating concepts and developing instruments. Although these provide useful guidance on the reasons for conducting a mixed methods study, the researcher needs to consider how the process of the two different approaches are integrated in the same study (Tashakkori & Teddlie, 1988).

 As many different mixed methods designs can be implemented, most designs use timing to guide the different data collection phases of the study (Onwuebbuzuie & Collins, 2007). Timing is used to explain how the qualitative and quantitative elements of the study are to be undertaken, for example whether data collection is to occur at the same time (concurrently) or one after the other, so that the results from the first phase are used to inform the other (sequential) (Onwuebbuzuie & Collins, 2007). It is also

essential to stipulate how the data interpretation has informed the study (NIH, 1999). This integration requires a clear methodological approach so that it does not resemble a 'pick and mix' (Gilbert, 2006). Therefore, a rationale for the inclusion of both qualitative and quantitative methods and analysis in the study will be provided.

5.6 Rationale for using mixed methods

Reflecting on which paradigm to use in this research caused the researcher great angst, as they felt forced to choose from two very different but opposing paradigms, namely positivism and constructionist/ interpretive. The researcher struggled to fit the research questions neatly into one or other of these paradigms. Tashakkori & Teddie (2003) believe that the focus should be on the research question as this drives the method rather than philosophical viewpoints and the researcher should not be made to choose between competing paradigms. The key is that a practical approach should be adopted to guide methodological choices.

This is supported by Johnstone & Onwuegbuzie (2004) who suggest that mixed methods is the third paradigm and that taking a non-purist approach enables the researcher to design studies which use both qualitative and quantitative methods in order to answer the research question. The researcher felt that the competing paradigms restricted the approach to the study design and so adopting a pragmatic approach which values both objective and subjective data and respects different paradigms was suitable for this study since the research questions in this study could not be completely answered by either qualitative or quantitative methods alone. Mixed methods were chosen in this study to provide a greater and broader understanding and explanation of the research question rather than using one method alone (Creswell & Plano Clark, 2007). It allows a more flexible approach to the study design and has greater potential to extend the impact of the research to a wider community (Sandelowsk, 2000).

Recently there has been an increase in the use of mixed methods in nursing and healthcare research, largely due to the recognition that using

either qualitative or quantitative methods alone is inadequate to portray the complex nature of the environment (Creswell *et al.,* 2003, Howe, 2004, Johnstone, 2004).

5.7 Two phase exploratory sequential design

A two phase exploratory sequential design has been chosen as the mixed methods approach (Creswell & Plano Clark, 2003, Tashakkori &Teddlie, 1998). This approach uses a qualitative first phase where results are used to inform and guide the second quantitative phase (Greene *et* al., 1989). The underlying philosophy is that an exploration is needed first because there is little known about the subject and there are no specifically designed or validated tools or instruments available (Creswell & Plano Clark, 2007). This design is frequently used for the development of new instruments (Greene *et al.*, 1989) and often used to investigate components of emergent themes (Morgan, 1998). The advantages of this design are that the two phases are distinct and make data collection easier. However, it can take a long time to start both phases.

The first qualitative phase of the study used three focus groups and eight one-toone interviews to explore the informational needs of patients with a diagnosis of AAV. The findings from the first phase were used to guide and develop the Vasculitis Informational Needs questionnaire. This was used in the second quantitative phase to conduct a patient survey using the membership of the support group Vasculitis UK and the membership of the VCRC (Figure 9).

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Overview of Study Design

Qualitative Phase    Develop vignette     Focus groups 1,2      Transcription                    Face to Face        Transcription         Patient's Views
                     and focus group      and 3 Norwich          Analysis                        Interviews            Analysis
                     interview schedule   Birmingham and                                     Birmingham Norwich
                                          Romford                                               and Romford

                                                            Themes from the focus
                                                            groups will be explored in                                                  Themes from the
                                                            greater depth at the face                                                   patient's views will be
                                                            to face interviews                                                          used to guide and inform
                                                                                                                                        the second phase

Quantatative Phase   Develop Vasculitis   Pilot              Survey Vasculitis    Analysis         Used to guide
                     Informational        Questionnaire      UK and VCRC          Questionnaire    development of
                     Needs                                                                         package
                     Questionnaire

                                                                                                   Develop
                                                                                                   Educational
                                                                                                   Package
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Figure 9 Overview of study design

5.8 Ethical Approval and Research Governance

Ethical approval for the study was obtained from the East Norfolk and Waveney Research Ethics Committee (ref 07/Q0603/9) (Appendix D), together with local site specific approval in Birmingham and Romford. Ethical approval was also obtained from the University of South Florida Institutional Review Board for the Vasculitis Clinical Research Consortium e-mail survey (USF IRB Pro00006828) (Appendix E). Informed consent was obtained from all patients participating in the focus groups and the face-to-face interviews. Consent was not obtained individually from members of Vasculitis UK, as return of the questionnaire was taken as implied consent. All participants had to agree to participate in the study prior to the participant accessing the online survey. The participant's

willingness to participate in the study was documented. The informed consent documented that the participants were free to refuse entry into the study and free to withdraw from the study at any time without prejudice to future treatment. The online system did not collect the subject's name, only the fact that the participant agreed to take part (Appendix F).

It was explained to the participants that if at any time during the focus groups or individual interviews they experienced any distress when recalling a particularly sensitive situation, the participant could terminate the interview and would be offered access to support systems for counselling. Similarly, if the researcher witnessed disclosure of unsafe/unethical medical practice, the researcher would have to follow up the issue with the appropriate professional body.

5.9 Qualitative First Phase

A qualitative approach was chosen for the first part of the study, to answer the research question number 1 "What is the experience of receiving a diagnosis of a rare potentially life threatening condition such as AAV?". Qualitative methods are suitable to explore perceptions, opinions and experiences and are often used to study phenomena about which little is known (Polit & Beck, 2004). It enables the researcher to seek the views and opinions of individuals and gain an understanding and insight of their social world (Parahoo, 2006). They can explore topics in greater depth and are able to offer explanations and understanding which are missing from the traditional scientific quantitative approach (Mason, 2002). Qualitative methods allow a more flexible and sensitive approach to data collection than quantitative, where strict parameters are identified and set and cannot be deviated from. Focus groups and one-to-one interviews have been chosen as the qualitative methods.

5.10 Focus groups

Focus groups are one qualitative approach of data collection (Kreuger, 1998). A focus group is a method of interviewing a small selected group of

individuals to explore a specific subject in depth. The individuals are purposively chosen because of their experience and knowledge of the subject area. The aim of the focus group is to facilitate discussion between the individuals, so that they can share their experiences, opinions and attitudes, thus allowing the researcher to gain insight into their world.

The purpose of the focus groups in this study was to explore what it is like to receive a diagnosis of AAV, by facilitating participants to share their experiences. This was carried out by a facilitator, whose role was to prepare and manage the group, ask questions, encourage active participation by all and observe the interactions within the group. Individual participation is vital and a key element of focus groups (Webb & Kevern, 2001).

5.10.1 Rationale for using the method

Focus groups have been chosen because they are particularly suited to gather rich, in-depth information when little is known about a subject. Focus groups allow participants to share their experiences and knowledge (Powell & Single, 1996). The group interaction allows a high level of face validity through the discussion which permits confirmation, reinforcement or contradiction and thus generate a rich and complex data set (Kitzinger, 1995, Greenhalgh & Taylor, 1997). This type of interaction would not be possible in a one-to-one interview, questionnaire or by direct observation. This method encourages individuals to participate who may feel vulnerable on a one-to-one basis, it allows participants to express negative aspects of care in a non -threatening environment (Avocella, 2011). It also enables the facilitator to observe the interaction of the group members where this is not possible with one-to-one interviews (Madriz, 2000). However, there are disadvantages in using focus groups as sometimes one person can dominate the conversation and influence the others. It is possible that not everyone will have the opportunity to share their views and they can be hard to control and manage (Avocella, 2011). It is an important role of the moderator to encourage everyone to join in the discussion and everybody should be encouraged to speak so that different viewpoints can be heard.

The moderator should emphasise that there is no right or wrong answers and that everybody's viewpoint is important and valuable. The moderator can use probing questions such as 'how did that feel at that moment 'to explore issues further and also to learn more about participant's reactions.

5.10.2 Vignette

A vignette was chosen as a tool to aid discussion at the start of the focus group as a sort of 'ice breaker'. A vignette is a short story designed to draw out responses to a given situation (Finch 1987). Traditionally used in quantitative surveys to find out opinions and beliefs, they are increasingly used in qualitative research (Eskinlen & Caswell, 2006). A vignette was written to capture the essence of some patients' experiences. It was appreciated however that it might not be representative of all participants' experiences.

The narrative centered on a person with AAV having difficulty getting a diagnosis and information. Because AAV is rare and many patients have never met anyone else with these diseases, it was felt that this would help with the group interaction and stimulate discussion and sharing of experiences. The participants will be sent the vignette one week prior to the focus group. The reason for starting the focus group with a vignette is that participants will have had some time to think about the story and formulate their opinions and beliefs in advance, instead of the facilitator beginning the focus group with a general question directed at the group.

5.10.2.1 Vignette: Jane's Story

'I had been feeling unwell with aches and pains and tiredness for some time and no-one really knew what was wrong with me. I had various blood tests and investigations. I was seen by several doctors and finally I was given this diagnosis of 'Vasculitis'. This made me feel rather frightened as I had never heard the name before. But, I didn't want to bother the doctor with questions as he was too busy. I became really worried and wanted to find out more about this rare condition but didn't know where to start'.

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Thinking about Jane's Story

Before you attend the discussion group could you please think about what it may have been like for Jane to be told she had an unusual disease like vasculitis and then think about what information she may have needed?

A focus group interview guide was prepared to help facilitate participants to share their experiences, opinions and attitudes (Appendix G).

5.11 One-to-one interviews

One-to-one semi- structured interviews were chosen to explore in greater depth the emerging themes from the focus groups with different individual patients to find out if the themes generated are familiar with other patients and to find out if there were any differences. Interviews are widely used as a qualitative approach of data collection (Mishlers, 1986). Loftland & Loftland (1995) describes an interview as a purposeful conversation that allows an in-depth exploration of a particular subject or experience. There are three types of interview, structured, semi-structured and open ended. The structured interview usually follows a structured questionnaire, whereas the semi-structured interview uses open ended questions and the in –depth interviews uses only one or two questions but explores them in much more depth (Britten, 1995). Kvale & Brinkman (2009:3) define a semi-structured interview as:

'an interview with the purpose of obtaining descriptions of the life world of the interviewee in order to interpret the meaning of the described phenomena'

5.11.1 Rationale for using the method

The semi-structured one-to-one interviews allow the researcher to explore topics in-depth and discover rich experiential data from the patients about their experiences. It allows the researcher to follow up interesting responses and adapt questions, which is not possible with self-administered questionnaires (Robson, 2002). In addition, during a one-to-

one interview the researcher can observe the participant's body language and eye contact which can help interpret the participant's emotion (Tod, 2006) which may add to the depth and richness of the data gained (Mason, 2002). For example body language is more powerful than the spoken word. Field notes were taken in order to record this data. Tod (2006) recommends a less structured approach to interviews where the aim is to explore a particular phenomenon, or to explain a social process or relationship.

A structured approach was considered to be too rigid and would not give the opportunity to be flexible and explore the patient's responses in more depth. However, an open-ended interview was too uncontrolled, in that it would not be possible to ask all the desired questions and there was a danger that all of the topics would not be covered. Therefore, a semi-structured approach was used to give some structure to the discussion and to ensure that all potentially relevant topics were covered. An interview guide was prepared with a list of questions to facilitate this (Appendix H). The interview guide was developed following a meeting with 10 AAV patients and three health care professionals (one nurse, one consultant and one qualitative researcher) to agree the topics for discussion.

5.12 Recruitment

Patients for the focus groups and one-to-one interviews were recruited from three centres, Norfolk & Norwich University Hospital, City Hospital Birmingham and Harold Wood Hospital, Romford. These centres were chosen as each has a medical expert in AAV with a pool of 60-120 patients with AAV. Three centres were used to ensure a broader spread of social and educational backgrounds. In each centre the rheumatology consultant approached potential participants, provided them with an information sheet about the study and a consent form (Appendix I). If the patient agreed to participate, they posted the signed consent form back to the researcher. The researcher telephoned each individual to find out their gender, age, disease status and length of diagnosis, to decide if they met the study inclusion criteria. If suitable, the researcher provided them with an

explanation of the study and what would be expected of them. The researcher thanked them for their valuable contribution to the study. In addition each participant was sent detailed written patient information materials regarding the study.

5.13 Inclusion criteria for focus groups and one-to-one interviews

Patients with AAV (GPA, EGPA, MPA and PAN) who fulfilled the American College of Rheumatology (ACR) classification criteria (Fries *et al.*, 1990) and the Chapel Hill Consensus Conference definitions (Jennette *et al.*, 1994) were included (Appendix J). Participants were aged 18 years or over (AAV is rare < 18 years). Adequate command of the English language was necessary to participate in the focus groups and one-to-one interviews. Participants had to be capable of giving informed consent.

5.14 Exclusion criteria

Participants with concomitant severe medical problems, those with life threatening disease and participants unable to give informed consent were not included. Also, those with limited command of English and being aged less than 18 years were excluded. This was determined by the participant's consultant rheumatologist. Those participants with other types of vasculitis such as Giant Cell Arteritis, Takayasu's arteritis, Polyarteritis nodosa, Kawasaki's disease, Behcets, Henoch-Schönlein purpura, Essential cryoglobulinemic vasculitis and Cutaneous leukocytoclastic vasculitis were also excluded.

5.15 Focus Group Information

One week prior to the focus groups, all participants who had agreed to attend were sent the following information: a covering letter to explain what the study was about, information on what a focus group is and their involvement, the vignette and details of the venue.

5.16 Focus group participants

Participants were invited to participate in a focus group for 1 to 1 ½ hours to discuss their experiences when given a diagnosis of AAV and to think about what their informational needs were. Three separate focus groups from different locations Birmingham, Romford and Norwich were used to ensure the broadest possible spread of social and educational backgrounds. Each focus group consisted of minimum 6 (maximum 10) participants, chosen to represent different disease subtypes of AAV (EGPA, GPA, MPA) and disease duration. A group of 6-12 members is an optimum size, as it is a manageable size for group discussion without being too large (Merton *et al.,* 1990, Stewart & Shamdasani, 2007). Smaller groups of 4-6 however are more appropriate to explore subjects where the participants have had a profound experience (Kreuger, 1988).This enables enough variation of characteristics but sufficient shared experience to allow shared discussion. Purposive sampling was used but care was taken to ensure a representative spread of age, disease duration and disease subtype, so that all diseases were represented.This was carried out by the researcher using a grid and separating individual diseases out by gender and age.

5.17 Facilitator

As participants arrived, names were checked, consent forms were collected and refreshments were served which allowed people to talk to each other informally, creating a relaxed atmosphere. At the start introductions were made to familiarise the participants with the facilitator, the moderator and the rest of the group. The role of the moderator was to observe the group dynamics, facilitate participants sharing ideas, opinions and experiences. The facilitator read a prepared welcome statement which explained that the purpose of the study was to explore the informational needs of patients with AAV, so that the information from the study can be used to develop an education programme that reflects patients' needs. The facilitator also advised the group that the focus group would be tape recorded and transcribed. It was explained to the group that under each seat was a

number and that this number would be used to identify who was speaking when the tape was transcribed. After everyone introduced themselves, including the moderator, ground rules were agreed as described by Krueger & Casey (2000), namely to respect each other, to keep confidential any material disclosed in the interview, to use first names only and finally to enjoy the session.

To start the focus group the facilitator asked everyone if they had received the vignette and read it out aloud, then they paused and asked the group, "What struck you most about this story?" This generated much discussion from individuals in the group and one participant revealed that she had not had a particularly good experience. Once the participants had finished discussing the vignette, the semi-structured focus group interview guide was used to elicit patients' expectations, views and ideas on their informational needs (Lorig, 2001).

5.18 Data Analysis

A criticism of qualitative research is that many researchers have failed to explain how they analysed their data (Lee & Fielding, 1996, Huberman & Miles, 1994). With many relying on only one method, that of constant comparative analysis developed by Glaser & Strauss (1967) (Onwuegbuzie & Leech, 2006), a weakness of this method is that by using just one approach could lead to misinterpretation of the data thus affecting validity. It should be acknowledged that data analysis of qualitative data is a subjective process and there are inherent difficulties in the reliable interpretation of it. This has led researchers to develop techniques and tools to systematically guide data analysis, so that the process is transparent (Corbin & Strauss, 1990, Glaser & Strauss, 1967, Ritchie & Spencer, 1994, Bryman & Burgess, 1994, Cresswell, 1997,Denzin & Lincoln, 1998, Feldman, 1995, Miles & Huberman, 1994, Silverman, 1993). A popular method of data analysis is the framework technique developed by Ritchie & Spencer (1994). This is a five step process which involves:

1. Familiarisation with the data.
2. Identification of a thematic framework.
3. Indexing.
4. Charting.
5. Mapping and interpretation.

The framework technique is a systematic and comprehensive method for researchers to analyse data and make sense of it by mapping emergent themes or concepts that explain the data.The focus groups were digitally recorded and transcribed as verbatim text, then the transcripts were read thoroughly and analysed by the researcher using the framework technique (Ritchie & Spencer, 1994). The first step in the process is familiarisation with the data: the focus groups transcripts were read and re-read so that the researcher was familiar with emerging ideas and recurring themes. Recurring words and sentences were underlined and notes were made in the margins of the transcripts. This enabled the researcher to understand the data and cross reference it to the study aims and objectives (Ritchie *et al.*, 2003). The second step is identification of a thematic framework, with the notes, key issues, concepts and initial recurring themes from the first step used to build a thematic framework. Similar ideas or themes are grouped together onto large pieces of paper, helping to begin to organise and classify the data (Appendix K). This framework was then applied to the other transcripts and the themes refined.

The third step in the process is indexing, where the framework is applied to the data and searched for sections of data that match a theme. Once indexing was complete, the data from the focus groups was coded into developing descriptive categories. This was then recorded onto charts, where under each theme or heading a summary of the participant's accounts was provided. This process is known as charting (Appendix L).

Finally the last step of mapping and interpreting the data occurred. This involved reviewing the data and charts as a whole, with each chart checked against sub headings and themes. The themes and sub headings were condensed further (Figure 10p118). In order to ensure that the

interpretation of the data was an accurate representation and understanding of participants' views, a summary of the identified themes was sent to the participants in the focus groups and they were invited to discuss their views on their clarity and authenticity either by post or in a telephone conversation with the facilitator (Appendix M and N). Participants agreed with the themes and subheadings and no new categories emerged and no existing ones were amalgamated. The identified themes were then used to guide the in-depth semi-structured interviews with individual participants.

5.19 One-to-one interviews

Different participants were invited to take part in a one-to-one semi-structured interview for approximately 30 minutes to 1 hour to explore their experiences in relation to their informational needs. Participants were recruited from the three same centres as the focus group participants: Birmingham, Romford and Norwich. Participants were chosen to represent the different disease subtypes of AAV (EGPA, GPA, MPA) , duration of disease and disease subtype, so that all diseases were represented. One week prior to the interviews, all participants who had agreed to take part were sent the following information: a covering letter to explain what the study was, information on what a one-to-one interview is and their involvement, and details of where the interviews would take place (Appendix I).

5.20 Data Analysis

The interviews were digitally recorded and transcribed as verbatim text. The transcribed tapes were read thoroughly and analysed by the researcher using the framework technique (Ritchie & Spencer, 1994). The data was then mapped against the framework headings and subheadings from the focus groups. The framework headings and subheadings identified were member-checked, a summary of headings identified was sent to participants in the interviews (Appendix M). They were invited to discuss their views on their clarity and authenticity either by post or in a telephone

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conversation with the facilitator. No new data emerged and the existing themes generated were validated by the participants.

5.21 Credible inferences and trustworthiness of data analysis

It can be difficult to measure the quality of mixed methods studies and authors have discussed this at length (Teddie &Tashakkori, 2003, Greene, 2007, Lincoln & Guba 1985). However, this does not mean that it does not receive the same rigour as a qualitative or quantitative study alone, just that different terminology is used to describe this process. The term 'inference' has been used by some authors to describe the process of measuring quality in a mixed methods study (Tashakkori &Teddie, 1998, Eisenhart & Howe, 1992, King *et al.*, 2004). Inference refers to the process of the study and how the results are interpreted and used to answer the research question (Teddie & Tashakkori, 2009). Similarly, it is important to consider the outcome of the study, whether the findings are consistent or different to previous literature, whether it adds new knowledge and understanding to the field or build upon existing knowledge (Krathwohl, 1993, Teddie & Tashakkori, 2009).

A number of methods were used to establish credible inferences and trustworthiness of the data analysis of the first phase. The first was triangulation of data sources, including using three geographical sites with different demographics, using both focus groups and individual interviews to explore and triangulate experiences (Cresswell, 2007). This included three researchers with qualitative and clinical expertise, who individually analysed the transcripts, followed by a meeting to agree themes. Member checking, each participant was invited to comment on the clarity and authenticity of the transcripts and the identified themes by letter or by a telephone conversation (Lincoln & Guba, 1985). Any such comments were used to validate or to review the emphasis given to themes interpretation. The results were felt to answer the research question and were found to be consistent with the literature for rare diseases. For a more detailed explanation see the discussion in section 6.

5.22 Quantitative second phase

The findings from the first phase were used to inform and guide the second quantitative phase of the study (Greene *et al.*, 1989). A Vasculitis Informational Needs questionnaire was developed and this was used to survey the membership of Vasculitis UK and the membership of the Vasculitis Clinical Research Consortium. In order to answer the research questions in 5.2 a quantitative approach was chosen. Quantitative methods allow for comparisons and hypothesis to be tested and results are generalisable (Robson, 2002). The most suitable method to find out the informational needs of patients with AAV was to conduct a questionnaire survey of Vasculitis UK (a national support group of 600 people with AAV) and to survey The Vasculitis Clinical Research Consortium (VCRC) (an online registry with self-reported AAV predominantly based in the USA). These two particular groups were chosen because they have a large membership of people with self-reported ANCA associated vasculitis from the UK and largely America.

A quantitative survey is defined as "a set of scientific procedures for collecting information and making quantitative inferences about a population" (McColl *et al*., 2001). Surveys are a valuable method of collecting data which are not easily observable or measurable (Bowling, 2002). They are useful for finding out information on beliefs, opinions, knowledge and satisfaction (Schofield & Knauss, 2011). Data can be obtained quickly and relatively cheaply. Surveys can be carried out by telephone, interview, post or via the internet. It was felt that it was not feasible to conduct a telephone survey as they are often less effective (Polit & Beck, 2004). Respondents are less likely to participate if they do not know the interviewer and gaining access to individuals' telephone numbers would be too problematic and costly. An interview survey was not felt to be appropriate due to the time involved, the cost of interviewing a large number of patients and the problems of accessing a large number of participants over a wide geographical area.

Two methods were considered appropriate to survey the two different groups. Firstly a mailed self- administered questionnaire was considered the most suitable method to survey VUK as they do not have an online membership. They distribute a quarterly newsletter to their membership and the questionnaire would be included with this. This would permit access to a large number of people from a wide geographical area. A strength of this method is that individuals are familiar with this process and the questionnaire can be filled in at their leisure (Fink, 2006) and face-to-face contact is not required (Sarantakos, 2005).The disadvantages are that respondents must be able to see and read, be motivated to fill it in and remember to post it back. Another weakness is that people with low education and low literacy skills and those who do not like writing are less likely to respond (Czaja & Blair, 2005).

Online surveys are relatively new but with the increased use and access to technology, are becoming more popular for several reasons: they are extremely efficient, quick, economical, any destination in the world can be reached and most importantly data collection is immediate. There are some disadvantages: not all households have access to a computer or the internet, individual responders may lack the technical ability to complete the questionnaire and they may not be suitable for sensitive topics (Fink, 2006, Czaja & Blair, 2005). For the reasons highlighted above, an online survey was considered the most suitable method to reach the membership of the VCRC, as this is an online registry and individuals are familiar with using this type of technology.

5.23 Informational needs tools

A search of Medline, Evidence-Based Medicine (EBM) to find a tool to assess the informational needs of people with AAV revealed nothing. One tool had been developed to assess the educational needs of patients with arthritis in general (Educational Needs Assessment Tool (ENAT) (Hardware *et al.*, 2004). It contains 39 items grouped into seven domains, managing pain (6 items), movement (5 items), feelings (4 items), arthritis (7 items), treatment (7 items), self-help measures (6 items) and support systems (4

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items). Respondents were asked to rate each item "how important is it for you to know more about" using a five-point scale (1 = not at all important, 2= fairly important, 3 = a little important, 4 = very important and 5 = extremely important). Some of the questions related to pain, such as the use of hot and cold techniques, may not be recommended in AAV. The questions related to movement are more focused for OA or RA, although all of the questions about feelings are appropriate in AAV. Many of the other questions were not suitable for patients with a rare, complex multi-system disease and thus the tool was felt to be too simplistic and not in-depth enough to address the information needs of patients with AAV.

An information needs questionnaire was developed to establish the arthritis information needs of patients prior to setting up a community resource centre in Birmingham (Adab *et al.*, 2004). The questionnaire asked respondents to rank on a four point scale (1= not at all useful to 4=very useful) how valuable different types of information sources and resources were in four domains: support information, non-medical health information, skills related information and medical information. Although this questionnaire has not been validated, the domains contain many questions that are relevant to AAV and care was taken to ensure that these were represented in the final questionnaire (Appendix O).

A tool was found which measured the unmet psychosocial needs of SLE patients, the SLE care needs and support assessment tool (SLENQ) (Moses *et al.*, 2005). It has 97 items in seven domains: physical (10 items), daily living (8 items) psychological / spiritual / existential (10 items), health services (10 items), health information (10 items), social support (10 items) and employment / financial (4 items) and others (35). Respondents are asked to rate each item using a five-point scale (1 = no need, 2= need already satisfied, 3 = low need, 4 = moderate need and 5 = high need). In addition, 13 questions assessed the need for information on: disease, tests and information about results, treatment, knowing when to see a doctor, exercise and sports, support groups, occupational therapy, dental health, dietary information, counseling services, home (nursing) care. The focus of this tool is psychosocial and it asks very little about diagnosis and treatment

and is very lengthy (Moses *et al.*, 2005). Therefore it was felt to be too simplistic in nature and it would not cover all the topics that emerged from the themes in the first qualitative phase particularly information about the disease, medications and side effects.

Due to the paucity of published material, the cancer literature was drawn upon as these conditions share some similarities with AAV, as they are serious, complex, potentially life threatening illnesses and require intensive immunosuppressive therapy. The informational needs of cancer patients have been studied using survey methodology (Galloway *et al.*, 1997, Yi *et al.*, 2007). The researcher felt that it was not appropriate to develop an educational needs questionnaire from scratch as a suitable one was found for adaptation in the cancer literature. A tool suitable for adaption was found in the cancer literature, with the most appropriate felt to be theToronto Informational Needs Questionnaire (TINQ-BC), which is a validated and reliable self-administered questionnaire designed to elicit the informational needs of women with recently diagnosed breast cancer (Galloway *et al.*, 1997; Graydon *et al.*, 1997). It has 52 items, grouped under five domains: disease (9 items), investigations (8 items), treatments (16 items), physical (11items) and psychosocial (8 items). The items are scored using a five point scale from 1= not important to 5 = extremely important. It takes twenty minutes   to complete and internal consistency was assessed by Cronbach's α with a score of 0.96 (Galloway *et al.*, 1997). The TINQ- BC has been adapted for use in Korean women with breast cancer and shown to be reliable (Yi *et al.*, 2007). The questionnaire has been adapted for use in men with prostate cancer in the UK and also for use in colon cancer in Ireland and has been shown to be reliable with a Cronbach's α of 0.92 (Templeton & Coates, 2001, O'Connor *et al.*, 2010). In prostate cancer the number of items was reduced to 29 removing irrelevant items such as item 24: If I can wear a brassiere and item 51: when to have a mammogram. The final 24 items are: disease (n=3), investigative tests (n=6) physical (n= 3), treatment (n=10) and psychosocial (n=7). In colon cancer two items were removed: item 24 and 51 but three additional items were added resulting in a 53 item questionnaire. The final

53 items are disease (n=9), investigations and tests (n=8), treatment (n=15), physical (n=11) and psychosocial (n=10).

The reason that the TINQ-BC was chosen as suitable for adaptation was that most of the items, grouped under the five domains of disease, investigations , treatments, physical and psychosocial, mapped very closely to the themes and subthemes generated from the first phase of the study. They also related to the domains of support information, non-medical health information, skills-related information and medical information included in the needs assessment questionnaire developed by Adab and colleagues (Adab *et al.*, 2004). However, the questions in the TINQ-BC are more comprehensive than those of Adab as the domains contained more relevant questions that reflected many of the concerns of participants from the first phase of the study. Furthermore, the questionnaire has been validated and is suitable for use in other disease groups (Templeton & Coates, 2001, O'Connor *et al.*, 2010). Permission was sought from Springer Publishing Company to use the questionnaire and confirmation is shown in Appendix P.

5.24 Adaptation of theTINQ-BC

The first stage in the adaptation of the TINQ-BC to a Vasculitis Information Needs Questionnaire (VINQ) was to remove any irrelevant questions (Buckingham & Saunders, 2004). Starting with the full set of 52 items, those that were solely related to breast cancer were removed. A total of nineteen irrelevant items were removed:

Item 2: If the breast cancer will come back
Item 4: When to examine my breasts
Item 7: How breast cancer acts in the body
Item 12: If there is cancer anywhere else in my body
Item 17: Who to talk with if I hear about treatments other than surgery, radiation or chemotherapy
Item 21: How to care for my wound/ incision
Item 22: What to do if I am concerned about dying

Item 24: Did I need to wear a brassiere

Item 31: How long will my wound/ incision take to heal?

Item 34: Where I can get help, if I have problems feeling as attractive as before?

Item 35: How the treatment works against the cancer

Item 36: If there are any special arm exercises to do

Item 39: If I am going to need help to take care of myself

Item 41: If the treatment will alter the way I look

Item 42: How to tell if the cancer has come back

Item 43: Which foods I can or cannot eat

Item 44: If I can take a bath or shower

Item 48: How to prepare for tests

Item 51: When to have a mammogram

A further three items were also removed:

Item 15: How the tests are done

Item 16: Why they need to test my blood

Item 20 : Where my family can go to get help dealing with my illness

Four questions were amalgamated into two questions:

Item 1: 'How I will feel during the tests' and item 33: 'How I will feel after the tests' were combined to 'How I will feel during/ after tests'.

Item 38: 'If there are any physical things I should not do' was combined with item: 52 'If I can continue my usual social activities' to 'If I can continue with my usual social and physical activities'.

Three items were reworded: item 46: 'Why the doctor suggested this treatment plan for me' was changed to 'Hhow my treatment was chosen'. This was amended because patients in the first phase wanted to know the names of their medications and why their medications were often changed. Item 45: 'What types of treatment are available' was amended to'The names of drugs used to treat vasculitis' for the same reasons above. Item 49:'What to do if I feel uncomfortable in social circumstances' was changed to 'Hhow to access psychological support' in response to the

comment made by participant eight "Counselling. Or some form of psychological help".

Five items were added: Is it important for me to know:

What the symptoms of vasculitis are
If it is contagious
How is it diagnosed?
How often should I have blood tests?
How to access other services eg. benefits, social services

These were all questions that emerged from the qualitative first phase of the study and were highlighted by participants as important to them. The last question is also one of the items included in the arthritis informational needs questionnaire developed by Adab *et al.*, (2004). Care was taken to ensure that the themes from the first phase, reaction to diagnosis, the need for information on disease, investigations and treatment and access to knowledgeable practitioners, were represented in the VINQ (Mooney *et* al., 2013). Similarly, that the subscales of the Vasculitis Self-Management Scale were integrated (Thorpe *et a*l., 2008, Thorpe *et a*l., 2007) (Appendix M). Below is a comparison of the previous adaptations of the TINQ-BC, including the VINQ)(Table 5).

	No Items	Disease	Investigations and tests	Physical	Treatment	Psychosocial
TINQ- BC	52	9	8	11	16	8
Prostate cancer	29	3	6	3	10	7
Colon Cancer	53	9	8	11	15	10
VINQ	33	7	5	3	13	5

Table 5 Comparison of adaptations of the TINQ-BC

5.25 Questionnaire Design

Although, the TINQ-BC was chosen for adaptation, it does not contain any information on demographics, diagnosis, diagnostic delay, time since diagnosis, who provided information at diagnosis and the preferred mode of education delivery. All of these questions needed to be added to the VINQ. The order in which questions are asked is important and requires careful consideration. There is controversy about whether demographic data should be placed at the beginning or end of a questionnaire (Fink, 2006). Those who feel that it should be at the beginning (Dillman, 2000, Bradburn *et al* ., 2004) would argue that it is easy for these questions to be answered and those respondents that fail to complete questionnaires generally leave the questions unanswered at the end. Therefore by having the demographics at the start you have full demographic details of the respondent. Those who support placing it at the end would argue that demographic questions are mundane and respondents will become bored with the questionnaire and fail to complete it (Bourque & Fielder, 1995). It was decided that the demographic data would be at the beginning, so that any respondent not meeting the inclusion criteria could be identified quickly and not entered into the study.

The layout of the questionnaire is important: the length should be no more than twelve pages, with enough space between questions (Fink, 2006). The design of the questionnaire was to have most questions set out on a vertical format with the exception of the rating scale questions where a horizontal format was used. For clarity, boxes were used where appropriate and instructions and questions were not split between pages. The final questionnaire was six pages long.

The VINQ had information about the study at the beginning of the questionnaire rather than a separate participant information sheet. This was because information about the study was announced in the Vasculitis UK newsletter and on the VCRC website, followed by instructions on how to complete the questionnaire.

The VINQ (Appendix Q) was divided into 3 main sections, the first section contained the demographic data such as:

1): Age, gender, education status, diagnosis, time to diagnosis, disease duration from diagnosis.

The second section contained the informational needs of participants. In this section there were 33 items covering the following five domains: disease, investigations, treatment, physical, psychosocial care. Respondents were asked to rank each using a 5 point scale (1= not important, 2=slightly important, 3= moderately important, 4=very important and 5=extremely important). The stem question was "it is important for me to know".

The third section contained questions related to preferred mode of education delivery: such as written, by a health care professional, internet, CD, group programme.

A free text box was included so that participants could provide details of any type of information that they found useful.

5.26 Content validity

The content validity of the VINQ was established by asking three doctors with expertise in the care of patients with vasculitis (two consultants and one specialst registrar) and a vasculitis specialist nurse to review the VINQ items for subject matter, use of language and patient understanding. The reviewers had not otherwise been involved in the design of the questionnaire. No further changes were made to the questionnaire at this stage. The questionnaire was then pilot tested in 20 patients with AAV,(eleven females and nine males, age range 25-75, mean age 60 years, disease 10 EGPA, 8 GPA and 2 MPA). The questionnaire was posted to them and the following questions were asked:

1) Were the instructions clear and easy to follow?
2) How much time did it take to complete?
3) Were there any questions that were confusing?
4) Did you object to answering any questions?
5) Was the layout clear and attractive?
6) Any other comments

Participants found it easy to complete and follow, the average time taken to complete it was twelve minutes, there were no objections to answering any questions and they found the layout clear and attractive. One question was found to be confusing and that was item 10, "what the results of blood tests / ANCA mean", as none of the participants had heard of ANCA. Following the pilot test, the VINQ was modified to clarify language and remove medical jargon for example, "ANCA" was removed. The VINQ language and terms were slightly modified for use internationally, but these changes did not alter the content of the questions and were mainly linguistic (e.g. 'leaflet' was replaced with' pamphlet', educational attainment levels were changed from the UK system to the US system, 'tick' was changed to 'check' and more options for ethnic origin were added (Appendix R).

5.27 Reliability and validation of the VINQ

The reliability of the VINQ was assessed by the test –retest method (Fink ,2006). The questionnaire was distributed to a group of 20 patients at two different time points (3 months apart). No differences in the scores were seen for the different time frames. Consistent results are associated with good reliability. The VINQ was assessed for internal consistency using Cronbach's α (Table 6). The reliability of the questionnaire was high, with an overall score of 0.94 which indicates a high degree of internal consistency. There was also a high degree of consistency for each of the five domains (Table 6, Appendix S).The readability of the questionnaire as measured by the Flesch reading ease scale and was 73.8, considered fairly easy to read, with a reading grade of 4.4 (Doak *et al.*,1996).

Subscale in VINQ	Cronbach's α	Items
Disease	0.81	7
Investigations and tests	0.84	5
Treatments	0.92	12
Physical	0.83	3
Psychosocial	0.89	5
Total	0.94	33

Table 6 Cronbach's α value of subscales of VINQ

The face validity of the questionnaire was assessed by the researcher, a consultant with a specialist interested in vasculitis and a qualitative researcher to determine if the questions in the VINQ measured what we wanted to. Threre was general agreement that it was fit for purpose. Another method of assessing concurrent validity would have been to compare the results of the VINQ with the TINQ.

5.28 Recruitment for the survey

The VINQ was used to survey the membership of VUK and the VCRC. Participants were recruited for the mail survey from the membership of Vasculitis UK. Inclusion criteria: member of VUK with a reported diagnosis of Granulomatosis with Polyangiitis (Wegener's granulomatosis), Microscopic Polyangiitis, Churg-Strauss Syndrome (EGPA), 18 years of age or older and English speaking. Exclusion criteria: inability to provide informed consent and complete survey.

Participants were recruited for the online survey from the VCRC Patient Contact Registry which is part of the Rare Diseases Clinical Research Network (RDCRN). More than 2000 patients, representing all the different types of vasculitis, are currently enrolled in the web-based registry (Table 7). Inclusion criteria: enrolled in VCRC Contact Registry, a reported diagnosis of EGPA, MPA, GPA , 18 years of age or older and English speaking. Exclusion criteria: inability to provide informed consent and complete survey.

Disease	N	Percent
Granulomatosis with Polyangiitis (Wegener's)	1424	46%
Microscopic Polyangiitis	151	5%
Churg-Strauss Syndrome	526	17%
Other	989	32%
Total	3115	100%

Table 7 VCRC Contact Registrants with AAV (as of July 2011)

The VINQ was distributed with the regular mailed newsletter to the membership of VUK. Information about the study was included in the newsletter and a stamped addressed envelope was provided for return. No reminder was sent to complete the survey and respondents did not receive any financial incentive for completing the questionnaire. Unfortunately at the time of the survey VUK did not have any accurate figures of the numbers of members with the different types of vasculitis.

Members of the VCRC Contact Registry were surveyed in March 2012 using an email invitation to log onto the VCRC website and then complete an online survey. The email "shot" was repeated twice, to non-responders after three and six weeks. Potential participants were able to read the consent information in the privacy of their own home or other location where they access the internet. Potential participants could take as much time as needed to read the consent form. In the introductory email, as well as on the VCRC website, study staff contact information (both phone and email) was provided so participants could contact the study staff with any research related questions. The VCRC Contact Registry and the survey are voluntary. The study was not presented to the participant by the person who controls the health care of the participants. Potential participants who could not read English were not able to participate.

5.29 Data Analysis of the Questionnaire

Data obtained from the questionnaires was analysed by computer using the Statistical Package for the Social Sciences (SPSS Version 19.0, IMB, Armonk, NY, USA). Both descriptive and inferential statistics were used in the analysis and description of the data set. The median scores were calculated for the domain subscales in the VINQ to determine if there were any differences between the VUK and the VCRC cohorts. As the data set was not normally distributed non-parametric tests were used to test for differences between the median of two samples. The Mann –Whitney U test was used to compare any differences between different groups and a p value of $p < 0.05$ was used to reject the null hypothesis.

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In summary, a two phase exploratory sequential design has been chosen as the mixed methods approach (Creswell & Plano Clark, 2003, Tashakkori & Teddlie, 1998). The first qualitative phase of the study used three focus groups and eight one-to-one interviews to explore the informational needs of patients with a diagnosis of AAV. The findings from the first phase were used to guide and develop the Vasculitis Informational Needs questionnaire. This was used in the second quantitative phase to conduct a patient survey using the membership of the support group Vasculitis UK and the membership of the VCRC. The next chapter will present the findings from the first qualitative phase of the study.

Chapter 6 Results of the qualitative first phase

This chapter will present the results from the qualitative first phase of the study which was to answer to the research question 1) What is the experience of receiving a diagnosis of a rare potentially life threatening condition such as AAV?. The characteristics of the sample, the emergent themes and how the findings were used to guide and inform the second quantitative phase will be provided.

6.1 Respondent Characteristics

A purposeful sample of 15 patients participated in the focus groups (see table 10). Three focus groups were held, one in each hospital location. The Norwich focus group had seven participants and both Birmingham and Romford had four, each focus group lasted 90 minutes. There were 10 women and 5 men, 3 had EGPA, 9 GPA, 2 PAN and one MPA. Three male patients declined to participate in the focus groups, one due to partner care commitments, one due to work commitments and the other having no means of transport.The age of participants ranged from 48-80 years, disease duration ranged from less than one year to 20 years.

Participant	Disease	Age	Gender	Disease duration years
P1	EGPA	67	F	12
P2	GPA	69	F	15
P3	GPA	56	F	11
P4	EGPA	63	M	13
P5	EGPA	48	M	2
P6	GPA	67	F	9
P7	GPA	56	M	3
P8	GPA	39	F	5
P9	GPA	62	F	19
P10	GPA	80	F	3
P11	PAN	75	F	7
P12	GPA	57	M	>1
P13	GPA	62	F	14
P14	PAN	80	M	20
P15	GPA	73	F	20

Table 8 Focus group participants

6.2 One-to-one interviews

A purposeful sample of eight different participants was selected for the face-to-face interviews, to ensure a mix of gender, age, disease and disease duration from each centre (see table 11).These participants were a separate sample to the focus group participants and no participants took part in both. Participants were interviewed in the hospital setting and the interviews lasted 30–45 minutes. There were 5 female and three males, 4 had GPA, 3 EGPA and one MPA. The age of participants ranged from 26-78 years, disease duration ranged from less than one year to 12 years.

Patricipant	Diagnosis	Age	Gender	Disease duration years
P16	EGPA	26	F	4
P17	GPA	28	M	10
P18	MPA	60	F	>1
P18	EGPA	78	M	5
P20	GPA	52	F	>1
P21	GPA	52	M	12
P22	GPA	51	F	4
P23	EGPA	70	F	6

Table 9 Participants in one-to-one interviews

6.3 Results

The emergent themes from the first qualitative phase were: experience of receiving a diagnosis, the need for more information on disease, investigations and treatment and access to knowledgeable practitioners. These themes were mapped into an interpretative framework that explain the data (Figure 10).
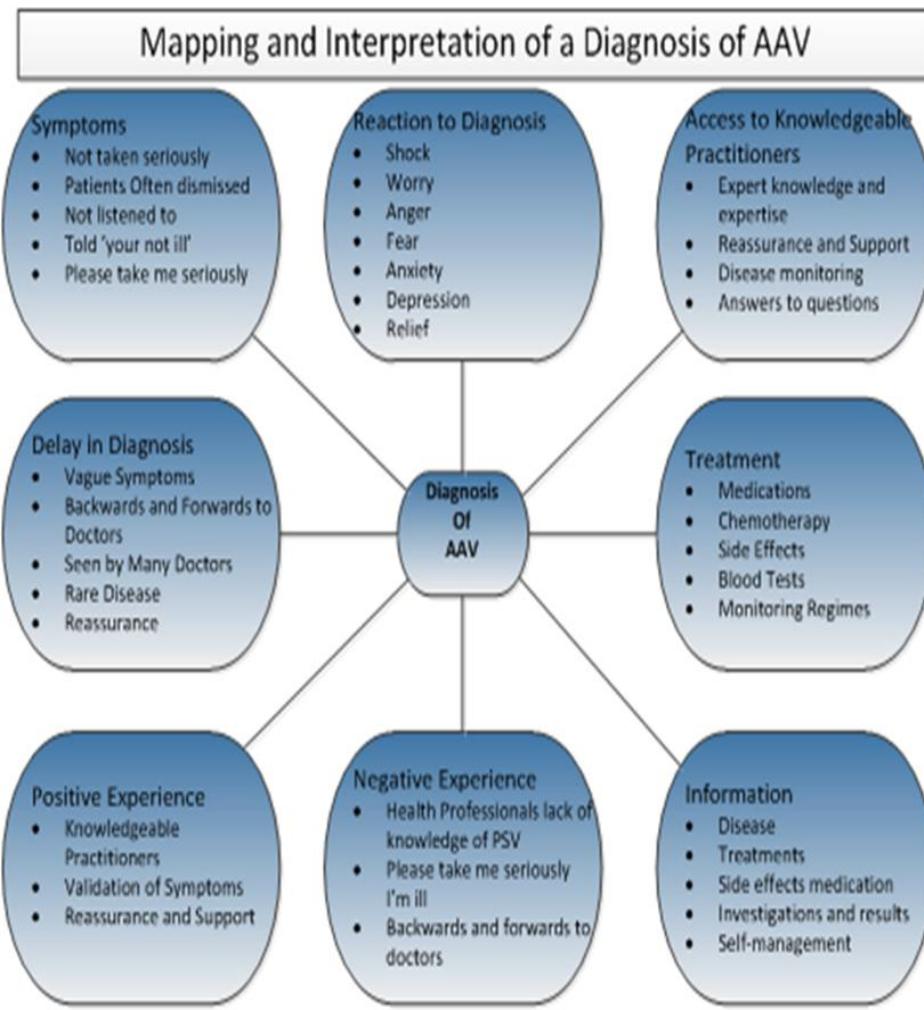
Figure 10 Mapping and interpretation of a diagnosis of AAV

6.31 The experience of receiving a diagnosis

The first theme to emerge from the data analysis was " the experience of receiving a diagnosis" under this theme participants described experiencing a range of emotions when first diagnosed with AVV.

P22   *"Well, first of all I didn't quite understand – you know, I'd never*
        heard of it or anything, and then when it was explained what I had
        and that I'd need chemotherapy and steroids it was a bit
        devastating, but I was quite ill at the time and I'd been admitted to
        hospital and I was in so much pain. So I think the first few days after

I'd been told I was on morphine so it was a bit sort of hazy, if you see what I mean".

P15   *"I was just scared, I just thought, at one point in hospital, I thought I was going to die, because I had all this going on, with clots as well, which wasn't normal, I was told I was out of the medical books, because of what was happening to me, it shouldn't be happening, so it was scary because I had never been ill in my life, never, never ever been ill, I was just scared, scared of if I was going to die, when you're 51 and told you have got that".*

Many respondents used common phrases to convey the depth of their shock and trauma such as *"Devastated, shock, scary time, fear".*

However, for some participants it was a relief to know that someone knew what was wrong with them and that they had a diagnosis.

P16   "*Relief, to know what it was*".

P18   "*I've got a label at last*".

P5   *"Well I must have had a different sort of reaction because I was elated because I was being fed anti-depressants and treated like I was mental going off my head*".

When consulting with health care practitioners, participants described both negative and positive experiences. Negative experiences were linked to patients' symptoms not being listened to or not taken seriously and being told that "you're not ill".

P15   "*Oh you have nothing wrong with you, then my leg blew up, then I came into hospital, thought deep vein thrombosis, did chest x-ray,I was bleeding into my lungs, realised I'd got a big problem. Oh yes its vasculitis (dr's).Scary, thought I was going to die*".

P11 "*Angry, I'm ill, kept going back, saw someone else, getting worse and worse*".

P2 "*I thought I just have to try again, and I went down to GP and I said look I'm not depressed, there's nothing wrong with my marriage, nothing wrong in the family, I'm ill. Please do something*".

P18 "*Passed from one consultant to another, begged last one don't pass me over*".

P13 "*Please take me seriously I'm ill*".

P1 "*I'm still raw about the whole thing*".

Positive experiences were often associated with validation of participants symptoms, confirming that there was something wrong with them.

P3 "*Very unusual, he said but I'm going to ask them to test for Wegener's, I had never heard of it, didn't mean anything to me, I felt so relieved*".

P5 "*I think I know what you've got, its very rare, very unusual, I'm going to ask then to test for vasculitis*".

When given the initial diagnosis all participants described being too ill to take in information and were trying to make sense of what had been said to them at the time.

P12 "*You're brain is working at double time because of what is happening to you, you don't know what questions are and depending on your doctor it maybe that you have to prod very hard for information, some are more willing to give information than others. Even when information is coming to you, you're trying to understand this language you've not heard before, and how is that going to affect me by that time you've got that the doctors gone on*

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to something else. You've missed all of that. So you have to gather information little globules of information as you go along absorb them take them into your life. Assimilate them and go on but you never know what the question is, is the major problem for me".

P3   "*Too ill to take information in*".

P11   "*Numb, can't remember, felt out of it* ".

P7   "*The talk went over my head, in one ear and out the other, I just couldn't remember things. My wife heard things. I would prefer somebody to talk to you and go through a leaflet".*

Many participants experienced a delay in receiving a diagnosis of AAV and some gave a detailed account of their symptoms.

P21   "*Took a long time to get diagnosed, I had been quite ill for a long time. I had   various problems that could indicate vasculitis for about 18 months, when in fact I had six operations on my nose, and it was thought that there was a deviation in my septum at one point, so I guess I didn't find out what it was for a long time. It was a relief that I now knew what the condition was*".

P7   "*Took about three years to diagnose me, a long long time, a lot of tests and a lot of other things went on, and I was just going downhill all the time*".

P15   "Two *years to get a diagnosis*".

P12   "*Mysterious symptoms, difficult to walk, difficult to eat, difficult to use my hands, difficult to get up and down stairs, hearing going, ache all over. Polyps in my nose again, foot drop".*

P9   "*High temperatures, hearing had gone, chest infection, sinuses ,urinary tract infection, attacked my kidneys and lungs*".

In contrast, there were some for whom their condition was diagnosed quickly.

P20   "*Dr X , he gave me it verbally as the result of a blood test, em that my doctor had sent me for, it was my doctor that picked it up, well all he said to me was that you have got a lot of inflammation going on and I just thought that he thinks it Polymyalgia. So I had an appointment to see Dr X and also an appointment to see the rheumatologist but I saw Dr x first and that came as a complete shock that I was going to the renal specialist, he said well you won't need to see a rheumatologist. Because I know what it is you've got from you're blood test. So then he explained to me em the sort, basically what vasculitis was, he didn't at that stage, he might have mentioned Polyangiitis but I was suddenly taken aback really, to discover I had something different to what I thought I had. I was very impressed I saw him on the Tuesday morning after we had got back from a week's holiday and was admitted the next day, he would have admitted me that day but It was not just convenient I can come in the morning, have the biopsy on the Wednesday, results on the Thursday, started the treatment on the Friday, So you know within 3 days they stared the treatment. Which was absolutely wonderful?".*

P12   "*GP was on the ball, got me an appointment the next day*".

P18   "*He thought straight away that I had got MPA, so it was spotted quite quickly*"

P6   "*It took three months*".

This participant recognized that is is difficult for GP's to be experts in every health care condition and stated:

P6   *"Only when my liver started going wrong and that it showed in the blood test, they started to take me seriously, I'm not criticising GP's who have a tough job in my opinion, you are going to have to go to experts, we don't know what's wrong with you".*

6.32 Finding out about Disease Management

The second theme to emerge from the data analysis was " finding out about disease management". It was clear that participants wanted information about their disease, medications and how to manage their condition.

P13   "*I was given no information, you have to prod very hard for information. Some are more willing to give information than others*".

BP   "*Not many people who know anything about it. The lack of information when I was diagnosed, my GP said the best route is to go on the internet, which I did and to be quite honest it frightened me what I read.There wasn't much information at all. Those American internet sites, some people they don't pull any punches.*"

P1   "*No understanding of treatments*".

P2   "*Regime of drugs, I used to ask the nephrologists what does this do, why does this happen and why do these drugs do this and all that*".

P7   "*Lack of information, on a cancer ward without any explanation, took you off medication*".

P13   "*Gave me chemotherapy, has it got a different name".*

P16   "*Chemo terminology confusing".*

P6   "*That's for people with cancer, frightening, just that word alone".*

P14   "*It's only what we read on the bottle isn't it. I suppose all the tablets you take if they could give you a list of what they are for*".

P1   "*Need for powerful medication explained, now I'm not trying to be critical I would like to understand why on earth we get all this treatment in the first place*".

P1   "*Over head, do not remember, I don't remember any leaflets on EGPA I think a written leaflet is essential*".

P17   "*You must inform the patients what on earth are they in for. I think this is really important*".

P5   "*Some information over the top, conflicting information, chemotherapy, I was told to get up in the night and drink water*".

P6   "*You feel a little sick, visions of no hair, a lot of the side effects of drugs are close to some of the symptoms.*"

P8   "*Drug regime, maintenance therapy, That's another concern I have what damage are the drugs doing*".

P13   "*Cataracts, nobody told me of side effects, to be told side effects medication*".

This participant talked openly about the significant impact that a diagnosis of AAV had on her life.

P8   "*Counselling. Or some form of psychological help. Definitely – for the patient and the relatives, you know because I think it's really – you know, my life really changed overnight. And not just mine my families it had a tremendous knock-on effect financially and emotionally. In all aspects really. One thing that would be very useful would be the side-effects of the drugs and maybe for others –*

is it contagious? Because people think if you've got a weird disease, and that's what it's been classed to me as a weird disease – when I went to the hospital I was told - you're the woman with the weird disease. I thought that's good! So I mean, I think personally there needs to be more information given over in the media and to GPs. My GP knows very little or much about it at all. Of course the general public, they don't.Symptoms aren't clear.They could be appertaining to so many other things I suppose. Research is very important. People do not have enough information about their condition and society is not well informed. Support and information are most important for patients. And I'm a nurse".

This participant also wanted support but was unsure who to turn to.

P8   "*Support group, very supportive part of getting better. Dr x helped me. There was very little help at all. No I had to find it out for myself. I think that's what I wanted (HOPE). I just don't know anybody my way to talk to.There is nobody to turn to, to talk to or get to know anybody who has a similar problem*".

Several respondents used the internet to find information about their disease and treatments but reported that they found the information frightening.

P18   "*Sometimes looking at the internet doesn't help because it puts the wind up you, I've stopped looking at that, you think oh my goodness, I'll start writing my last will and testament. I was a little bit weepy to begin with, particularly when I looked on the internet, well it was frightening, it didn't give me long really, I thought oh dear, and then you realise, it's treatable*".

P6   "*I kept moaning I don't know enough about it, I found information on web frightening*".

P4   "*I found information on the web frightening.*"

Participants wanted information so that they could regain some control over their life and know when to seek help.

P9   "You need to know that there is help out there you know, I mean some days having read the leaflets that they gave me at the outset, you should look for change in your own self as you feel unwell. But I don't know what these changes are I haven't got a clue. I mean a lot of days I feel awful and I think should I phone the GP, no I'll see how it goes. And I just go like that cause I mean twice it's flared with me it has always been in the eyes. And I can tell by all of a sudden blurred vision, something's happening and then I get in touch with them. I mean other people will probably have different symptoms it's knowing what to look for I find that confusing. Knowing when to ring the doctor. You want to keep ringing the doctor every 5 minutes".

P22   "Just anything really to help you to do things for yourself ".

P6   "Any information re diet, exercise, alcohol, what can we do for ourselves, want info re boundaries".

P16   "More information about blood tests, need to know about tests and how   vasculitis is diagnosed".

P2   "I was given a paper with lots of information, a leaflet abouit the Stuart Strange Trust. I'd like to look at a leaflet and be given the opportunity to discus it with someone. I felt I wanted someone to reassure me I would be alright, but then I needed to get a bit better before I wanted all the information".

6.33 Access to knowledgeable practitioners"

The third theme to be identified from the data analysis was "access to knowledgeable practitioners". Many participants recognized that the healthcare professionals they met in primary care (their GP and practice

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nurses) and some doctors and nurses in secondary care had none or very limited knowledge of AAV.

P11 "*GPs should know a little about it. About 50 doctors, not one of them had heard of it.You have to explain to doctors what your condition is, I might forget something that is important, don't know medical terms. She had never heard of it*".

P13 "*My own honest feeling was that nobody seemed to know that much or they didn't give you the impression that they knew a great deal*".

P3 "*I do find, I've got one doctor in our practice who was unhelpful, because I unfortunately broke my ankle, so I was still working at the time and I went in and he came into the surgery and he just looked at my notes and he said I don't know why you've come here for to see me because I know nothing about your complaint and I was furious, well a good job because I've come about my ankle, you know I was really really cross*".

P2 "*Yes, nurses often don't know and doctors don't. I've had doctors go and look it up, you know*".

Participants valued having access to practitioners who had real knowledge and experience of dealing with this AAV.

P15 "*I think knowing that I have got somebody on the end of a phone, if I want to get hold of nurse X, then I can or I perhaps have to leave a message for here at rheumatology , but nine times out of ten somebody will get back to me. I think knowing that or I could even come up here perhaps to the out patients, just knowing that these is somebody, who understands the situation, that does relive you but I*

can't think of something else just knowing that there is somebody up here, who can understand what's going on".

P12   "*The ones that do know, know an awful lot and the ones that don't, don't know anything about it'*.

P5   "*The rheumatology helpline, I've found that really good, I would go to rheumatology; I would initially ask rheumatology because they have the expertise*".

P4   "*If I have a problem I ring up X (nurse at hospital) rather than the doctors*"

P6   "*Access to knowledgeable nurse practitioners*"

P7   "*When I meet a brick wall at the doctors, anytime you want advice you're stuck It doesn't have to be a doctor, educate GP students, don't seem willing to pass on information back to us*".

P3   "*I never ever go to the doctor about ECPA I ring up nurse x. Well if you have a patient at the surgery with that complaint they should read up about it at least*".

Conducting the one to one interviews did not yield any new information but validated the findings from the focus groups.

6.4 Discussion

This is the first study to explore what it is like to receive a diagnosis of AAV. The key findings are: i) when given the initial diagnosis, all patients described themselves as being too ill to take in information and later found

it difficult to recall what information they had been given; ii) the isolation of patients with AAV in coping with a rare disease that few people have heard of; iii) the uncertainty of a condition that will relapse and remit and the side effects and risks of complex medication regimes. The findings were similar to those of Waldron *et al.*,(2011) who studied the information needs of patients with systemic lupus erythematosus. These patients also had difficulty taking in information and wanted in-depth information and access to knowledgeable professionals. There are also some similarities with the informational needs of cancer patients, whose life threatening diagnosis causes them anxiety and fear and who also seek more information to enable their active involvement in their care, and to access accurate literature about their disease, investigations and treatments (Grahn & Johnson, 1990, Wingate & Lackey, 1989, Galloway *et al.*,1997,Liao *et al.*, 2007, Templeton & Coates, 2003).

Receiving the diagnosis of a life-threatening disease, as well as being in pain, made it difficult for participants to understand information. One participant felt that experiencing such traumatic events affected her recall of the information she had been told. Thus for these patients, the timing of the information is significant to its value for them. This is a similar finding to cancer patients who when confronted with a poor prognosis did not recall much information after receiving the bad news (Jansen *et al* , 2008). Another participant described how the unfamiliarity of the circumstances meant that she did not know the questions to ask to get the information she wanted. Other participants had difficulty understanding some of the medical terminology used highlighting that information given to patients must be in a language they understand. Information sharing is seen to be a two way process and not simply a question of conveying specialist information to less informed people. Participants needed time to absorb information at their own pace to inform the basis for their questions. Written information would support this education process by giving time for patients to appreciate the meaning and then to internalise what it means to them. They could then prepare their questions ahead of meeting the doctor. For participants the diagnosis of a rare condition was frightening and this may have impeded their ability to retain information, as anxiety is known to

reduce concentration and information recall (Gustafson *et al.*, 1999, Kessels, 2003, Stephenson, 2006).

6.41 Diagnostic delay

Some participants experienced a delay in diagnosis of AAV and this was linked to their symptoms not being taken seriously when consulting with health care practitioners. Several participants felt that their symptoms were not being listened to and not believed and many were told that "you're not ill'. This led to frustration and as a consequence many participants had consulted several different doctors, had many investigations and tests before a diagnosis was reached. This difficulty and delay in diagnosis meant that some patients sought validation of their symptoms and for them not to be dismissed. For some people it was a relief to know they had something wrong and for others it was anger at the way they had been treated. These findings support Main's four reasons that patients consult with health care practitioners namely to seek reassurance, to get a cure or relief from their symptoms, get a diagnosis and legitimisation of their symptoms (Main *et al.*, 2010).

It is recognized that AAV is difficult to diagnose due to the wide spectrum of clinical presentations that may mimic many diseases (Watts & Dharmapalaiah, 2012). Patients can present with life threatening illness requiring urgent medical treatment or with general symptoms of fever, malaise, weight loss, headache and arthralgia that are common and could be due to a number of other conditions (Scott & Watts, 2000). Furthermore, diagnostic delay is common in rare diseases (Eurordis, 2008, Huyard, 2009, Jayne 2009, DH, 2013) and one study reports 46% of patients waiting more than a year to get a diagnosis, 20% over five years and 12% over ten years (Limb & Nutt, 2011). Because of the rarity of AAV, GP's are likely to have little knowledge or experience of vasculitis and many may not even have seen a case of AAV before. Besides it would be unrealistic to expect GP's to be knowledgeable about all rare diseases as there are more than 600 rare conditions. One participant recognized this and was not critical of his GP as he felt that they had a difficult job (P6:120). However,

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for some participants their GP recognized that their condition was serious and they were referred promptly to a specialist for early diagnosis. This first theme identifies that patient education begins very early on the disease as soon as the patient receives the diagnosis (Kohen & Esdaile, 2008). However this can be a challenging time for patients as the majority of patients were anxious and frightened and this can impede information recall. Therefore, clinicians should be aware of a patient's emotions during a consultation and deal with then before imparting information (Sep *et al.*, 2014).

6.42 Finding out about Disease Management

The second theme was "finding out about disease management". It was clear that participants wanted information about their disease, medications and how to manage their condition. However, while participants explicitly discussed their need for 'information', the evidence showed that this had two dimensions: one concerned AAV-specific factual information (product) and the other concerned the educational process of internalizing and using the information that had been given in actively managing their lives. Patients with AAV often face an initial challenge when being told that they have a potentially life-threatening disease requiring urgent therapy with potentially toxic drugs. Consequently, any education at this time typically focuses on starting their urgent treatment and securing consent for their chemotherapy. This may explain why many were confused as to why they required chemotherapy, and associated this with cancer. A possible explanation is that they were familiar with the term "chemotherapy" and knew that this was used to treat cancer. It is likely that they were frightened and anxious and just heard the word 'chemotherapy' and focussed on that without listening to the rest of the conversation. It is possible that due of the seriousness and complexity of their condition, doctors were concentrating on preserving life and organ function that they did not check the patient's understanding of what was said to them.This is a crucial time for patients and supports the need for information at this time, so that they can understand why they are receiving chemotherapy but how this is handled is extremely important as it may heighten patients' fears.

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Therefore, it is important to acknowledge that patients psychological needs may be as important as their physical ones in the management of AAV and should no longer be ignored (Koutantji *et al.*,2003). Research has shown that AAV patients have reduced health-related quality of life, both physically and emotionally (Hoffman *et al.*,1998, Koutantji *et al.*,2003, Carpenter *et al.*, 2009, Basu *et al.*, 2010, Walsh *et al., 2011, Basu et al., 2013,* Grayson *et al.,2013.* There is a psychological burden of disease associated with AAV and health care professionals should assess individuals' psychosocial status and quality of life during routine follow up (Flossman *et al* .,2007, Miller *et al.*, 2010).

While participants highlighted the need for psychological support, they also wanted information about their disease, medications and how to manage their condition.Most participants received verbal information about their disease from the doctor who treated them in hospital. However, a worrying number of participants reported not receiving any information at any stage of their illness. Participants said that they wanted a wide range of information concerning their disease, treatment and side effects.This supports the research by Thorpe *et al.* (2007, 2008), who assessed the self-management behaviours of AAV patients and found that patients experienced difficulty in being able to self-manage medication side effects, infection avoidance and knowing which symptoms to report to doctors. Carpenter and colleagues found that doctors were the most frequently used source of medicines information, followed by the internet and lastly pharmacists (Carpenter *et al.*, 2012). This is supported by the comment made by respondent (P2:122), she kept asking the doctor questions about her medication to learn more about her treatment. Conversely, respondent (P14: 123) did not receive any medicines information other than the insert in the medicines package and did not realise that he could have asked the pharmacist for more information. This supports the findings from Carpenters study where the participants rarely used pharamacists to seek more information. This could be because of the rarity of AAV, patients may feel that like GP's, pharmacists have little knowledge or experience of vasculitis. Although, several respondents used the internet to find

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information about their disease and treatments, they found the information frightening. However, the credibility of the websites visited was not assessed.

A recent study found that respondents had poor knowledge of the side effects of medications used to treat AAV (Brown *et al.*, 2012). This is worrying as infection secondary to therapy in the early stages of the disease increases mortality in the first year (Little *et al.*, 2010). It is vital that patients are informed of the risks associated with medications used to treat AAV so that early recognition of side effects can occur.

On the other hand, there is a significant amount of information for patients to absorb and try to understand at the time of diagnosis and patients forget between 40-88% of information given to them (Anderson *et al.*, 1979, Ley, 1989, Kessels, 2003, Jansen *et al.*, 2008). One of the early studies was of patients attending a rheumatology clinic and more than half wrongly remembered medical information given (Anderson *et al.*, 1979). Older age has been associated with less recall in cancer patients when large amounts of information are given (Jansen *et al.*, 2008). Furthermore, time constraints especially during in-patient says have resulted in patients being overwhelmed with medical explanations and jargon (Schillinger *et al.*, 2003; Street, 1992; Maddock *et al.*, 2011). Therefore, timing and the amount of information given is crucial if we are not to overload patients with vast amounts of information. One participant (P:118) explains that information needs to be given in bite sized chuncks so that patients can take it in and make sense of it and build upon this information. This is a similar finding to Donovan & Blake (2000) who found that patients attending a rheumatology clinic needed to make sense of what the doctor had told them and internalise what it meant for them.

A systematic review of interventions to improve cancer patients recall of medical information found that adapting information to individual needs plus the use of audiotapes or the use of a question prompt sheet were more effective in patient recall of information, but the number of studies included in the review were small (Van der Meulen *et al.*, 2008). Some doctors are

now sending patients a copy of the out-patient clinic summary letter that is sent to the GP, so that patients have a record of what was discussed during theconsultation. Whilst this is good practice, the information included in the letter is likely to be full of medical terminology and may be difficult for patients to understand. The systematic review concluded that there is little research into the effectiveness of providing patients with summaries of copy letters, however this is an area for future research (Van der Meulen *et al.*, 2008).

Participants also wanted to know more about their condition and medications. Some talked about the complexity of medication regimes and what this meant for them in terms of dealing with the disease and possible side effects of medication. Despite these overwhelming needs for information, education about these issues was not a routine part of their disease management. For those that had been given information about their medications some received conflicting information from two different doctors and were confused as to which advice they should follow. This supports Carpenter *et al's* (2010) finding that over half of AAV patients received conflicting medication information and that vasculitis doctors differed greatly in what information they gave patients about the risks and side effects of medications (Cozmuta *et al.*, 2013). Participants appreciate the need for information so they can manage their own drug regime and any side effects. Yet for many their only source was the printed information on drug packaging, creating considerable anxiety for patients, and under-confidence when managing their medication. Patients need to understand the importance of taking their medication as prescribed as non-adherence is linked to poor outcomes (WHO, 2003).

6.43 Internet

The internet is increasing being used as a medium for accessing health information and some participants in the absence of information given to them searched for this on the web and this heightened their anxiety. Patients may not be aware of the accuracy, currency or applicability of what information they have found. It seems poor practice to leave these patients

to search for material themselves, which might not be accurate, when it could be given to them by their consultant or a specialist nurse. These patients should be signposted by health care professionals to endorsed websites where information is accurate and reliable. GP's and other primary care staff also need to know where to access such information. This is recognized as a problem and one of the recommendations in the Rare Disease UK Strategy is that experts should signpost patients and health care professionals to recommended websites for further information (DH, 2013).

6.44 Knowledgeable practitioners

Participants reported that they wanted access to, advice from and treatment by knowledgeable practitioners. However, many expressed their frustration at the low levels of knowledge of both primary and secondary healthcare practitioners about the diagnosis and management of AAV.This mirrors a survey of approximately 600 patients and families, carried out by Rare Disease UK, which found several shortcomings in care. Just under half (46%) had waited one year to be diagnosed, 52% had not received sufficient information about their condition and 37% had had no one to contact regarding questions about their illness (Limb & Nutt, 2010). Of those who had received information (65%), this had been provided by a specialist doctor.

Rare diseases pose numerous challenges to both healthcare professionals and the patients. Ignorance of individual rare conditions is common amongst both groups.Because of the rarity of AAV, GPs are likely to have little knowledge or experience of vasculitis. Therefore, patients may need support and information about how to access the expertise that they seek within the complex system of AAV healthcare management, which is likely to be outside their previous experience. While they may expect to gain most of their treatment and advice from their GP, they may not realize that they can also access the AAV specialist who is responsible for managing their condition. They also may not be aware that they can ask their GP to refer them to medically expert advice and care, or that their GP's may not

have adequate knowledge, skills or experience to deal with their informational needs or concerns and what they need to do within the system to access it.

The rarity of the condition means that patients have no ready sources of information from within their community, as it is very unlikely that there will be another person with AAV within their social network. This exacerbates the lack of knowledge within the non-specialist medical community. Patients expressed the wish for specific forms of information. They wanted positive but direct information in booklet format which they could revisit when they felt ready. Serious, possibly life-threatening illness causes anxiety and fear, and this can impede information retention, assimilation, understanding and recall. Patients wanted the unfamiliar terminology that they were now encountering to be clarified. Having an education booklet would be in keeping with numerous other conditions, both common and rare, for which such booklets are available. Given the limited information that study participants with AAV received, this is likely to be of enormous value at both the acute and chronic stage. Participants also wanted the opportunity to discuss such information with a knowledgeable health care practitioner.

Despite participants high informational needs and their need for general support to help them live with their condition, they were, in the main, unmet by doctors and nurses.These deficits may be partially addressed by developing networks of multi-disciplinary professionals with expertise who can be called upon to provide advice. A number of recent documents have highlighted the need for patients with rare and complex conditions to be managed in networks (DH, 2013, Rare Disease UK, 2012, EU 2009).

6.5 Limitations

There are some limitations of the first phase of the study. "All vignettes declare their constructedness, loud and clear" (Spalding & Phillips, 2007). Not only are the vignettes to some extent fabrications, the occasions where they are used are deliberately set up as a research-specific event.

Therefore it is important to acknowledge that they influenced, at least initially by the subject of the focus group discussions. This vignette could be seen to be validated because it was found to be, for many, reflective of their individual experiences and thus it stimulated them to tell their stories to getting diagnosed. The few patients who had not had difficulty getting a diagnosis of AAV were also happy to highlight that the vignette was not like their experience so the discussions were not limited by the vignette. Neither were the discussions limited to diagnosis events, because the participants having been stimulated to reflect on their experience of getting a diagnosis, could then think about what would have helped them during this period of finding out about their illness and what education they would have valued, which was the point of the research. Thus the use of vignettes was found to be an very suitable method to generate discussions amongst a group of individuals who had never met in this way before, who may have been shy about sharing difficult personal circumstances, and who may not have been able to suggest informational needs if they had not had access to a vignette to stimulate their reflections. Whether the vignette was or was not wholly representative of every individual experience, it did stimulate insightful discussion in the focus groups.

Although, participants were purposefully chosen to represent different disease subtypes and different disease durations. There were more females than males in the focus groups, unfortunately three males declined at the last minute and replacement participants were not able to be found at short notice. There were more patients with GPA in the sample.

6.6 Conclusion

The diagnosis of a rare, life-threatening disease causes extreme anxiety and fear, impeding information retention and recall. Additionally, the timing of information is crucial, as patients have difficulty assimilating information when acutely ill. All participants desired information about their diagnosis and treatment and wanted written information but value having the opportunity to discuss it with a knowledgeable healthcare practitioner. Patient education needs to be tailored to individual needs on the illness

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pathway. Respondents expressed their frustration at the lack of knowledge and awareness of rare conditions amongst health care professionals. Participants reported that they wanted access to, advice from and treatment by knowledgeable practitioners. The consequence of a diagnosis of AAV is significant and impacts many aspects of individuals' lives and should not be underestimated by health care professionals'.

6.7 Summary

In summary, the first phase of the study highlighted that these participants' needs were often overlooked in routine practice. If we are to implement the first key area of improvement in the governments' Rare Disease Strategy UK that of 'empowering patients' (DH, 2013). First we need to understand what patients want to know about their illness so that information and education can be tailored to meet their needs and priorities, so that they can truly participate in shared decision making and make informed choices. As we know very little about the informational needs of this group the themes from the first phase were used to guide and inform the development of a Vasculitis Informational Needs Questionnaire which was used in the second quantitative phase to survey the membership of VUK and the VCRC. The next chapter will present the results of the second quantitative phase of the study.

Chapter 7 Survey results

This chapter will present the results of the second quantitative phase of the study. The characteristics of the two samples will be described and the results for the VINQ will be presented for the two groups.

7.1 Results

A total of 600 questionnaires were posted with the regular newsletter to the membership of VUK. A total of 397 were returned, 63 were excluded because they did not have a diagnosis of AAV, and 40 were returned unopened by the Royal Mail as individuals no longer lived at the mailing address. A total of 314 questionnaires were available for analysis, a 52% response rate, of these 255 had (GPA), 46 (EGPA) and 13 PAN (Figure 11).
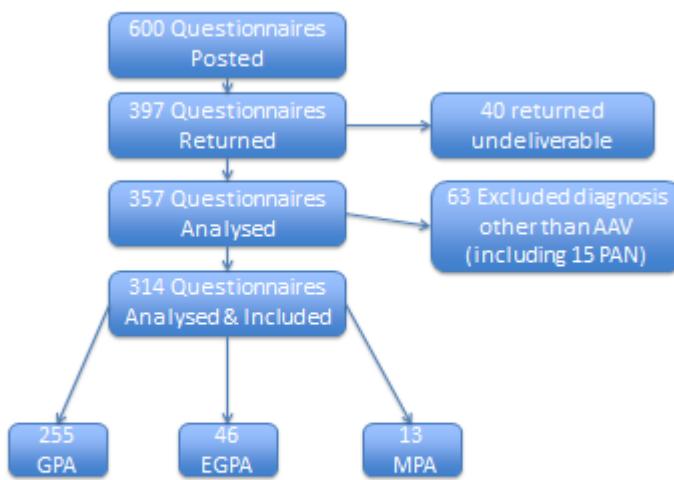
Figure 11 Survey response Vascuiltis UK

An email was distributed to 2740 registrants of the VCRC with two reminders to those who had not replied after three and six weeks. There were 387(14.1% response rate) respondents from the VCRC, of whom 114 reported a diagnosis other than AAV. The remaining 273 (10%) respondents from the VCRC with a diagnosis of AAV were included in the study (Figure12).
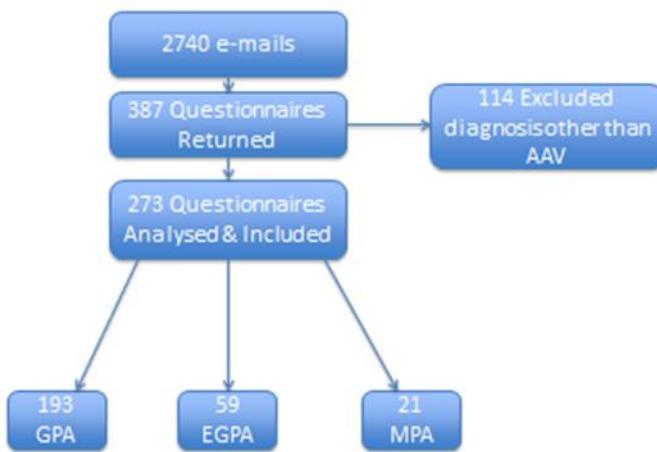
Figure 12 Survey response VCRC

7.2 Demographics of respondents

The demographic characteristics of both groups of respondents are shown in table 12. The disease subtype distribution was representative of the whole survey population. The total sample population for inclusion in the study was 587, with 287 (49%) male and 300 (51%) female, 448 (76%) GPA, 105 (18%) EGPA and 43 (6%) MPA with a median age of 60 (range 51-67). The VUK group had 314 respondents, 198 (63%) male and 116 (37%) female, 255 (81%) GPA, 46 (15%) EGPA and 13(4%) MPA with a median age of 63 (range 52-70). The VCRC group had 273 respondents, 88 (33%) male and 184(67%) female, 193 (71%) GPA, 59 (22%) EGPA and 21(8%) MPA with a median age of 58(range 49-64). The VUK

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respondents were older than those from the VCRC, and the VCRC sample had a greater proportion of women than the VUK sample. There were more respondents with GPA (255) in the VUK group but the VCRC group had more MPA (21) and EGPA (59).

	All Subjects	Vasculitis UK	VCRC
Study Group Characteristics			
Group Size	587	314	273
Age: median (range)	60 (51-67)	63 (52-70)	58 (49-64)
Males	287 (49)	198 (63)	89 (33)
Women n (%)	300 (51)	116 (37)	184 (67)
GPA n (%)	448 (76)	255 (81)	193 (71)
MPA n (%)	34 (6)	13 (4)	21 (8)
EGPA n (%)	105 (18)	46 (15)	59 (22)
Self-reported ethnicity white	560 (95%)	295 (94%)	265 (97)

Table 10 Demographics of respondents of VUK and VCRC

The age range of the sample is shown in figure 12 .There were seven respondents aged <24 years (1%), 27 aged between 25-34 (5%), 57 aged 35-44 (10%),103 aged 45-54 (17%),198 aged between 55-64 (43%),136 aged 65-74 (23%) and 59 aged over 75 years (10%). One third of the sample were < 54years, one third were between 55-64 and another third were over 65 years.
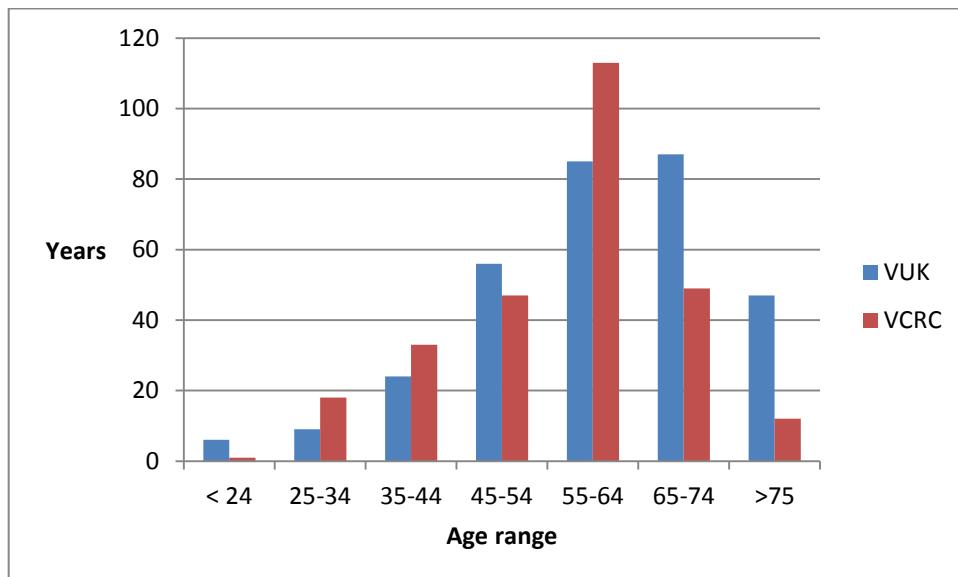
Figure13 Ages of respondents of VUK and VCRC

The distribution of disease duration (self- reported date of diagnosis to date of questionnaire completion) is shown in figure 14 and is seen to be shorter in the VCRC group than the VUK group, 16.4% of the VCRC had a disease duration of < 1 year compared with 6.1% of the VUK group. However, the VUK group had more respondents with longer disease duration >11-15 years 77(24.5%) and 47(15%) over 15 years, compared to the VCRC group of 35(12.8%) and 18(6.6%). The VCRC respondents reported their origin as 86% North American (86%) and European (12%).
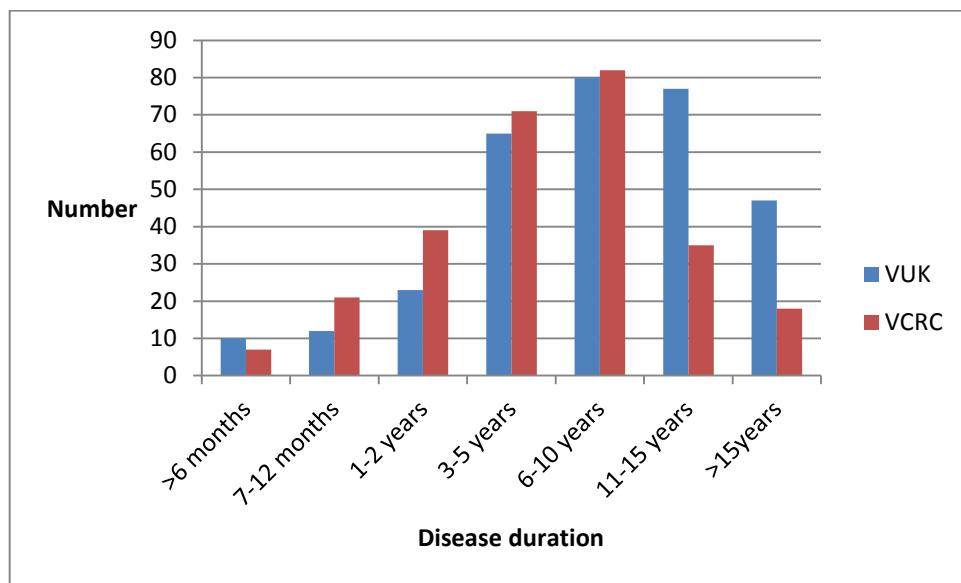
Figure 14 Disease duration of respondents

7.3 Time to diagnosis

In this sample time taken to be diagnosed varied, over a quarter (189)were diagnosed within three months of the onset of symptoms, over a third received a diagnosis within a year (220) and a further 92 were diagnosed within one to two years. However for some it took three to five years to obtain a diagnosis (44) and for others it took more than five years to be diagnosed (42) (Figure 15).
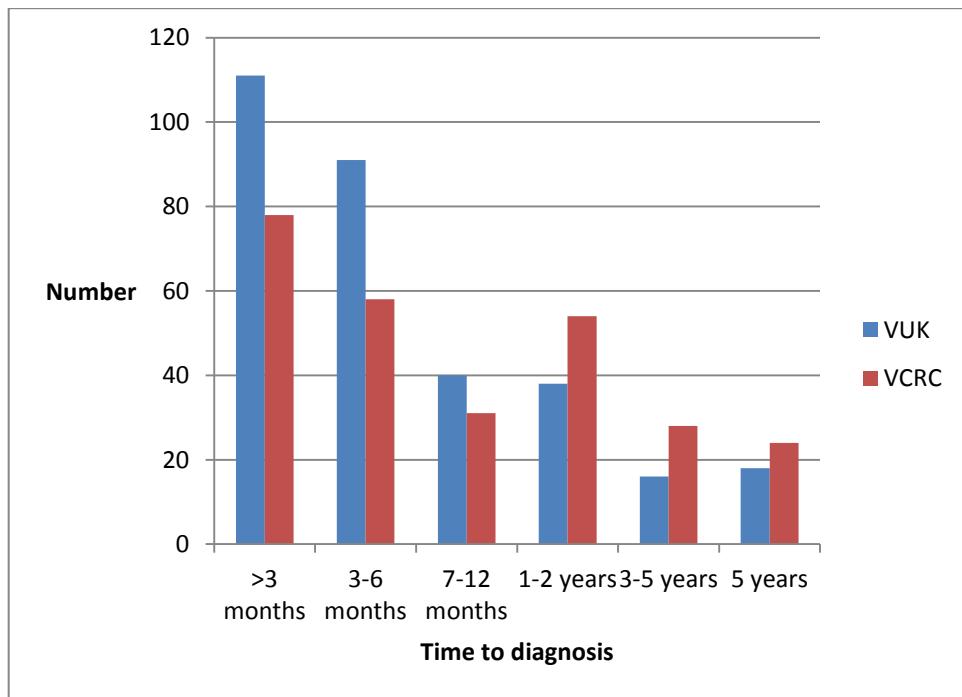
Figure 15 Time to diagnosis

7.4 Educational attainment

In the VUK cohort, 118/314 (37.5%) were educated to school- leaving age (14-16 years depending on date of birth) without necessarily obtaining any qualifications, 121/314 (38.5%) had A levels or some further education but not to bachelor's degree level, 53/314 (16.8%) had a bachelor's degree or higher. In the VCRC cohort, 32/273 (11.7%) were only educated to high school leaving or lower, 91/273 (33.3%) had received some further education but not to bachelor's degree level and 154/273 (54.9%) were educated to bachelor's degree level or higher (Table 11).

	Vasculitis UK	**VCRC**
Educational attainment	*314*	*273*
School leaving age	118/314 (37.5%	32/273 (11.7%)
A levels or equivalent further education	121/314 (38.5%)	91/273 (33.3%)
Bachelors degree or higher	53/314 (16.8%)	154/273 (54.9%)

Table 11 Educational attainment of participants

7.5 Information at diagnosis

Nearly all respondents reported that they had never heard of AAV before (VUK 96% and VCRC 95%). When first diagnosed 39.1% of VUK and 30.7%% VCRC respondents reported not receiving any information. Of those that did receive information about their condition, the majority received this information from a doctor (60% VUK and 68% VCRC), a nurse (4% VUK and 11% VCRC), and one participant in each group received information from a relative and other sources (10% VUK and 19% VCRC). Within the group of others a number received information from a support group.
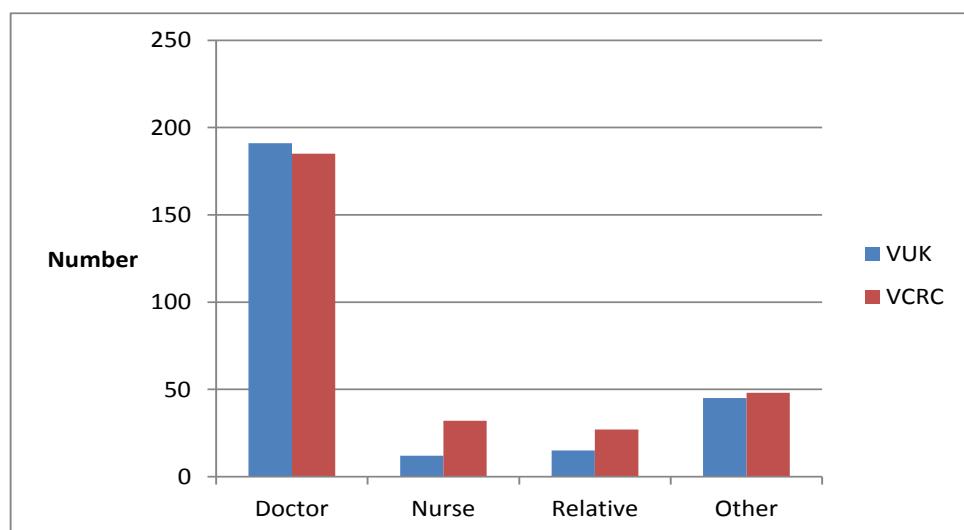
Figure 16 Who provided you with information at diagnosis?
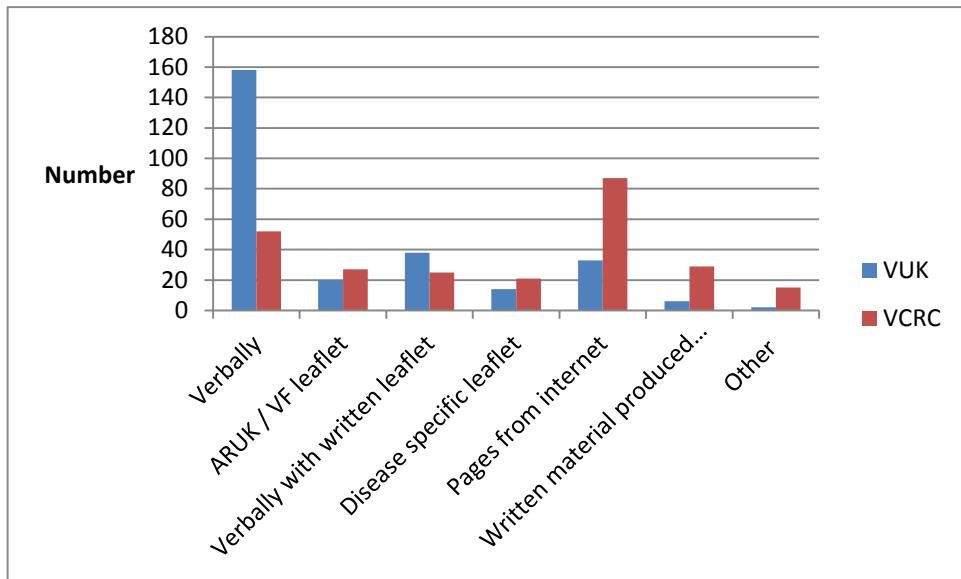
Figure 17 How was information provided?

7.6 Informational needs

The informational needs of both groups of participants are high (Figure 18, table 12), with all questions about specific needs scoring at least 3.0/ 5.0. The domains that were given the most importance covered questions about diagnosis,investigations and treatment (median 4.5), with psychosocial aspects given least importance (median 3.1). There was no difference in the pattern of responses between the VUK and VCRC groups (p>0.717). There was no difference in informational needs by gender as shown in figure 19 (p>0.139) and largely self- reported disease subtype (p> 0.304) (Figure 20).

However disease duration and age did show some differences but these were not staitistically significant (p>0.928)(Figure 21). Those with a short disease duration of <6 months scored lowest in the psychosocial domain with a median score between 2.6 and 3.0 indicating that they were only moderately important. Those who had their disease for one to two years scored a median of 4.0 for all the questions in the psychosocial subset indicating that this was very important to them. Those with longer disease duration >3 years appeared to still have high information needs in all of the

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domains, with a median score of 4.5 for disease, investigations and tests and treatment, physical 4.0 and psychosocial 3.5.

Variances were seen for two questions in the disease subset and one question in the physical subset for those with a short disease duration of <6 months. The question "Whether my vasculitis is hereditary" scored a median of 3.9 (p>0.233)and the question "If vasculitis is contagious" scored a median of 3.8 (p>0.181) compared to a median of 4.5 for all other groups. The question 27 "If I can continue my usual sports and hobbies" scored a median of 2.7 (p>0.717) compared to a median of 4.2 for all other groups.
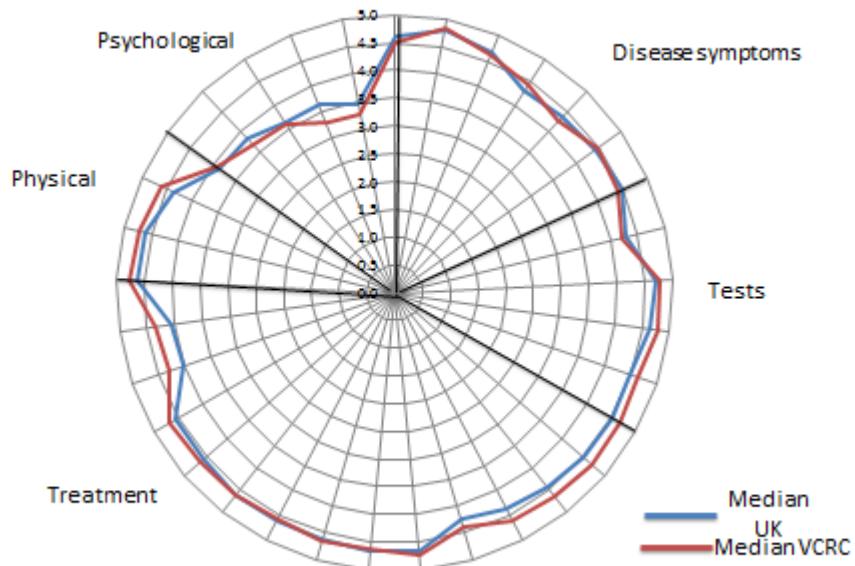
Figure 18 Median scores VUK and VCRC

	All Subjects	Vasculitis UK	VCRC
Ratings of Informational Elements			
Diagnosis (inc prognosis)	4.5	4.5	4.5
Investigations (type + results)	4.5	4.5	4.5
Treatments (inc side effects)	4.5	4.5	4.6
Life style	3.6	3.5	3.7
Patient support groups	4.5	4.4	4.6
Psychological care	3.1	3.1	3.0

Table 12 Median Score of subsets of VINQ

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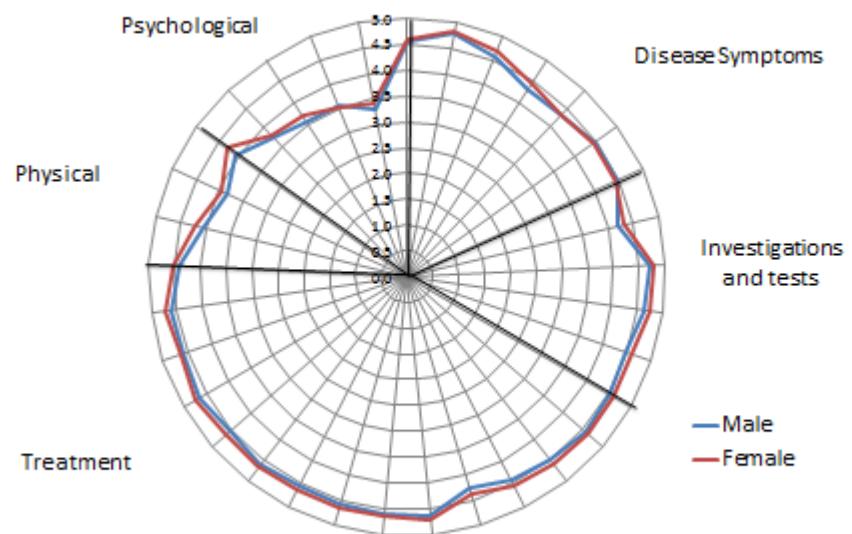
Figure 19 Median scores male /female
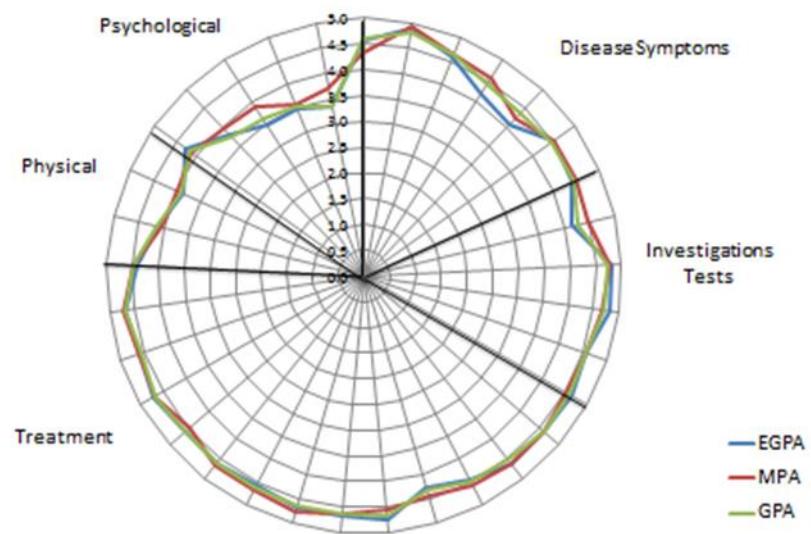
Figure 20 Median score disease subsets means
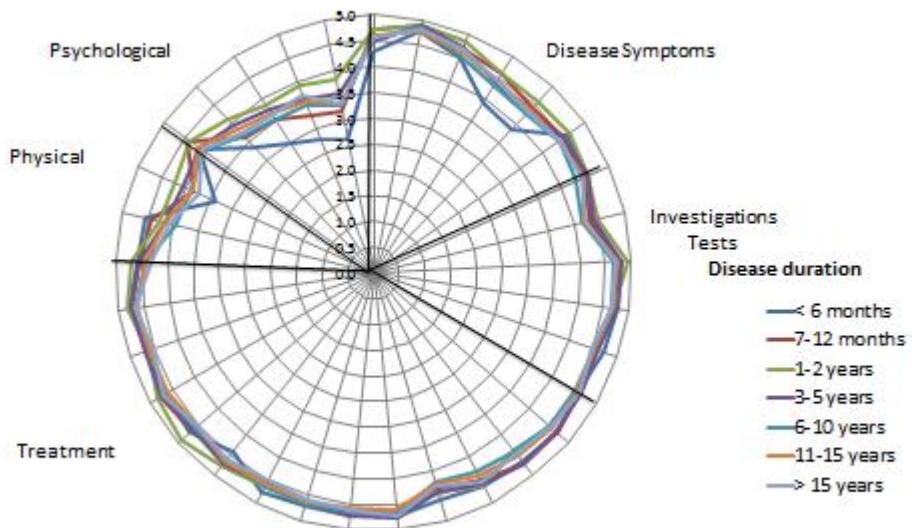
Figure 21 Median scores disease duration

7.7 Age Range

In response to how the informational needs were perceived according to age, a few differences were observed in the younger patients (>24 years) but these were not statistically significant (p>0.231). These related to the domain of investigations and tests in which they scored these questions slightly lower than the rest of the age groups (median 4.0 v's 4.5) (Figure 21).
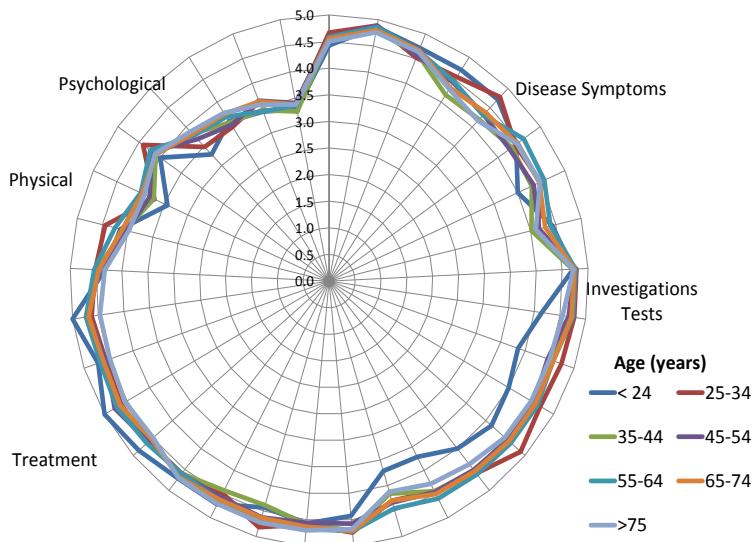
Figure 22 Median scores by age range

7.8 Comparison with cancer

The informational needs of participants with AAV were compared with patients with cancer previously reported using the TINQ (Harrison *et al.*, 1999. Graydon *et al.,*1997). Patients with vasculitis and cancer both required high levels of information, particularly the disease and treatment domains. For both groups, information about psychological aspects was much less desired (Table 13).

Subscale	TINQ median %	VINQ median %
Disease	89.2	90.1
Tests	84.8	90.4
Treatment	88.9	92.0
Physical	80.8	86.0
Psychological	70.9	59.0

Table 13 Toronto cancer informational needs and vasculitis informational needs median scores by domain

7.9 Preferred for source of information.

Participants in both the VUK and VCRC groups were highly desirous that information be provided by a doctor and supported by written material. In the VUK group the order of preference was: doctor and written material, written material alone, doctor alone, internet, group education, DVD, CD and 1-2 day course. In the VCRC group the order was Internet, doctor and written, doctor alone, written alone, education group, digital video disc (DVD), 1-2 day course and compact disc (CD).

7.10 Internet

All respondents in the VCRC group had access to the internet, compared to 68% in the VUK group. Just over a quarter (28%) of respondents in the VUK group did not have access to the internet, of these the majority were over 65 years of age (59), thirteen were >55-65 years, seven were aged between 30-55 years and one participant was less than 30 years.

7.11 Useful Information

From the open ended question that asked respondents to provide details of any information that they had found useful about their condition. A thematic analysis revealed that the internet was frequently used to find information and this was found to be invaluable. One responsent wrote "*Internet was terrific source of information, more so than doctor".* Support groups were another valued resource both online and face to face. Many reported that they had received excellent disease specific information from patient organisations in particular VUK and the Vasculitis Foundation. Some respondents described accessing medical books and medical papers to discover more information. A few participants remarked that the specialist nurse was helpful and many commented that written material from the hospital, support groups and ARUK was very useful.

Although some respondents reported being given information at diagnosis, they also had difficulty remembering what was said to them and also used the internet to find information. One participant wrote:

> "*The doctors at hospital X gave me a little information but I was really too weak, confused and attempting to put my life back together, to take much in. My cousin went on the VUK website to find information and at that point we realised all my mystery symptoms of the past 18 months were caused by EGPA*".

One participant who did not have access to the internet found it difficult to find information and wrote:

> "*.Apart from the ARUK leaflet, unless you have access to a computer there is very little information available*".

Some respondents read medical books and used the local library to copy pages from medical books.

In summary, the second phase of the study highlighted that participants with AAV required a considerable amount of specific information concerning their disease, treatment regimens and side effects and the results of investigations and tests. Individuals preferred to receive this information from a doctor. The next chapter will discuss the results of the second phase of the study.

Chapter 8 Discussion

This is the first study to explore the informational needs of participants with a rare chronic rheumatic disease and it makes a significant contribution to our knowledge about the education of patients with AAV. A cancer-specific informational needs questionnaire was adapted for use in AAV incorporating patient data from focus groups and one to one interviews. The VINQ demonstrated excellent survey reliability in two independent cohorts of participants. The results showed that respondents with AAV have significant informational needs that do not differ greatly by country of origin, sex, age, disease duration, or AAV subtype.

8.1 Informational needs

The results from the survey demonstrate that when diagnosed with a rare potentially life threatening illness, participants have significant informational needs about their disease, treatment and management. Participants ranked information about the disease as very / extremely important. They wanted to know certain information about their condition, such as the name of their vasculitis, its cause, whether it is hereditary or contagious.The diagnosis of a rare disease that respondents had never heard of before, meant that they sought information to try and understand what was happening to them. This was because they did not have any prior knowledge or experience of vasculitis to draw upon.

The participants also desired accurate information about AAV for example what the symptoms are and how is it diagnosed. Participants in both the VUK and the VCRC groups wanted a great deal of information about investigations and tests, they needed to know why they had x-rays, biopsies, scans and blood tests and the results of these. This is not surprising as many investigations and tests will have been requested and

performed by various clinicians in trying to establish a diagnosis of AAV. Nonetheless, it is important that clinicians explain to patients why they are requesting certain tests and investigations and the results and significance of these. In fact during the pilot of the VINQ, none of the participants with AAV had heard of the antibody ANCA, which is a test that can be helpful to aid diagnosis of AAV.

Similarly, respondents with AAV consistently ranked information related to treatment as either very important or extremely important. They wanted to know the names of drugs used and their side effects. This is also supported by comments made in the qualitative first phase (P2, P7, P16: p118). They desired detailed advice on side effects of medications, what side effects to report to the doctor or nurse and who they should call if they have any concerns. Furthermore, they wanted information on how long they would require treatment, the evidence base for the treatment decision and how to prepare for treatment. These findings are important because medications are vital to patient survival but are associated with increased risk of serious toxicity (Phillip & Luqmani, 2008). Cyclophosphamide and steroids are commonly used to induce remission, but patients need careful monitoring to observe for potential side effects (e.g. bone marrow suppression, haemorrhagic cystitis, infections, increased risk of bladder cancer, infertility and malignancy (Monach *et al.,* 2010). Once remission is achieved an immunosuppressant such as azathioprine or methotrexate or leflunomide or MMF are used as maintenance therapy for at least 12-18 months. These medications also have to be monitored for possible side effects such as bone marrow suppression (Appendix A).

In the first year of diagnosis AAV still has a mortality of 11.1% (Little *et al.,* 2010). The major causes of death were active uncontrolled vasculitis, infection secondary to therapy in the early stage of disease and cardiovascular disease during the chronic follow up phase (Luqmani *et al.,* 2011). It is vital that patients are fully informed of the reason and need for medication, the possible side effects and the monitoring process. They should receive information on what signs or symptoms to look out for, what to report to the doctor or nurse so that prompt treatment of infection or early recognition of drug toxicity occurs. They should also know when to have

regular blood tests for monitoring of immunosuppressant medication. It is known that patient's poor understanding of their condition and medications is linked to non-adherence with medications and poor health outcomes (NICE, 2009). Providing patients with written instructions of their medication regime, including how and when to take medications, has shown to be effective in aiding adherence and in reducing the incidence of adverse drug reactions (NPC, 2007, NICE, 2009).

AAV often presents with a fulminating life-threatening illness requiring urgent therapy and there may not be time for much education before treatment is begun. Additionally, this can be an extremely emotional and stressful time for patients who are trying to come to terms with the diagnosis of a serious illness, as described by the participants in the first phase of the study. Nonetheless, it is important that clinicians recognize that patient's informational needs are great and provide them with information about their medications and potential side effects. Key information may need to be given first and this should then be followed up later with more detailed information about their medications and side effects and supported with written materials as they cannot remember everything that they were told. This is supported by Kessels who advocates that the most important information should be given first (Kessels, 2003).

Respondents in this study had a great need for information on their disease, medications and side effects. This is supported in the cancer and rheumatological lliterature (Donovan, 1991, Galloway *et al.*, 1997, Neville *et al.*, 1999, Fraenkel *et al.*, 2001,Templeton & Coates, 2003, Adad *et al.*, 2004, Arvidsson *et al.*, 2005, Naeme *et al.*, 2005, Makelainen *et al.*, 2009, Schouffoer, 2011, van der Vaart *et al.*, 2013). It is widely accepted that people with cancer want information (Girgis *et al.*, 2000, Sanson-Fisher *et al.*, 2000, Tamburini *et al.*, 2000). In particular, they want information on their disease (Wingate & Lackey, 1989, Grahn & Johnson, 1990, Galloway *et al.*, 1997, Liao *et al.,* 2007, Sutherland *et al.*, 2009) investigations (Cook & Gotay, 1984, Derdiarian, 1986, Liao *et al.*, 2007) and treatments (Galloway et al., 1997, Jones *et al.*, 1999, Liao *et al.,* 2007). A systematic

review of cancer patients information needs by Rutten *et al.,* (2004) found the most important need was for information on treatment.

A survey of Canadian rheumatology patients found that 90% were very interested in receiving information about their disease and treatments (Neville *et al.*, 1999) and this is supported by Fraenkel and Neame who found that patients desired a great deal of information about their medications and side effects (Fraenkel *et al.*, 2001, Naeme *et al.*, 2005). Similarly, Adab *et al.*, (2004) found that 79% of patients wanted information on side effects of medication available in an arthritis education resource centre. In contrast only 38.4% of health care professionals felt this should be provided. The exact reasons for this discrepancy are unknown but it may be that there was an expectation that this information would have already been provided by the doctor who diagnosed their arthritis. Or it could simply be that health care professionals underestimate the amount of information patients want. Or that there is a mis match between what the health care professionals think /assume the patients need to know and what patients actually need to know (Sullivan *et al.*, 2001).

It was clear that participants with AAV wanted a great deal of information about their medications and possible side effects. This finding is relevant because a lack of information and understanding of medication regimens can lead to non-adherence and poor clinical outcomes (Carpenter *et al.*, 2011, Carpenter *et al.*, 2013). A study in the USA found that patients with AAV had difficulty adhering to complex medication regimens and were slow to report symptoms and medication side effects (Thorpe *et al.*, 2008). This may be attributed to patient's poor knowledge of the side effects of medication (Brown *et al.*, 2013). Or it could be because they are taking many different medications such as immunosuppressants, anti-hypertensives, treatment for other chronic illnesses and found it difficult to remember large amounts of information. Another possibility could be a deficit in education provision by health care professionals, or a lack of understanding of the potentially serious side effects of medications used to

treat AAV. An inpatient vasculitis education program in Germany showed that improvements in a patient's knowledge of medications and side effects led to an increase in health related quality of life (Herlyn *et al.*, 1997). Patients with AAV have have to manage the challenges and complexities of living with a long-term condition and its unpredictability (DH, 2005).

Aqualitative study of 20 rheumatology in-patients in Sweden showed that patients wanted more information about their medications and wanted to be more involved in their care (Arvidsson *et al.*, 2005). Although, some patients were relieved that the nurse was responsible for administering their medications during their stay, others questioned why they could not self-medicate, as when they were discharged this would become their responsibility. It is surprising that during a three to four week hospital stay patients still had information needs. It could be that nurses underestimate the amount of information patients want or they do not have the knowledge, skills and competencies to deliver such information. A qualitative study of in-patients perceptions of medication information provided by rheumatology nurses in Sweden found that there was variation in the amount of information given to patients (Makelainen *et al.*, 2009). Some patients were satisfied with the information given to them and participated in shared decision making but others were dissatisfied with the lack of information given to them. Many reported not receiving adequate information, with some only being told the name of the new drug they had been prescribed. The reasons for dissatisfaction were attributed to a lack of time, information provided was standardised and not tailored to patient's individual needs. This was a small qualitative study of 15 patients in one hospital and the findings may be different in different units. Nonetheless, the results are similar to the study by Arvidsson *et al.*, (2005).

A lack of personalised care for people living with a long-term condition has recently been recognised (Coulter *et al.*, 2013). The report by The Kings Fund identifies the need for a radical redesign of the way services are delivered to patients with a long-term condtion in England (Coulter *et al.,* 2013). They propose a 'house of care model' in which the patient is at the centre of care. In this model patients are actively encouraged to develop

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personalised care plans supported by shared decision making with their clinicians. Key to this process is the sharing of information between the patient and the clinician to maximise the patients' preparedness for their consultation. In order that patients are prepared for their consultations, they are sent out the results of tests and inverstigations and they are signposted to additional credible information sources. So that when they come to their consultation, they have prepared a list of questions that address their concerns and needs.

The informational needs of the VUK and the VCRC group are high (Figure 18, table 12), with all questions about specific needs scoring at least 3.0/ 5.0. The domain given the least importance with a median score of 3.1 was psychosocial. We know that many aspects of quality of life are impaired in AAV, with significant levels of depression and anxiety (Koutantji *et al.*, 2003, Herlyn *et al.*, 2010, Tomasson *et al.*, 2012, Basu *et al.*, 2013, Brezinova *et al.*, 2013). Despite the psychological burden of disease associated with AAV, participants were relatively less interested in receiving information related to the psychological aspects of disease management, a finding that parallels the informational needs of patients with cancer (Graydon *et al.*, 1997, Templeton & Coates, 2003).

This is a surprising finding as the results from the first phase of the study suggest that the psychological impact of a diagnosis of AAV is significant, causing anxiety and distress. One explanation for the lower priority of psychological support found in this study could be due to the fact that this reflects the questions asked in the VINQ and TINQ and that the VINQ inadequately assessed the psychological needs of these patients. As participants may have been inhibited by the use of the word psychological, however, only one question directly asked about accessing psychological support. It is also possible that participants, by joining a group, are getting informal psychological support and therefore feel less need to know about the availability of other sources of such support. Alternatively, group members may be more independent and may not need further support. In

contrast, prior to setting up a general arthritis education resource, support was high on a list of desired features in a needs assessment of what should be provided conducted (Adab *et al.*, 2004). Likewise, a large postal survey of 12,000 patients from eighteen European countries with eight rare conditions, found that 87% wanted psychological support at diagnosis (Kole & Faurisson, 2009). The question in this survey asked 'should psychological support be provided at diagnosis?. So it appears that the word psychological did not put respondents off answering this question, as many individuals interpret the word psychological as being 'in your head'. Although this was a large survey, only a small number of rare diseases were studied and AAV was not one of them. So the fact that respondents with AAV reported lower priority for psychological support, these results should not be interpreted that these participants may not need psychological support as only 15% of respondents rated it as not important and 12% as slightly important, with the remainder 73% rating it as moderate to extremely important. The lower scores on the psychological questions reflect lower priority relative to other dimensions of illness but do not necessarily suggest a low psychological burden of disease.

There are mixed results in the literature regarding the psychological impact of AAV, with rates of anxiety and depression reported to be between 19%-43% (Hoffman *et al.*, 1998, Koutanji *et al.*, 2003, Herlyn *et al.*, 2010, , Hajj – ALI *et al.*, 2011). Kountanji and colleagues found that 43% of patients with AAV were anxious and 25% were depressed as assessed by the Hospital Anxiety and Depression questionnaire (Koutantji *et al.*, 2003). This is supported by Herlyn and co-workers who found that 19% were anxious (Herlyn *et al.*, 2010) and Hoffman describes rates of depression between 33%-43% (Hoffman *et al.*, 1998). Similarly, depression is known to be higher in EGPA patients compared to the general population 23.6% v's 7.6 % (Hajj-Ali *et al.*, 2011). However, Kountanji *et al.*, (2003) found that compared to controls there was no significant difference in mental health using the SF36. Similarly, Basu and colleagues found no difference in mental health in AAV patients compared to the general population using the SF-8, which is a validated shortened version of the SF36 (cases mean

49.3, controls mean 49.0) (Basu *et al.*, 2010). They also found similar rates of psychological distress (cases 8% and controls 6%) and depression (cases 15% and controls 21%) between the two groups. The exact reason for this discrepancy is largely unknown but may reflect the use of generic and symptom –specific tools used in the studies. Or it may be attributed to the differences in the response rates of the two groups (80% for cases and 39% for controls). A study of 692 vasculitis patient's illness perceptions found that a quarter reported negative illness beliefs. This was associated with younger age, history of depression, poor health and active disease (Grayson *et al.*, 2013). It is not surprising that some patients will experience anxiety and depression, as this is a common feature of many chronic conditions (Kunik *et al.*, 2005, Rosso *et al.*, 2013).

8.2 Ethnicity

In the VUK / VCRC cohorts nearly all the participants were Caucasian (95%), however, all of the non-Caucasian population were from the VCVR cohort in which there were three American Indians, six Asians, three Black African/ American and one native from Hawaii. This is relevant as health care professionals need to be aware that there are differences in the beliefs about medications between different ethnicities. South Asian patients in the UK (defined as Indian, Pakistani or Bangladeshi) with RA and SLE are more concerned about their DMARDs and worried about potential side effects (Kumar *et al.*, 2008). They also were concerned about the overuse of DMARDs compared with their white/ Irish counterparts. They believed that overall medicines were dangerous. This study identified that cultural influences need to be taken into account when educating South Asian patients about their disease and treatment as they thought that their health was in the hands of god or it was just their fate. Moreover, South Asians are known to stop their DMARDs earlier than North European counterparts (Helliwell & Ibrahim, 2003).

A qualitative study exploring the beliefs of medications in 32 South Asian patients with RA and SLE (Kumar *et al.*, 2011) found that they had several concerns about DMARDs, in particular the necessity of long term medication, they were worried about the side effects of medication and were concerned about a lack of efficacy. Only one male decided to take part and males may have different opinions. The study did not examine beliefs about individual drugs and it is possible that participants may have had different views about biological agents compared to DMARDs. Nonetheless, this study highlights the importance of understanding patient's health beliefs as this can impact adherence to treatment.

Non- adherence has serious health and financial issues such as poor clinical outcomes and waste of medicines dispensed (WHO, 2003). Adherence to therapy can improve a patient's quality of life and life expectancy, particularly in AAV where medications are critical to survival. Patients with AAV need to be aware of the benefits, risks, and complications associated with their disease and treatments. Respondents in this study wanted more information on the benefits and risks of treatments prescribed. In addition, they wanted to know how to prevent / ease side effects, what side effects and when to report them to the doctor or nurse. However, information that was provided to them about their medications lacked consistency between primary and secondary care and pharmacists. This is a similar finding to Carpenter *et al.*, (2010) who studied 228 vasculitis patients and found that just over half received conflicting information regarding their medication. It is essential that health care professionals are consistent in the information given to patients about their medications, so that misunderstandings do not happen.

It has been shown that patient involvement in decisions regarding their medications is vital (Bitten *et al.*, 2000). In the Thorpe study participants believed wrongly that their medication side effects would go away (Thorpe *et al.*, 2008). This is worrying as some of the side effects are serious and potentially life threatening. Moreover, clinicians need to explore the patient's beliefs and fears about medication as this can impact adherence to treatment. Patients with long term conditions such as AAV are

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encouraged to self-manage as much as possible but in order to do this they will require information and knowledge about their disease and treatments. Thorpe *et al.*, (2008) explored some of the barriers to effective self-management and suggested that one of the barriers was a lack of effective patient education, in particular information about symptom monitoring and reporting of medication side effects. Successful self-management will only be achieved if patients have access to comprehensive and clear information that they understand.

It is not unsurprising that AAV patients have significant information needs as nearly all respondents reported that they had never heard of AAV before (VUK 96% and VCRC 95%). This is to be expected as this is a rare condition with a prevalence of 2/10,000 (Watts *et al.*, 2012) and there is a general lack of awareness within the population regarding many rare diseases (EUORDIS, 2009). These results are also consistent with previous research that patients with rare diseases have high information needs (EURODIS, 2009, Budych *et al.*, 2012).

Generally, there were relatively little differences in informational needs between the two groups. However, in response to how the informational needs were perceived a few differences were observed in the younger patients <24 years. These related to the domain of investigations and tests in which they scored these questions slightly lower than the rest of the group (mean 4.0 v's 4.5). However, these results need to be interpreted with caution because of the small sample size of seven. This study found that they there were no differences in information needs despite gender. This is a different finding to the literature which reports that females try to find information more than males (Rutten *et al.*, 2005, Mayer *et al.,* 2007, Carpenter *et al.*, 2012). This may be attributed to the fact that these are rare conditions that few people have heard of and it was difficult to find accurate information easily (EUORDIS, 2009, DH, 2013). .

8.3 Educational attainment

There were differences in the educational level of the two cohorts. In the VCRC group 54.9% were educated to degree level or above compared to just 16.8% in the VUK group. This could be due to the fact that the median age of the VUK cohort was higher at 63 years compared to 58 years in the VCRC group and therefore this generation would be much less likely to go to university with university intake around 10% of the age group (Table11). Despite educational differences, the two cohorts had similar informational needs across all domains. The delivery routes for education may need to be different as the VCRC cohort preference for delivery of information was via the Internet. This probably reflects the fact that this group was surveyed over the Internet. This is consistent with other Internet surveys in which the preference for information is via the Internet (Nulty, 2008, Carpenter *et al.*, 2011a).

8.4 Population differences

The results of the survey show that there appear to be no population differences in the informational needs of patients with AAV. This is surprising as the health care systems of the UK and the USA are very different. The UK has a national health service where health care is free at the point of contact and use is not limited. In the USA, the majority of health care provision is private and covered by private health care insurance or the ability to pay (Chua & Rutledge, 2006). Therefore, those that are uninsured or have a low income they may be less inclined to seek medical care. On the other hand, the reason for no differences in informational needs could be because these are rare diseases and many people find it difficult to find accurate information (EUORDIS, 2009, DH, 2013). Alternatively, it may be that the search for information is a priority to enable patients to cope and live with these rare conditions.

8.5 Who provided information?

Most participants in both groups received verbal information about their disease from the doctor who treated them in hospital. However, a problem with giving verbal information only, is that it assumes that the information has been received, processed and understood (Silverman & Kurtz, 2013). The results from the first qualitative phase found that participants had difficulty assimilating information when acutely ill. Giving verbal information however does allow for questions to be asked. A worrying number of respondents (39.1% of VUK and 30.7%% VCRC) reported not receiving any information at any stage of their illness. This figure is consistent with The National Audit Office (2005) report that in general up to 40% of patients and carers are still not offered information at diagnosis and 20% leave the hospital without any discharge information. This is supported by Kole and Faurisson (2009) who found that 25% of participants with a rare disease did not receive any supplementary information about their diagnosis other than the name. Even when discharged from hospital patients ranked information about their illness and treatment as high (Suhonen *et al.*, 2005, Arvidsson *et al.*, 2005, Makelainen *et al.*, 2009). It may be, there is an assumption that patients expect to receive adequate information whilst in hospital in relation to their disease and its management (Jones *et al.*, 1999, Valimakie *et al.*, 2002).

This may be attributed to the fact that patients are a captive audience and they expect health care professionals to have the time to communicate relevant information to them. On the other hand, acutely ill patients maybe looked after by many different specialists and bombarded with information that they are unable to understand or recall. Alternatively, it may be that they were looked after by non-specialists, who lacked the confidence and expertise to answer their questions. Or it could simply be because there are reduced opportunities for information sharing as patients are spending less time in hospital now and this reduces contact time with health care professionals. Another explanation is that ward nurses or junior doctors may not be the right people to provide information to patients with rare conditions as they may lack sufficient knowledge.

It is not known why so many participants reported not receiving information at diagnosis. It could be attributed to the fact that many reported being anxious and this is known to affect information recall (Gustafson *et al.*, 1999, Kessels, 2003, Stephenson, 2006, Mooney *et al.*, 2013). Or possibly that they were not given additional information other than the name of their condition or because many had their condition for over ten years (40% VUK and 20% VCRC) and at that time there was a general lack of patient information available. Of those that did receive information about their condition, the majority received this information from a doctor (60% VUK and 68% VCRC), a nurse (4% VUK and 11% VCRC), and one participant in each group received information from a relative and the remainder from other sources such as the internet or support groups (10% VUK and 19% VCRC). It is not surprising that doctors were the main source of information provision at diagnosis as this is in keeping with other studies (Rutten *et al.*, 2004, Neville *et al.*, 1999, Carpenter *et al.*, 2011a). Following diagnosis there is no reason that an experienced and knowledgeable vasculitis specialist nurse could not provide patient education.

8.6 Role of the rheumatology nurse

Patient education is an important part of managing any rheumatic condition and is   routinely provided by rheumatology specialist nurses for a number of conditions (Ryan, 1996, Cornell & Oliver, 2004, Hill, 2007, Brown, 2012). The role of the rheumatology nurse practitioner is well documented in the UK (Phelan *et al.*, 1992, Hill *et al.*, 1994, Ryan, 1997, Carr, 2001, Goh *et al.*, 2006, Oliver & Leary, 2010). The first mention in the literature was in the early 1980's in Leeds where nurses were employed in research studies (Bird, 1983). Their role developed to include running nurse led clinics for patients with RA. By the end of the 1980's rheumatology nursing clinics began to emerge in the UK. A national survey of the role of the rheumatology specialist nurse in 1992 revealed that 96% undertook drug monitoring and education of colleagues and 86% provided patient

education (Phelan *et al.*, 1992). Many rheumatology nurses also provide advice, information and support via telephone helplines (McCabe *et al.*, 2000, Hughes *et al.*, 2002, Brown *et al.*, 2006, Thwaites *et al.*, 2008).

A survey by Carr (2001) found that 82% of rheumatology nurses routinely gave information and advice to patients, 52% carried out drug monitoring and 35% performed joint counts. Goh and colleagues used a postal surveyed to establish the roles of 95 rheumatology nurse practitioners in the UK (Goh *et al.*, 2006). A total of 95/ 200 questionnaires met the entry criteria, the majority of nurses were providing care for RA patients (96.8%) and psoriatic arthritis (PA)(95.8%), OA (63.2%), AS (62.8%), SLE (51.6%) and scleroderma (34.7%). The majority of rheumatology nurses (80%) regularly provided patient education and drug monitoring. It would appear from this study that no nurses were involved in caring for patients with ANCA vasculitis. A limitation of this study was that the British Health Professionals in Rheumatology (BHPR) handbook was used to identify respondents and this may not be a true representation of all nurses working in rheumatology. A survey by the Royal College of Nursing in 2009 of 272 rheumatology nurses found that they had expanded their role and contribute to the management of many different rheumatological conditions, (78%) RA, (73%) PA, (72%) sero- negative RA, (61%) AS, (55%) seronegative arthritis, (42%) SLE, (40%) OA and other connective tissue diseases 35% (RCN, 2009). In this study 91% reported that counselling patients about their medications formed the main part of their role and 95% routinely provided patient education. The majority spent their time managing RA patients, 95% provided psychological support and 84% DMARD monitoring. The low response rate of 17.6 % makes it difficult to generalise the findings, and the sample population was members of BHPR and the Royal College of Nursing (RCN) Rheumatology Nursing Forum, so the sample may be skewed as many nurses working in rheumatology are not members of these organisations. Again, the questionnaire did not specifically ask about ANCA vasculitis making it difficult to map out the role of the specialist vasculitis nurse. Nonetheless, it does provide valuable insight into the variation in the roles of rheumatology nurses with the majority of the role restricted to RA.

The effectiveness of rheumatology nurse practitioners in the UK compared to consultant rheumatologists in managing RA patients has been evaluated and found to be safe and effective (Hill *et al.*, 1994, Ndosi *et al.*, 2013). In Hill's study those attending the nurse clinic had reduced pain, improved knowledge and increased satisfaction. The consultant however saw more patients. A multi-centre study also found that the nurses were as effective as doctors (Ndosi *et al.*, 2013). However, the nurse appointments were five minutes longer than the doctors but nurses provided more patient education. An evaluation of an expert rheumatology nurse run monitoring clinic for DMARDs compared to an out-patient clinic nurse for 71 RA patients showed that patients attending the expert nurse clinic reported better coping mechanisms and control over their RA (Ryan *et al.*, 2006).The role of the rheumatology nurse specialist is well documented in the UK and it has been evaluated.

In contrast, very little is known about the role of the rheumatology nurse in the USA. Hooker cites the first use of a nurse practitioner in rheumatology in the USA as over 30 years ago in 1976 (Hooker, 2008a). Similar to the UK experience the nurse practitioner was employed as a clinical trials research nurse. A study to explore the roles of 112 physician assistants in rheumatology using a web based survey and telephone interviews found that nearly all undertook the first consultation with a patient and nearly all initiated DMARDs and half participated in clinical trials research (Hooker & Rangan, 2008b). Surprising, there is no mention in this study of physician's assistants providing patient education. The recruitment for the study may be an under representation as it is not known how many physicians assistants work in rheumatology. Solomon *et al.,* (2013) carried out an e-mail and postal survey of 482 nurse practitioners and physicians assistants working with RA patients in the USA to establish their role. There were 174 replies, a 30% response rate, two thirds had their own caseload and nearly all provided patient education (98%), almost all adjusted medications (97%) and virtually all undertook physical examinations (97%). There were some differences in the roles, nurse practitioners ran more infusion clinics than physician's assistants (31% v's 15%). However, the low response rate

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makes it difficult to make direct comparisons. Nevertheless, it is clear that nurses have become an integral part of the multi-disciplinary team in rheumatology.

The European League Against Rheumatism (EULAR) has published ten recommendations on the role of the rheumatology nurse in the management of inflammatory arthritis (Van Ejik – Hustings *et al.*, 2012). These include that patients should have access to a nurse for education, to have access to a nurse as part of on-going disease management and to see a nurse for psychosocial support including self-management. Although patient education is considered a key role of the nurse in inflammatory arthritis, it appears that in AAV this is often an overlooked aspect of care. There is little mention of the role of the nurse in ANCA vasculitis in either the UK or the USA. Yet, nurses are ideally placed to be involved in the care of these patients, to help patients understand their condition and provide advice and support (Brown, 2012). There is considerable scope to develop this area of practice and patients should have access to specialist / consultant nurses who have the knowledge and expertise to be involved in the management of their care. Of course, it would be unrealistic to expect all nurses to be able to undertake this educational role in AAV as it is a highly specialised and complex area.

8.7 Whose role is it to provide patient education?

Whilst patients should be informed about their disease and treatments, there is some confusion as to whose role it is in the USA. A recent large survey of the attitudes, beliefs and information needs of 2,795 RA patients, 500 doctors and 101 nurses showed that 68% of nurses thought that it was their responsibility to provide information to patients about the side effects of medications, compared to only 14% of doctors (Furfaro *et al.*, 2013). There was also a discrepancy between the groups in the levels of patient knowledge about medications, as 87% of doctors and 90% of nurses believed that patients had high levels of knowledge compared to only 50% of patients.

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A study by Moret *et al.*, (2008) examined the roles of 302 doctors and 533 nurses in the conveying of medical information to hospital in-patients in France. When asked whose responsibility it was to provide information to patients they found that 85% of doctors and 92% of nurses thought it was the doctor's sole responsibility to provide information on diagnosis and prognosis. However, 55% of the nurses felt that they lacked adequate medical knowledge to communicate with patients. There were differences of opinions in who should provide information regarding investigations and tests with nurses indicating they had an important role to complement doctors and doctors believing that it was their sole responsibility. This study also found that a quarter of patients thought that they did not receive adequate information on the risks and benefits of treatment. Although, the doctor may see it as their responsibility to provide information on diagnosis, prognosis and treatment, often they do not have enough time to do this effectively. Time constraints and staff shortages have been cited as a barrier to patient education (Albano *et al.*, 2010). Furthermore, the healthcare team need to be clear on individual roles and responsibilities in coordinating patient education. Doctors may perceive that it is their role or delegate it solely to nurses. If this is the case then, nurses should have the experience and knowledge to educate these patients. All patients should be provided with written information about their condition and treatment and given the opportunity to discuss this with a knowledgeable practitioner.

8.8 Preferred source of information

Participants in both the VUK and VCRC groups were highly desirous that information be provided by a doctor and supported by written material. However, participants did not want written information to be a substitute for a conversation with their doctor and this is a similar finding in a systematic review of the effectiveness of written information leaflets (Raynor *et al.*, 2007). It is not surprising that the doctor was the most preferred source of information as this is consistent with other studies (Neville *et al.*, 1999, Carpenter *et al.*, 2010, Limb & Nutt, 2010). Nurses were not a significant source of information and this is not unexpected as the majority of nurses

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do not have the expertise or knowledge to deal with patient's questions regarding AAV. Although there are some specialist vasculitis nurses who will have this knowledge and experience but these will be in the minority. For patients with a rare disease such as AAV there is much less educational provision, as the majority of health care practitioners do not have the experience and knowledge to educate these patients on an on-going basis. This means that it is the responsibility of the consultant to address patients' concerns. This may cause tensions because of the demands on consultant time and the reluctance of patients to seek such advice at this level. If specialist nurses received relevant training to provide such advice, this would help to address such tensions.

8.9 Diagnostic delay

Diagnostic delay is common in rare diseases and in this study over a quarter of respondents were diagnosed within three months of the first presenting symptom and just over a third were diagnosed within a year. A further 15% were diagnosed within one to two years. However, for five per cent it took three to five years to obtain a diagnosis and a further five per cent waited more than five years for a diagnosis. There were slight differences in diagnosic delay between the two groups, the VUK group were diagnosed earlier than the VCRC, with of 35% of VUK v's 18% of VCRC diagnosed within <3 months and 66% of VUK compared to 50% of VCRC within 6 months. At one year 79% of VUK compared to 61% of VCRC had received a diagnosis and by 1-2 years 90% of the VUK group and 69% of the VCRC cohort were diagnosed. This is a similar finding to Abdou and colleagues who found diagnostic delay in AAV to be between three to 12 months (Abdou *et al.*, 2002). The findings are also consistent with results from a large survey of a patients and families living with a rare condition in which 46% of patients waited more than a year to be diagnosed, 20% waited over five years and 12% over ten years (Nutt & Limb, 2010). Diagnostic delay is common in rare conditions, ranging from one year for cystic fibrosis and amyotrophic lateral sclerosis to 14 years for

Ehlers Danlos- syndrome (Kole & Faurisson, 2009). Early diagnosis was associated with the availability of specific diagnostic tests that confirms the diagnosis. Similarly, in AAV a tissue biopsy result confirming vasculitis provides a definitive diagnosis (Miller *et al.*, 2010). An explanation for the shorter delay in diagnosis seen in the VUK cohort may be attributed to the fact that in the UK health care is free at the point of contact compared to the USA where it is covered by private health care insurance or the ability to pay and this may have contributed to responsents not seeking help earlier. Or it could be the fact that respondents were referred earlier in the UK to specialists compared to respondents in the USA.

Although, it can be difficult to diagnose AAV, a delay in diagnosis and treatment can affect the patient's outcome. A delay in diagnosis was associated with more severe disease, more hospital admissions, higher use of steroids and immunosuppressive therapy (Sokolowska *et al.*, 2013). Diagnostic delay in rare conditions is associated with frequent consultations with many different doctors and specialists, numerous investigations and tests, patients are often mis-diagnosed before a diagnosis is finally reached (Kole & Faurisson, 2009). This is supported by some of the comments from the participants in the qualitative first phase who struggled to get a diagnosis and were seen by many doctors (P7, P21:p120). All of this leads to frustration and loss of confidence in the health care system by patients (Kole & Faurisson, 2009). Likewise, poor knowledge of health care professionals about rare conditions attributes to this diagnostic delay.

8.10 Use of the Internet

The internet is increasingly being used as a medium for accessing health information. The results from question number 17 in the VINQ revealed that the internet was frequently used to find information and this was found to be invaluable by participants (Appendix T). However, in this study just over a quarter (88) of the VUK participants did not have access to the internet

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and of these 57 were aged over 65 years. Consequently, a considerable number of participants would not be able to do this and therefore would be deprived of further information. This is important as the AAV's have a peak age of onset of between 65 -74years (Watts *et al.*, 2012) and health care professionals should not assume that everybody has access to the internet especially those over the age of 65 years. Vasculitis experts are encouraged to signpost patients to accurate sources of information on the web (DH, 2013). However, for those who do not have access to the Internet, they should be provided with written information or printed pages from the Internet from recognized credible sources.

It has been suggested that good quality web-based patient education materials may lead to better health status and health care use for patients (Lorig *et al.*, 2008, Nahm *et al.*, 2012, Meesters *et al.*, 2012). Maloney and colleagues evaluated the quality of OA health information websites and found that they were of a poor quality as measured by the DISCERN tool (Maloney *et al.*, 2005). This tool judges the quality of information on websites against 16 criteria on a five point Likert scale (1=poor to 5=good quality). Medical search engines however were associated with higher quality websites. An evaluation of the readability and suitability of credible web based patient education materials used in rheumatology found that most materials were written at readability levels above the recommended sixth-grade reading level and have only adequate suitability (Rhee *et al.*, 2013). Of these, the vasculitis foundation resource had the highest reading age of 12.5. This could be be due to the fact that AAV are complex conditions and some of the terminology used may be difficult to understand.

Low health literacy in musculoskeletal conditions is reported to be between 7%-42% (Loke *et al.*, 2012). Of 194 patients attending a US rheumatology clinic, 10% could not read the words 'cartilage, diagnosis, rheumatologist, symptom or inflammatory' (Swearingen *et al.*, 2010). Health care professionals should be aware that low health literacy may impair an individual's ability to understand written educational material and that includes web based materials. Clearly there are challenges in producing suitable web-based educational materials that patients can understand.

Rhee and colleagues conclude that effective educational resources are needed to educate patients but are lacking (Rhee *et al.*, 2013). One solution is to involve patients in the design of educational materials as these are likely to be more acceptable and relevant to patients (Kennedy et al., 2003). This should include ethnic minority groups as well so that they are not disadvantaged (Samanta *et al.*, 2103). A Health Literacy Universal Precautions Toolkit for Rheumatology (HLUTR) has been produced for use by all members of the rheumatology team to improve patient's health literacy. (www.nchealthliteracy.org/toolkit/Rheum/toolkit.pdf). This toolkit not only deals with written materials but addresses spoken communication and medication adherence. A small study evaluating its effectiveness in the US in four rheumatology and cardiology practices found that over half of the staff felt that the tools were useful for assessing low health literacy and all agreed that it improved patient care (Callahan *et al.*, 2013). More research with larger numbers of centres are needed for further evaluation. Even so, this is a free tool that can be downloaded, with access to video clips, educational materials and pictures and may be a useful start to assess the effectiveness of existing materials and rheumatology services.

A recent study by van der Vaart *et al.*, (2013) found that 85% of patients with SSc and RA had used the internet to search for information about their condition, 58%-63% for information about medications and lifestyle issues and 57% to find a support group. However it can be difficult, frustrating and time consuming to find correct, comprehensive and relevant information (Langille *et al.*, 2010, Culver & Chadwick, 2005). Signposting patients to credible web based resources should not be considered good patient education. As some participants in the focus groups and the one to one interviews who searched for information on the web, found that this heightened their anxiety. Patients should be given an opportunity to discuss any information on the web with a health care practitioner, so that their concerns can be addressed.

8.11 Challenges for rare conditions

There are several challenges for clinicians and patients when faced with dealing with a rare, potentially life threatening illness such as AAV. Diagnostic delay is common, there is an increased risk of morbidity and mortality and relapse is common (Jayne, 2009). The rarity of these conditions means that they are unlikely to be diagnosed or managed solely by general practitioners, junior doctors or doctors with little knowledge or experience in vasculitis (Ingelfinger & Drazen, 2011, Veyckemans *et al.*, 2011). Many doctors and nurses have never heard of GPA, EGPA or MPA and have no experience of these conditions.

In recognition of the many challenges facing patients with rare conditions in the USA, the National Organisation for Rare Disorders (NORD) was established in 1983 to fight for the unmet needs of these patients. This organisation is a collection of patient support groups whose aim is to improve the care and quality of life for individuals living with a rare condition. They were instrumental in getting the Orphan Drug Act passed to support the development of new treatments for rare conditions. In 1997 an umbrella group was formed in Europe called the European Organization for Rare Diseases (EUORDIS). Together they have campaigned for the rights to early diagnosis, better access to treatments and services. They have published several reports that have led to the development of national plans for rare diseases in every country in Europe by the end of 2013. France and the UK has embraced the challenges facing patients with rare conditions and developed a national strategy to improve early diagnosis, recognition of rare diseases as a specialty, the development of patient and health care professional information materials and research into the epidemiology and treatment of these conditions (EUORDIS, 2006, DH, 2013). It is clear that the diagnosis of AAV is significant and impacts many aspects of patients' lives. The next chapter will present the conclusion of the study, the strengths, limitations and recommendations.

Chapter 9 Conclusion, strengths, limitations and recommendations

This chapter is the last part of the thesis in which the results of the study will be revisited and the original contribution to knowledge in the field of AAV will be considered as well as the implications for patients and health service delivery. The first section of this chapter examines the first issue of 'receiving a diagnosis of AAV'. The second section looks at the informational needs of patients with AAV and the third section examines the strengths and limitations of the study and how this research has contributed to the knowledge and understanding in this area. Lastly is to consider how the research findings can be put into practice and discuss areas for further research.

9.1 To understand what it is like to receive a diagnosis of AAV

The first two chapters looked at what is AAV, its prognosis, management and the risks associated with treatment and the impact of this disease on individual's lives. The first qualitative phase of this mixed method study was designed to answer the research question 'What is the experience of receiving a diagnosis of a rare potentially life threatening condition such as AAV'.

The results of the first qualitative phase found out that receiving the diagnosis of a rare potentially life threatening disease causes anxiety and fear and this can impede information retention, understanding and recall. Therefore, timing of information is crucial, as patients have difficulty taking in information when acutely ill. The need for emotional support at diagnosis was often overlooked by doctors and nurses, patients reported being frightened, highlighting that the psychological needs are just as important in the management of AAV and should not be ignored.

All participants desired information about their diagnosis and treatment and wanted written information but value having the opportunity to discuss it

with a knowledgeable healthcare practitioner. Respondents expressed their frustration at the lack of knowledge and awareness of rare conditions amongst health care professionals. Participants' symptoms were often not taken seriously or dismissed as not serious. When consulting with health care practitioners, they described positive and negative experiences. Positive experiences were associated with knowledgeable practitioners who have expertise of AAV and negative experiences were linked to patient's symptoms not being listened to or taken seriously and being told that 'you're not ill'. Participants reported that they wanted access to, advice from and treatment by knowledgeable practitioners. In conclusion, the consequence of a diagnosis of AAV is significant and impacts many aspects of individuals' lives and should not be underestimated by health care professionals.

9.2 Informational needs of participants with AAV

The second quantitative phase of the study was designed to answer the following questions:

 A) What are the informational needs of patients with AAV?

B) How do patients with AAV prioritize their informational needs?

C) How is information provided to patients and by whom?

D) What sources of information are preferred?

E) Are there any differences in the informational needs of patients in the UK and USA?

The second part of the study highlighted that people with AAV required a considerable amount of specific information concerning their disease, treatment regimens and side effects and the results of investigations and tests. Individuals preferred to receive this information from a doctor. Most participants received verbal information about their disease from the doctor who treated them in hospital. However, a significant number of respondents

reported not receiving any information at any stage of their illness. There were no significant differences in informational needs between the two cohorts of participants regardless of country of origin, sex, age or disease subtype. The findings from the study support the need for patients with rare conditions to be educated in a similar manner to patients with more common chronic conditions, as both have very similar educational needs.

9.3 Health service delivery

When the author embarked on this research project she expected to be advocating that patient education programmes for people with AAV should be implemented similar to those for RA. However, on reviewing the evidence base for patient education in more common rheumatic conditions there is conflicting benefits. Patient education programmes and self-management programmes cannot solely provide patients with the skills to be able to manage their condition without the support and help of others. The management of AAV requires access to a multidisciplinary team of experts. Complex conditions are more difficult to self-manage and they should be managed in conjunction with specialists. This does not mean that patients cannot become experts of their own condition but it will take time, knowledge and experience. Rather than using the term patient education, we should be thinking about 'The Patient Information Sharing Journey'. This enables health care professionals to tailor information to suit the needs of the patient at each stage of the disease pathway and also to adapt it to their readiness to learn. The author has challenged her own assumptions that a generic patient education programme for AAV is a good thing and should be implemented. It is clear that due to the complex nature of AAV and the many different disease presentations, the education of these patients has to be done on an individual basis. First we need to understand the patient's information needs in order to improve the educational strategies and outcome measures used.

Although, patient education in rare diseases poses unique challenges, the informational needs in these patients are high and need to be met. At diagnosis, neither health care professionals nor patients may have access to much detailed information. The patient may feel isolated because friends and relatives to whom patients often turn to for help are unlikely to have heard of the condition, given the lack of general awareness regarding many of these diseases. Health care professionals, unless working in the relevant sub-specialty, may have limited understanding of the disease and may not be able to help patients understand and contextualize relevant information. Yet, doctors and nurses need to help patients understand information so that patients can internalise the information and contextualise what this might mean for them. Participants clearly expressed a desire for information to be provided by knowledgeable professionals, to whom access can be especially difficult.

The recently published report "The UK Strategy for Rare Diseases" aims to improve the quality of life for people with rare conditions with a focus in five areas, empowering patients, recognizing and preventing rare diseases, diagnosis and early treatment, coordination of care and the role of research (DH, 2013). The report recommends that patients should have access to specialist multidisciplinary teams who provide coordinated care and support. This should include a specialist nurse who has the skills and knowledge to educate and support patients. The focus is to improve the whole patient experience from the first point of contact, which is usually the GP, to diagnosis and follow up care. It recognizes how valuable the patient's experience is and this has many information sharing opportunities. The diagnosis and management of AVV is complex and therefore partnership-building with specialist teams will be needed to improve the patient experience.

9.4 Strengths of the study

The study has a number of strengths. Using a mixed methods approach in which the results from the qualitative first phase were are used to guide and inform the development of the VINQ ensured that relevant items in the questionnaire were included. Mixed methods allow a more flexible approach to the study design and have a greater potential to extend the impact of the research to a wider community (Sandelowsk, 2000). An established questionnaire was adapted and validated for use in patients with rare auto-immune diseases. This study includes large numbers of participants with rare diseases, with equal numbers of women and men, there is consistency between cohorts despite the differences in recruitment strategies and response rates, suggesting that the findings are generalizable to the AAV community as a whole and supporting the argument for needs –led education provision. The two study populations enabled comparisons with two different countries.

9.5 Study limitations

The study has several potential limitations. Although the same questionnaire was used in both groups, it was administered differently to each. While the response rates differed (52% postal VUK, there was only a 10% response rate from the internet survey (VCRC). Although e-mail reminders were sent, a better response rate may have been achieved by putting an advert on the Vasculitis Foundations website and also in their quarterly newsletter, as well as advertising the survey at support groups and patient conferences. It is noteworthy that very similar results were obtained from both a written survey and an internet administered survey suggesting that for this type of survey the method of administration makes little difference. However, the low response rate of 10% from the internet survey means that there is a bias towards the postal questionnaire. Therefore it makes direct comparisons very difficult due to the low numbers of the internet survey, so it is difficult to make generalizations as the

internet sample may not be truly representative of the whole USA popualtion. Also, the internet responders may also be highly motivated, have joined a rare disease registry and be used to participating in internet research. There may be recall bias for the questions which asked about information provision at diagnosis. Clearly each group of respondents is self- selected and only represents those who have joined a disease specific patient group and access and respond to requests for participation in research studies. The VCRC group is further selected by requiring access to the Internet. The diagnosis is self-reported and was not independently checked, therefore there is the potential for misdiagnosis classification which could have influenced the results. There is a disproportionate representation of GPA in both groups, which is to be expected, as GPA is the most common type of ANCA vasculitis. In both groups MPA is under represented. Prevalence data suggests that in white Caucasian populations GPA is the most common, with EGPA being the least common, in a ratio of 7:3:1 (Watts *et al.*, 2012). In the VUK cohort this may reflect the development of the organisation, which originally was established as a support group for patients with GPA. Also, the study did not measure information needs over time. The self- reported vasculitis diagnosis was not confirmed by a doctor. However, for the rare types of vasculitis include in the study this is highly unlikely but possible. The results of the study cannot be generalizable to the USA population due to the small numbers and this study needs to be replicated with larger numbers.

9.6 Recommendations

9.61 That patients with AAV are educated about their condition

Now that patients with AAV are surviving the critical phase of the illness and attaining disease remission, they need to be treated like other chronic illnesses where patient education has been recognized as an important aspect of chronic disease management and the cornerstone of good quality care. It is now best practice, to provide patient information for chronic illnesses, and patient education has been acknowledged for some time as

being a vital part of patient care (North *et al.*, 1999, Barlow *et al.*, 2000, Albano *et al.*, 2010). Indeed, the shortcomings in care provided to patients with rare conditions have been recognized and it is now government policy to provide patients with timely information about their disease and treatments (DH, 2013). Patients with AAV are similarly entitled to be educated about their condition, to the level that they need to manage their lives. All patients should be provided with written information about their condition and given the opportunity to discuss this with a knowledgeable practitioner. Participants had difficulty understanding some of the medical terminology used highlighting that information given to patients must be in a language they understand. Participants needed time to absorb information at their own pace to inform the basis for their questions. Written information would support this education process by giving time for patients to appreciate the meaning and then to internalise what it means to them. They could then prepare their questions ahead of a meeting with the doctor or nurse.

Patient education begins very early on, in fact as soon as the patient receives the diagnosis (Kohen & Esdaile, 2008). However, the timing of this information is crucial as patients have difficulty assimilating information when acutely ill and this can impede information recall. Furthermore, clinicians should be aware of a patient's emotions during a consultation and deal with then before imparting information (Sep *et al.*, 2014). Key information may need to be given at diagnosis and followed later with additional information. The optimal time for more in –depth information should be when the patient has had time to digest and make sense of what is happening to them. The exact timing of this will be different for each individual but clinicians need to assess a patient's readiness to learn. A separate consultation should be arranged to explain the patient's diagnosis and treatment with enough time allocated to do this. This can help make the most of each patient encounter through the use of good communication, thereby increasing patient satisfaction and improving outcomes (Steel *et al*.,2012, Marcusen, 2010).

9.62 To ensure that patients understand the importance of their medication and possible side effects

Medications are the mainstay of treatment in AAV but are associated with serious toxicity. It is essential that patients are fully informed of the reason, the need for the medication, possible side effects and the monitoring process. As non-adherence has serious health and financial repercussions such as poor clinical outcomes, medicines waste (WHO, 2003). Patients should be provided with written and verbal information about the name of their medication, what it is for, when to take it and how and how long for, what the side effects are, what signs or symptoms to look out for and what to report to the doctor or nurse so that prompt treatment or early recognition of toxicity occurs. In addition, patients should know about any contraindications with other medicines and any special monitoring such as blood or urine tests. Adherence to medications can be encouraged with the supply of pill cards, pill charts and dosset boxes. Health care professionals also need to understand the patient's health beliefs as this can impact adherence to treatment. Adherence to therapy can improve patient's quality of life and life expectancy, particularly in AAV where medications are critical to patients' survival. It is essential that health care professionals are consistent in the information given to patients about their medications, so that misunderstandings do not happen. Patients will need information and education to help them to self- manage and participate in informed decision making. Furthermore, the healthcare team need to be clear on individual roles and responsibilities in coordinating patient education and all patients should have a personal management plan.

9.63 Information about AAV needs to be easy to access for patients and health care professionals

Patients and health care professionals should have access to written information about AAV. All patients should be provided with written information about their disease and treatment, as well as information on where to access additional information. This written information should be easy to read and understand and written in plain English without jargon. It

can be difficult to search for accurate medical and patient information for rare diseases and judge whether it is from a reliable source. Experts should signpost patients and healthcare professionals to accurate sources of information on the web as well as endorsed patient organisations and support groups. Web based education materials should be written in simple language that patients can understand. People with low health literacy may benefit from other educational strategies where individual verbal education is critical and supported with pictures, audio tapes and video clips. All educational material should be assessed for readability and suitability for patients.

9.64 Patients should be provided with psychological support

The consequence of a diagnosis of AAV is significant and impacts many aspects of individuals' lives and should not be underestimated by health care professionals. Emotional support at diagnosis was often overlooked by clinicians. Routine follow up should include an assessment of individuals' psychosocial status and quality of life. Patients should be offered help and support to cope with their condition, including counselling and referral to a psychologist if appropriate. A specialist nurse has a valuable role to provide support and advice to patients and their families. Patients should be provided with details of patient support organisations that provide education and support to members. Some organisations provide support via telephone helplines that are manned by specialists or other patients with similar conditions. Another way of providing psychological support is through online disease specific support groups, which can help minimise the patients feelings of isolation.

9.*65 To raise awareness of AAV*

Respondents expressed their frustration at the lack of knowledge and awareness of rare conditions amongst health care professionals. Participants' symptoms were often not taken seriously or dismissed as not serious. Better education of practitioners in primary and secondary care to

recognize and diagnose AAV early is needed to improve patient outcomes and the patient experience. There is a need to raise awareness of AVV within the health care profession and the general public. This could be through education, for example teaching student nurses and trainee doctors about these conditions during their training. Media campaigns can be used to raise awareness of AAV for the general population and the medical community. There are a number of vasculitis patient support groups that raise awareness of vasculitis nationally and this needs to be recognized and promoted. Clinicians need to work with support groups to raise awareness of AAV and work with them in developing coordinated care pathways and service redesign (Coulter et al., 2013, NHS England , 2013) Clinicians with expertise in vasculitis should recognize their educational role and promote an exchange of knowledge from experts to non-experts. This could include encouraging colleagues to sit in on specialist clinics. Patients should be involved in teaching medical and nursing students about their condition. Clinicians, researchers, patients and their families should work together to raise awareness of AAV. Patients should be encouraged to have their voice heard so that we can improve the quality of care delivered to individuals with a rare condition.

9.7 How is this study going to change clinical practice?

To my knowledge this is the first study to explore what it is like to receive a diagnosis of AAV. Until now, very little was known about what it is like to receive the diagnosis of AAV or what the informational needs of these patients are. The findings from this study can be used to improve the communication between patients and health care providers. The timing of information is crucial as patients have difficulty assimilating information when acutely ill. It is important to understand the impact that a diagnosis of AAV has and the difficulties patients encounter when dealing with non-experts. Patients with AAV require a considerable amount of information to help them manage their disease and that they have significant information needs and we as health care professionals need to address this. Effective

communication skills are needed if health care professionals are to improve the patient's understanding of their illness, increase adherence to treatment and enhance patient communication (Back *et al.*, 2005, Maguire, 1999, Viller *et al.,* 1999). It is clear that patients faced many challenges and doctors and health care professionals need to be aware of these.

Although patient education is considered an essential role of the nurse, it appears that in AAV this is an overlooked area of care. This is mainly due to the complex nature of the disease, its rareness and the management is consultant led. Nonetheless, there is considerable scope to develop this area of specialist practice and patients should have access to specialist / consultant nurses who have the knowledge and expertise to be involved in the management of their care. The findings from this study can be used to influence health care policy for patients with rare conditions such as AAV. With the advent of clinical commissioning groups these will become the gatekeeper for people with rare conditions and treatment pathways may limit access for this group of patients to other specialists. The results from the study can be used to inform the development of a 'Patient Information Sharing Journey' directive in vasculitis that is driven by the patient's needs. The results can be used to inform commissioning decisions made in the NHS but more importantly to help clinicians understand their patients' needs better. With efficiency savings in the NHS, it is likely that patient education may be seen as a nice add on rather than a fundamental part of care. The results from the study can be used to strengthen the argument that patients with a rare condition need educating just like patients with other more common chronic illnesses. We need to improve the delivery of clinical care for this group of patients and this includes the patient experience and sharing of information. The results from this study have been included in the updated guidelines for management of AAV with the recommendation that all patients should receive tailored information and education (Nataski *et al.*, 2013).

This study can improve clinical practice as the more knowledge and understanding we have of what it's like for patients to cope with a rare disease the better we can improve the quality of care provided to patients. This knowledge can enable us to target resources more effectively to improve the patient experience. This study contributes to the understanding from a patients' perspective of what it is like to receive a diagnosis of a rare potentially like threatening illness. It is clear that patient education needs to be tailored to individual needs on the illness pathway. It is vital that patients are provided with information so that they can truly participate in shared decision making and make informed choices. Patient education for AAV should be recognized and supported.

9.8 Areas for further research

This study highlights the need for more research into rare conditions so that we can understand the difficulties encountered by patients and their families. More research is needed into the financial impact of AAV, the reasons for diagnostic delay and the valuable role that patient associations have in imparting knowledge and educating members. It is unclear as to what are the most effective educational strategies to be used when educating patients, as well as which outcome measures should be used to test interventions. The use of web based educational materials in educating patients with AAV has not been studied. Further exploration is needed to determine which patients require psychological support and at what point in the disease trajectory is this most important for them.

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Appendix A Medications used in AAV

Medication name	Type / route of administration	Side effects	Monitoring
Cyclophosphamide	Cytotoxic Oral or intravenous	Bone marrow suppression Haemorrhagic cystitis Increased risk of infections(upper respiratory tract, urinary tract) Bladder cancer Lymphoma Infertility Alopecia Amenorrhea	FBC, U&E's, LFT's CRP/ESR Urinalysis Infection
Glucocorticoids	Synthetic hormone Oral, intravenous, intra articular	Weight gain Hypertension Increased risk of infections Cataracts Diabetes Osteoporosis Mood swings Peptic ulceration Myopathy Avascular necrosis	BP and weight Known side effects
Azathioprine	Immunosuppressant Oral	Bone marrow suppression Increased risk of infection Dizziness Diarrhoea Nausea Rash Impaired liver function Cancer Hypersensitivity	FBC, U&E's, LFT's CRP/ESR Infections
Methotrexate	Cytotoxic Oral or subcutaneous	Bone marrow suppression Diarrhoea Nausea Stomatitis Headaches Impaired liver function Teratogenic Pneumonitis	FBC, U&E's, LFT's CRP/ESR

Leflunomide	Immunosuppressant Oral	Bone marrow suppression Diarrhoea Nausea Stomatitis Impaired liver function Potentially teratogenic Hypertension Rash	FBC, U&E's, LFT's CRP/ESR BP and weight
Mycophenolate mofetil	Immunosuppressant Oral	Bone marrow suppression Malignancy Increased risk of infection Anaemia Gi manifestations	FBC, U&E's, LFT's CRP/ESR Infections
Rituximab	Monoclonal antibody Intravenous	Infections (encephalitis) Bone marrow suppression Anaemia Infusion reaction Hypertension Bronchospasm Cancer	FBC, U&E's, LFT's CRP/ESR Infections

Appendix B Structured Clinical Assessment in AAV

Structured Clinical Assessment	
Physical examination	All systems
Bloods	
FBC, U&E's, LFT's	General health status /organ function Toxicity of medication
CRP/ESR	Inflammatory markers, measure response to treatment /Active disease
Urinalysis	
Dipstick	Infection: nitrates. leucocytes Haematuria / proteinuria: decline in renal function or toxicity of
24 hour protein	cyclophosphamide haemorrhagic
Egfr	cystitis Assessment of kidney function
BP	Hypertension Reducing renal function Cardiovascular risk factor
ANCA antibodies	Disease
BVAS	Disease assessment
VDI	Damage
Radiology	
Chest	Lung infiltration Nodules/ cavities Lung haemaorrhage
Tissue biopsy	Confirm diagnosis
Kidney	Focal segmental necrotizing vasculitis
Nerve	
Imaging	Inflammation, assessment of organs
SF36	General health
HAQ	Disability
Toxicity of treatment	Observe for any of these
Infection	
Bone marrow suppression	
Hypertension	
Diabetes	
Osteoporosis	
Avascular necrosis	
Abnormal LFT's	
Pneumonitis	
Haemorrhagic cystitis	
Bladder cancer	
Skin cancer	
CVD assessment	Yearly
Psychosocial support and education	Ongoing

Appendix C Studies for Literature review

Author	Study	Design	Results	Limitations
Herlyn K, Höder J, Gross WL, Reinhold-Keller E (2002) Article in German abstract in English	An evaluation of a new patient education programme for vasculitis	An interdisciplinary education programme to provide information on disease, therapies, side effects, coping strategies and nutrition. A patient and physician-administered questionnaires assessing socioeconomic, knowledge and disease-related outcome-parameters was designed. Patients are trained in closed groups (n = 10-15) and asked to complete questionnaires at baseline, 4 weeks and 6 months after training.	Statistically significant improvement of knowledge and HRQL. Information on disease, drugs, side effects ,coping strategies, nutrition, physiotherapy.	In patient education programme in a tertiary referral centre. Not based on CBT Most education programmes are out patient based. Captive audience Group education. How can standardised be considered patient centred and holistic?
Herlyn K, Höder J, Gross WL, Reinhold-Keller E (2008) Article in German abstract in English	Longitudinal effects of structured patient education programs for vasculitis patients Prospective study in a pre/post design Assessment before, 4 weeks, 6, 12 and 24 months after participation	Knowledge (16 questions, Score 0-45)Health-related quality of life (SF-36) Functional capacity (NRS 0-10) Self- efficacy (9 item scale, Hasenbring et al.) Socioeconomic factorsDisease extent index (DEI) Patients were trained in closed groups (n=10-15) and completed the questionnaires at baseline, 4 weeks, 6 and 12 months following participation	102 patients, 10 groups 2001-2006.70% female. Mean age 55 years. A statistically significant increase in their knowledge in the three aspects of medicine, therapy and side effects, nutrition and physiotherapy. Health-related quality of life in all dimensions increased considerably. Both self-efficacy and the patient-assessed health status improved.	Group education and not disease specific. In patient setting tertiary referral centre.
Thorpe et al (2007)	Development of a tool to assess the self-management behaviours of AAV.	43 items: 8 domains, medication adherence, health services adherence, infection avoidance, diet, exercise, symptom monitoring, reporting symptoms and side effects and adjusting activities. Likert scale 1-5 how often they performed the behaviour 1= none – 5 all the time.		Did not include support groups. Needs further validation. Only those barriers to activities stated by at least 10% were included. Convenience sample, biased towards kidney involvement, under representative of EGPA. , Recently diagnosed under represented. Disease duration 6

			years.
Thorpe, C T (2008) Rheumatology:47: 6:881-886	To characterize patient perceptions, related to eight self-management behaviours for adults with (ANCA-SVV), and to determine if these perceptions were associated with performance of each behaviour	Cross-sectional, observational study, 202 participants completed the VSMS questionnaire. Assessed 8 self-management behaviours, also perceptions about these behaviours, socio-demographics, clinical factors and social desirability bias.	Perceived barriers to medication, health services, diet and exercise adherence were similar to those in other illnesses. Insight into barriers experienced by patients in performing behaviours (infection avoidance, symptom monitoring, reporting symptoms and side-effects and adjusting activities.	
Carpenter, D.M, DeVellis, R.F, Hogan, S.L, Fisher, E, DeVellis, Jordan, J (2010) Patient Education & Counseling. 81(2): 169-76	The effect of conflicting medication information and physician support on medication adherence for chronically ill patients.	228 vasculitis patients, online questionnaire, Two on line questionnaires completed. Data collected on conflicting information, adherence, self-efficacy, outcomes , physician support and medication adherence	Over half of patients received conflicting medication information (51.3%). AAV patients who received contradictory advice about medications were less adherent than those who did not receive contradictory advice	
Carpenter, D.M, DeVellis, R.F, Hogan, S.L, Fisher, E.B, DeVellis, B.M, Jordan, J.M (2011) Journal of Health Communication. 16(6): 629-	Use and perceived credibility of medication information sources for vasculitis patients: Differences by gender.	Online questionnaire, 232/253 patients (92%) completed the questionnaire .Asked how often they obtained medication information from 12 sources during the previous year and rated the credibility of 6 sources. physicians, pharmacists, nurses, brochures and pamphlets, medicine	Patients used physicians and the Internet most to obtain medication information and rated them as the most credible sources. Female patients were more likely to use medication package inserts and the Internet and were less likely to use nurses than were male patients. Support groups and nurses were used less. Patients had been living	Non–Internet users may have different opinions. Recall bias over medication sources over a year. Biased towards females 69%, and white 91%, 59% had AAV.. Group was highly educated with 66% M and 58% F, college graduates. Mainly GPA M 725, f 54%,only 11% css M, 13% F, MPA 7% m, 8% f

			with vasculitis for an average of 6.5 years, and 27.6% were currently experiencing a relapse or flare. Differences between male and female participants are noted	included 7% females with Takayasus, quality of information on internet variable and quality not judged.

Carpenter, D.M, Kadis, JA, Hogan, S.L, DeVellis, R.F, Jordan, J.M(2011)Journal of Rheumatology, 38(4): 709-15	The effect of medication related support on the quality of life of vasculitis patients in relapse and remission.	Same population as above.28.4% were experiencing a relapse and 71.6% were in remission Medication support. was measured as 1=does not do this to 4=does this a lot	Both groups reported equally moderate amounts of support from their doctor and partners (mean=2.1). Those experiencing a relapse had reduced quality of life in seven out of the eight domains, apart from physical role limitations. Greater doctor support was associated with better quality of life in 6 domains apart from bodily pain and energy. Similar results are seen with partner support	We do not know if the pain was related to their vasculitis or if the patients were taking any analgesia
Pepper JK, Carpenter D.M., & DeVellis R.F. (2012) Journal of Behavioral Medicine, 35: 115-123	Does adherence-related support from physicians and partners predict medication adherence for vasculitis patients?	Tested the informational – Motivation behaviour model developed for HIV on 172 vasculitis pts,		
Carpenter, D M (2013) :164:51 -52 Predictors of medication non-adherence for vasculitis patients: From demographic factors to interpersonal influences: Clinical and experimental immunology	To document which demographic, clinical, regimen-related, intrapersonal and interpersonal factors affect medication adherence for vasculitis patients.	ASSIST sample pop. Regimen-related (experience of side effects), intrapersonal (depressive symptoms), and interpersonal (adherence-related support from family and friends) factors were measured at baseline	Results. Younger age (r=-0.23, p<0.001), female sex (r=0.16, p<0.05), experience of side effects (r=0.15, p<0.05), and more depressive symptoms (r=0.22, p<0.001) were associated with more medication non-adherence.	

			In the regression model, younger age (β=-0.01, p=0.01) and more depressive symptoms (β=0.01 p=0.02) predicted worse adherence	
UhIfelder ML, Waimar Tun j , Stone J H , Hellmann DB 1999 Abstract	A vasculitis webpage role in patient education and clinical research	304 visitors completed questionnaires,	205 (67.1%) vasculitis, 77 (25.3%)relatives. 188(64.6%) female, 103 (35.4%)male. Mean age 44.B years (range 16-83 years) mean age at diagnosis 43.3 years. Forty-two (16.8%) were from 21 different countries outside U.SA, including Canada, India, Vietnam, Italy, Brazil, and Australia. Diagnosis CNS vasculitis 03.5%. PAN 10.5%, leukocytocJastic vasculitis 8.2%, GPA 7.6%, RA vasculitis 5.3%, Behcet's 3.6%, HSP 3.6%, GCA 3.0%, and hypersensitivity vasculitis 3.0%. Seventy-eight responses (25.6%) uncertain of their diagnosis.	Did not just include AAV but other vasculitis, 25% uncertain of diagnosis. Low response rate
Carpenter D.M., Blalock S.J., DeVellis R.F.Journal of the American Pharmacists Association(2013)	Do patients with a rare illness use pharmacists as sources of medication information?	Vasculitis patients (n = 232) who were taking at least one medication. Online survey. Same sample population as ASSIST.	Participants consulted physicians and the Internet more than pharmacists for medication information; 96 participants (41.4%) ever used pharmacists for vasculitis medication information.. Pharmacists were perceived as a less credible source of medication information than physicians and the Internet. Participants used physicians and/or the Internet more than pharmacists for five of eight types of medication information, including adverse	Vasculitis patients consulted sources other than pharmacists for medication information. Several factors, including perceived pharmacist credibility and a noncommunity-based pharmacy, may contribute to infrequent patient use of pharmacists as a medication information source.

			effects and drug effectiveness	
Brown N, Bruce I, Venning M (2012) Abstract BSR	Prevention of treatment related morbidity in anca-associated vasculitis: The patient's perspective:	A questionnaire was distributed to Vasculitis UK members. This questionnaire assessed patient awareness of potential side- effects associated with vasculitis therapy, as well as uptake of screening and prophylactic approaches to reduce these complications	Response rate 347 (49.6%). Of these 306 responses were analysed from patients with PSV . 241 (79%) GPA , 41 (13%)EGPA, 15 (5%) MPA and 9 (3%) other . 190 (62%)mean age of 61.7 (range 15-87 years). Treatment received ; oral steroids 96%, oral cyclophosphamide 49%, intravenous cyclophosphamide 41%, azathioprine 69%, mycophenolate mofetil 28% and Rituximab 14%. Of potential adverse events, the best recognized were bone problems (20.9%) and weight gain (19.3%) with awareness of increased infection risk only 10.5% and general increased cancer risk 7.5% (skin cancer 6.5% and bladder cancer 3.9%).	A lack of awareness of potential side effects of therapy amongst vasculitis patients, particularly with regards to infection and cancer risk. Variability in reported practice in terms of infection prevention strategies and cancer screening/prevention. In particular skin cancer awareness was very low. There may have been recall bias and self-reported AAV.

Appendix D Ethical approval for the study from the East Norfolk and Waveney Research Ethics Committee

East London and the City Research Ethics Committee 1

3rd Floor
Aneurin Bevan House
81 Commercial Road
London
E1 1RD

Tel: 020 8223 8602
Fax:

Dr Richard Watts /Janice Mooney
Senior Lecturer
Norwich
NR4 7TG

21 September 2007

Dear Dr Watts/ Ms Mooney

Study title:	**What Are The Information Needs Of Patients With Primary Systemic Vasculitis? Development Of An Educational Programme**
REC reference:	**07/Q0603/9**
Amendment number:	**1**
Amendment date:	**06 July 2007**

The above amendment was reviewed at the meeting of the Sub-Committee of the REC held on 21 September 2007.

Ethical opinion

The members of the Committee present gave a favourable ethical opinion of the amendment on the basis described in the notice of amendment form and supporting documentation.

Approved documents

The documents reviewed and approved at the meeting were:

Document	Version	Date
Questionnaire	1.0	06 July 2007
Amendment 1	1.0	06 July 2007
Notice of Substantial Amendment (non-CTIMPs)	1	06 July 2007
Covering Letter		06 July 2007

Membership of the Committee

The members of the Committee who were present at the meeting are listed on the attached sheet.

R&D approval

All investigators and research collaborators in the NHS should notify the R&D office for the relevant NHS care organisation of this amendment and check whether it affects R&D approval of the research.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

07/Q0603/9:	**Please quote this number on all**
correspondence	

Yours sincerely

Miss Sandra Burke
Senior Research Ethics Committee Administrator
East London and The City Research Ethics Committee 1

Copy to: Ms Sue Steel,   University of East Anglia

East London and the City Research Ethics Committee 1

Attendance at Sub-Committee of the REC meeting on 21 September 2007

Name	Profession	Capacity
Dr Chandan Alam	Experimental Pathology	Expert
Dr Arthur T. Tucker	Principal Clinical Scientist & Honorary Senior Lecturer	Expert

Appendix E Ethical approval from the University of South Florida

Denise Shereff, M.L.I.S., A.H.I.P.
University of South Florida
USF College of Medicine
3650 Spectrum Blvd, Suite 100
Tampa, FL 33612

Dear Ms. Shereff,

Educational Needs of Patients with Systemic Vasculitis- an international survey (RDCRN# 5534, protocol version date 15Feb12) has met all requirements for activation. Official signoff has been received from the Study Chair for the following: all data online CRF forms, all required special technical modules.

 As of today's date, this protocol has been activated with the DMCC.

Please remember to register this protocol at clinicaltrials.gov. For more information on how to register a protocol on clinicaltrials.gov, please refer to the following website: http://clinicaltrials.gov/ct2/invest.

Please do not hesitate to contact the DMCC with any comments, questions or concerns.

Jeffrey Krischer, Ph.D.
Professor and Chief
Division of Informatics and Biostatistics
Director, Pediatrics Epidemiology Center
University of South Florida
3650 Spectrum Boulevard, Suite 100
Tampa, Florida 33612
E-mail: jpkrischer@epi.usf.edu / Telephone: (813) 396 9512 /Fax: (813) 396 9601

Appendix F   : INFORMED CONSENT TEMPLATE

Informed Consent Form

Title: Educational Needs of Patients with Systemic Vasculitis- an international survey

Sponsor: The National Institutes of Health (NIH)
                    Vasculitis Clinical Research Consortium (VCRC)

What you should know about this study
You are being asked to take part in a research study. This consent form explains the research study and your part in the study. Please read this form carefully. It tells you what you need to know about the research study. If you agree to take part in this study, you will need to agree to participate at the end of this form.

This consent form may contain words that you do not understand. Please contact the study staff to explain any words or information that you do not understand. Contact information can be found at the end of this consent form.

Why is this research being done?
The purpose of this study is to learn about the information needs you may have about your vasculitis and the way you would like to learn more about your vasculitis.

People 18 years or age and older with one of the following diseases may take part in the study:

- Polyarteritis Nodosa   • Churg-Strauss Syndrome

- Granulomatosis with
  polyangiitis
(Wegener's granulomatosis)
  - Microscopic Polyangiitis

What does this study involve?
This study consists of an online survey located on the Vasculitis Clinical Research Consortium website. After reading and understanding this consent form, if you decide to participate, you can agree to participate and you will be directed to the survey.

You will be asked to provide answers to a series of questions related to your vasculitis. The survey will contain multiple choice questions, and some questions which will require a brief answer. You may choose to skip any question(s) that make you feel uncomfortable. At the end of the survey you will be asked to click the submit button in order for your responses to be stored in our secure database. It should take approximately 10-15 minutes to complete the survey.

How many people will be in this study?
You will be one of approximately 2000 adults asked to participate in this study.

What are the possible risks of the study?
Your responses to the questions on this survey will be anonymous. Some of the questions are personal and might make you feel comfortable. You do not have to answer any question(s) that you don't want to.

None of the information you enter can be linked back to you, we will not know who you are when we receive your answers.

Are there benefits to being in the study?
There are no direct benefits to you for completing the survey. By taking part in this survey you may contribute to knowledge about the way patients with vasculitis think about their illness.

Will taking part in this research study cost me anything?
There are no costs to you for participating in this research study.

What are your options if you do not want to join the study?
Your alternative to participating in this study is not to participate in the study. If you do not participate in this study, your regular medical care will not be affected.

Confidentiality
None of the information you enter can be linked back to you, we will not know who you are when we receive your answers.

The data you do enter will be kept in a database. The database has passwords and security so only researchers and authorized people (including the Principal Investigator, study coordinator, and all other research staff) will be able to see the data. Certain government and university people who need to know more about the study may also look at the data. For example, individuals who provide oversight on this study may need to look at your records. This is done to make sure that we are doing the study in the right way. They also need to make sure that we are protecting your rights and safety. The USF Institutional Review Board (IRB) and its related staff who have oversight responsibilities for this study, staff in the USF Office of

Research and Innovations, USF Division of Research Integrity and Compliance, and other USF offices who oversee this research.

The investigators conducting this survey are committed to making the results of the research public through scientific presentations and publications of research articles. Information from this study may be used for research purposes and may be published; however, your name will not be used in any publication.

To help us protect your privacy, we have obtained a Certificate of Confidentiality from the National Institutes of Health. With this Certificate, the researchers cannot be forced to disclose information that may identify you (for this study, we will not be able to identify you because the information you enter will not be linked back to you and is anonymous), even by a court subpoena, in any federal, state, or local civil, criminal, administrative, legislative, or other proceedings. The researchers will use the Certificate to resist any demands for information that would identify you, except as explained below.

The Certificate cannot be used to resist a demand for information from personnel of the United States Government that is used for auditing or evaluation of Federally funded projects or for information that must be disclosed in order to meet the requirements of the federal Food and Drug Administration (FDA).

You should understand that a Certificate of Confidentiality does not prevent you or a member of your family from voluntarily releasing information about yourself or your involvement in this research. If an insurer, employer, or other person obtains your written consent to receive research information, then the researchers may not use the Certificate to withhold that information.

Event with the Certificate of Confidentiality, the investigators continue to have ethical and legal obligations to report child abuse or neglect and to prevent you from carrying out any threats to do serious harm to yourself or others. If keeping information private would immediately put you or someone else in danger, the investigators would release information to protect you or another person.

Department of Health and Human Services (DHHS) personnel may request identifying information for purposes of performing audits, carrying out investigations of DHHS grant recipients, or evaluating DHHS funded research projects.

Right Not to Participate or to Withdraw
Participation in this research study is voluntary. You may choose not to take part in this study, or if you agree to take part, you may stop at any time. You will not suffer any penalty or lose any benefits if you decide not to take

part in the study. You may also skip questions that you do not feel comfortable answering. If you begin the survey, and then decide you do not want to complete it, your answers will not be stored. **In order for your answers to be stored, you must click the "Submit" button at the end of the survey.**

Who do I contact for questions?
This study is being conducted by researchers at Boston University and the University of South Florida in collaboration with other investigators within the Vasculitis Clinical Research Consortium.

If you have questions or concerns about this study or about the survey, please contact:

In the United States:

Dr. Peter Grayson, MD	**Denise Shereff, MLIS, AHIP**
Boston University Medical Center	University of South Florida
College of Medicine	
Division of Rheumatology	Department of Pediatrics
peter.grayson@bmc.org	denise.shereff@epi.usf.edu
Tel: (617) 414-2508	Tel: (813) 396-9557

In the United Kingdom:

Dr. Richard Watts, MD	**Janice Mooney, M.Sc.**
University of East Anglia	University of East Anglia
Norwich School of Medicine	School of Nursing Sciences
Richard.watts@uea.ac.uk.	j.mooney@uea.ac.uk
Tel: +44 1473 702131	Tel: + 44 1603 597108

If you have questions about your rights as a research subject, please contact:
University of South Florida Institutional Review Board
12901 Bruce B. Downs Blvd., MDC35
Tampa, FL, USA 33612-4799
Phone +1 (813) 974-5638; Fax +1 (813)974-7091

Statement of Consent
I understand the purpose of this study, the procedures to be followed, the potential risks and the potential benefits. I have had the opportunity to ask questions, and my questions have been answered to my satisfaction. I have been told whom to contact if I have additional questions. I have read this consent form and agree to participate in this study, with the understanding that I may withdraw at any time.

I certify that I am at least 18 years of age and that I am the vasculitis patient.

By clicking the "yes" button below, I consent to participate in this research

VASCULITIS CLINICAL RESEARCH CONSORTIUM

Appendix F Study Protocol VCRC
Educational Needs of Patients with Systemic Vasculitis – an international survey

Vasculitis Clinical Research Consortium (VCRC)
VCRC Protocol 5534

This protocol is for research purposes only, and should not be copied, redistributed or used for any other purpose. The procedures in this protocol are intended only for use by Consortium investigators in carefully controlled settings. The Chair of this study should be consulted before using or attempting any procedures in this protocol.

Study Chairs

Richard A. Watts, D.M.
Senior Lecturer
Norwich School of Medicine
University of East Anglia
Norwich Research Park
Norwich NR4 7TJ
Tel: 01473 702131
Email: Richard.watts2@me.com

Janice Mooney, M.Sc.
Lecturer
School of Nursing Sciences
University of East Anglia
Norwich Research Park
Norwich NR4 7TJ
Tel: 01603 597108
Email: j.mooney@uea.ac.uk

Denise Shereff, M.L.I.S., A.H.I.P.
Principle Investigator
University of South Florida
3650 Spectrum Blvd., Suite 100
Tampa, FL 33612
Tel: (813) 396-9557
Email: denise.shereff@epi.usf.edu

Peter C. Grayson, M.D.
Rheumatology Fellow
Boston University School of Medicine
Boston University Vasculitis Center
72 East Concord Street, E-533
Boston, MA 02118
Tel: 617-414-2508
Email: peter.grayson@bmc.org

Peter A. Merkel, M.D., M.P.H.
Professor of Medicine
Boston University School of Medicine
Boston University Vasculitis Center
72 East Concord Street, E-533
Boston, MA 02118
Tel: 617-414-2501
Email: pmerkel@bu.edu

PARTICIPATING INSTITUTIONS/INVESTIGATORS TABLE (CONTACT INFORMATION)

Boston University Principal Investigator: Peter C. Grayson, M.D.

Contact:	Peter C. Grayson, M.D.
Institution:	Boston University Medical Center
Address:	72 East Concord Street, E-533
Phone:	(617) 414-2508
Fax:	(617) 414-2510
Email:	peter.grayson@bmc.org

University of South Florida Principal Investigator: Denise Shereff, M.L.I.S., A.H.I.P.

Contact:	Denise Shereff, M.L.I.S., A.H.I.P.
Institution:	University of South Florida
Address:	3650 Spectrum Blvd, Suite 100
Phone:	(813) 396-9557
Fax:	(813) 910-5940
Email:	denise.shereff@epi.usf.edu

Vasculitis Clinical Research Consortium Principal Investigator: Peter Merkel, M.D., M.P.H.

Contact:	Carol McAlear, M.A.
Institution:	Boston University School of Medicine
Address:	72 East Concord Street, E-533
Phone:	(617) 414-2505
Fax:	(617) 414-2510
Email:	pmerkel@bu.edu

Data Management and Coordinating Center Principal Investigator: Jeffrey Krischer, Ph.D.

Contact:	Renée Leduc, Research Project Manager
Institution/ Department:	Data Management and Coordinating Center (DMCC); Pediatrics Epidemiology Center; University of South Florida
Address:	3650 Spectrum Blvd, Suite 100; Tampa, FL 33612
Phone:	(813) 396-9308
Fax:	(813) 910-5944
Email:	renee.leduc@epi.usf.edu

Appendix **1.** PROTOCOL SYNOPSIS

Protocol Number:	5534
Protocol Title:	Educational Needs of Patients with Systemic Vasculitis – an international survey
Study Chairs:	Janice Mooney; Richard Watts; Peter Grayson; Peter Merkel; Denise Shereff
Statistician:	Peter Grayson
Consortium:	Vasculitis Clinical Research Consortium (VCRC)
Participating Sites:	N/A
Activation Date:	
Sample Size:	2000
Target Enrollment Period:	3-6 months
Study Design:	Registry
Primary Study Objective:	To find out how information is provided and by whom and to explore the informational needs and sources used by patients with systemic vasculitis in an international setting.
Secondary Study Objective:	To compare the informational needs of patients with vasculitis from the United States to patients from the United Kingdom.

Study Population and Main Eligibility/ Exclusion Criteria:

Inclusion Criteria

- Enrolled in VCRC Contact Registry

- Patient reported diagnosis of granulomatosis with polyangiitis (Wegener's granulomatosis), Microscopic Polyangiitis, Churg-Strauss Syndrome, Polyarteritis Nodosa

- 18 years of age or older

- English speaking

Exclusion Criteria

- Inability to provide informed consent and complete survey

Primary Outcome Measures:

1. Relative ranking of the importance of the components of patient educations and preferred method of education.

Sponsors (federal, state, foundation and industry support):

National Institutes of Health (NIH)

1.1 OVERVIEW

The purpose of this study is to learn about the informational needs of patients with systemic vasculitides and their preferred method of education.

2. OBJECTIVE

The aim of the proposed study is to find out how patients with vasculitis are provided information about the disease and to explore the informational needs and sources used by patients with systemic vasculitis.

2.1 BRIEF PROJECT DESCRIPTION

A cross-sectional study design and online questionnaire will be used to assess the informational needs in patients with several different types of systemic vasculitis. Patients will be recruited from within the Vasculitis Clinical Research Consortium (VCRC) online Patient Contact Registry[1]. Survey response from participants in the VCRC Patient Contact Registry will be compared to responses from a similar survey recently administered to patients within a United Kingdom (UK) based vasculitis support group (Vasculitis UK).

2.2 DETAILED DESCRIPTION

All patients enrolled in the Vasculitis Clinical Research Consortium's Contact Registry will be invited via email to participate in this study. The Contract Registry includes people who self-identify as having one of the following types of vasculitis: granulomatosis with polyangiitis (Wegener's), microscopic polyangiitis, Churg-Strauss syndrome, polyarteritis nodosa, Takayasu's arteritis, giant cell arteritis, Behcet's disease, Henoch-Schöenlein purpura, or CNS vasculitis. People voluntarily enroll in this Registry with the understanding that they will receive information about clinical studies for which they might be eligible. The introductory email will include basic information about the study and all of the required elements for informed consent in a brief format. Once participants agree to participate in the study, then they will be directed to the online questionnaire.

When completing the questionnaire, the patients will be asked a series of questions. The questionnaire content is included as an appendix. The online questionnaire version will be thoroughly tested for usability.

It is expected that most participants will require approximately 10-15 minutes to complete the questionnaire.

The survey data will be stored by the Rare Diseases Clinical Research Network Data Management and Coordinating Center (DMCC) at the University of South Florida. The data will be de-identified. Names or other personal health information will not be collected.

2.3 AIMS/HYPOTHESES

We hypothesize that the informational needs and sources of information sought by patients are similar despite differences in local health care provision and country of origin.

3. BACKGROUND

Modern therapy has converted the systemic vasculitides from conditions with a very poor outcome to chronic diseases, which relapse and remit. Little is known about the informational needs of this group of patients. Patients with rare diseases often experience difficulty accessing accurate information about their condition because their attending physician may not have experience of the condition, nor do members of their social network. We have conducted a postal survey of 329 members of a UK based patient support group (Vasculitis UK). There were 255 Granulomatosis with polyangiitis (GPA) patients, 46 Churg Strauss, 15 polyarteritis nodosa and 13 microscopic polyangiitis. The survey was developed using three focus groups and eight face: face interviews. It was then piloted using further 20 patients to check for language and content. We demonstrated that patients want accurate up to date information delivered by an experienced healthcare professional, and that this education needs to be given in two phases[2]. Patients ranked information designed to improve their knowledge about the disease most highly and were less interested in receiving information about psychosocial support. Patient informational needs during the acute phase of the illness were very different from those in the later chronic phase. We wish therefore to compare our results from the UK with an international group of patients.

4. STUDY DESIGN AND METHODS

There are no interventions for this study. Participants will complete an online survey. Once the participant has completed the survey, no follow-up contact will be made.

Data will be collected and stored by the Rare Diseases Clinical Research Network's Data Management and Coordinating Center at the University of South Florida. Analysis will be done in collaboration with Peter Grayson at Boston University Medical Center.

4.1 INCLUSION CRITERIA
- Enrolled in the VCRC Contact Registry
- Patient reported diagnosis of granulomatosis with polyangiitis (Wegener's granulomatosis), Microscopic Polyangiitis, Churg-Strauss Syndrome, Polyarteritis Nodosa

- 18 years of age or older

- English speaking

4.2 EXCLUSION CRITERIA
- Inability to provide informed consent and complete survey

4.3 PATIENT RECRUITMENT
Patients will be recruited from within the Vasculitis Clinical Research Consortium (VCRC) Patient Contact Registry to participate in an online questionnaire. More than 3000 patients, representing all the different types of idiopathic vasculitis, are

currently enrolled into the on-line registry. The different types of vasculitis available for study include: granulomatosis with polyangiitis (Wegener's granulomatosis), microscopic polyangiitis, Churg-Strauss Syndrome, polyarteritis nodosa, giant cell arteritis, Takayasu's arteritis, Henoch-Schöenlein purpura, Behçets disease, and CNS vasculitis.

VCRC Contact Registrants by Disease (as of November 2011)

Disease	N	Percent
Granulomatosis with Polyangiitis (Wegener's)	1424	46%
Microscopic Polyangiitis	151	5%
Churg-Strauss Syndrome	526	17%
Polyarteritis Nodosa	243	8%
Giant Cell Arteritis	159	5%
Takayasu's Arteritis	322	10%
Henoch- Schöenlein Purpura*	23	0%
Behçets Disease	220	7%
CNS Vasculitis*	20	1%
Other	27	1%
Total	3115	100%

* Recruitment into Contact Registry only recently commenced.

Online Questionnaire Design and Implementation:
The Data Management and Coordinating Center (DMCC) at the University of South Florida serves as the coordinating center for data management and analysis infrastructure for the Rare Diseases Clinical Research Network. The DMCC has expertise in web based recruitment and referral tools and maintains the VCRC Patient Contact Registry. The DMCC will assist in the development and implementation of the questionnaire for this project. At present, one VCRC questionnaire study has been successfully completed online through the Contact Registry, and recruitment efforts were extremely encouraging.

Online Questionnaire Elements:
We will conduct an internet survey of members of the VCRC Contact Registry. We will use the same questionnaire that we used for our survey of members of Vasculitis UK. The language used in the survey has been modified for international use but the content has been preserved. The survey is divided into three sections: i) how information is given at diagnosis and by whom; ii) patients are asked to rank using a 5 point scale how important it is to be given information on the following categories: disease, medication and side effects, disease management, investigative tests and psychosocial care (1= not important to 5 = extremely important); iii) asks about the preferred method of information delivery.

5. SAFETY MONITORING

If participants contact USF to report an adverse reaction to the survey, USF will report the adverse event via the adverse event data monitoring system (AEDAMS). Otherwise patients will not be solicited for adverse events.

5.1 DATA AND SAFETY MONITORING PLAN

The study protocol will be reviewed by the National Institutes of Health (NIH). Participant enrollment may only begin with an IRB approved protocol and consent form.

This is an observational/survey study that meets the federal definition of minimal risk.

5.2 STUDY OVERSIGHT

The Study Chair has primary oversight responsibility of this clinical trial. The NIH has oversight responsibility of the Data Safety Monitoring Plan (DSMP) for this study. The Study Chair will review accrual, patterns and frequencies of all adverse events (if applicable) and protocol compliance after the accrual period has ended.

5.3 DEFINITIONS AND STANDARDS

The Rare Diseases Clinical Research Network defines an adverse event as: "…an unfavorable and unintended sign, symptom or disease associated with a participant's participation in a Rare Diseases Clinical Research Network study."

Serious adverse events include those events that: "result in death; are life-threatening; require inpatient hospitalization or prolongation of existing hospitalization; create persistent or significant disability/incapacity, or a congenital anomaly/birth defects."

An unexpected adverse event is defined as any adverse experience… the specificity or severity of which is not consistent with the risks of information described in the protocol.

Expected adverse events are those that are identified in the research protocol as having been previously associated with or having the potential to arise as a consequence of participation in the study.

All reported adverse events will be classified using version 3.0 of the Common Terminology Criteria for Adverse Events (CTCAE) developed and maintained by CTEP at National Cancer Institute.

Only those events associated with the conduct of the study and as defined above are reportable.

5.4 REPORTING TIMELINE

- Within **24 hours** (of learning or the event), investigators must report any reportable Serious Adverse Event (SAE) that:
    - Is considered life-threatening/disabling or results in death of subject

    -OR_

    - Is Unexpected/Unanticipated
- Investigators must report all other reportable SAEs within **5 working days** (of learning of the event).
- Al other (suspected) reportable AEs must be reported to the RDCRN within **20 working days** of the notification of the event or of the site becoming aware of the event.

Local institutional reporting requirements to IRBs, any GCRC oversight committee and the FDA, if appropriate, remain the responsibility of the treating physician and the Study Chair.

5.5 RDCRN Adverse Event Data Management System (AEDAMS)

Upon entry of a serious adverse event, the DMCC created Adverse Event Data Management System (AEDAMS) will immediately notify the Study Chair, the PIs, the Medical Review Officer, and any additional agencies of any reported adverse event via email.

Serious adverse events: The NIH appointed Medical Review Officer (MRO) determines causality (definitely not related, probably not related, possibly related, probably related, definitely related) of the adverse event. The MRO may request changes to the protocol or consent form as a consequence of the adverse event. A back-up notification system is in place so that any delays in review by the MRO beyond a specified period of time are forwarded to a secondary reviewer. The Adverse Event Data Management System (AEDAMS) maintains audit trails and stores data (and data updated) and communication related to any adverse event in the study.

The DMCC will post aggregate reports of all adverse events (serious/not serious and expected, unexpected) for site investigators and IRBs.

5.6 STUDY DISCONTINUATION

This study will not have any discontinuation rules as it is an observational/survey study. The NIH and USF IRB have the authority to stop or suspend this trial at any time.

5.7 SUBJECT DISCONTINUATION

This is a one-time anonymous survey. All survey data submitted will be included in the primary analysis.

5.8 DATA QUALITY AND MONITORING MEASURES

As much as possible data quality is assessed at the data entry point using intelligent on-line data entry via visual basic designed screen forms. Data element constraints, whether independent range and/or format limitations or 'relative' referential integrity limitations, can be enforced by all methods employed for data input. QA reports assess data quality post-data entry. As we note, data quality begins with the design of the data collection forms and procedures and incorporates reasonable checks to minimize transcription and omission errors. Of the more important quality assurance measures are the internal validity checks for reasonableness and consistency.

6. STATISTICAL CONSIDERATIONS

Data will be collected by the Rare Diseases Clinical Research Network's Data Management and Coordinating Center at the University of South Florida. Analysis will be done in collaboration with Peter C. Grayson and investigators from the University of East Anglia.

6.1 STATISTICAL METHODS

We will describe the VCRC group as a whole compare the results with the UK group for differences basic demographics, vasculitis education received, the relative ranking of the importance of the components of education (q16) and their preferred methods of education. In addition we will conduct a subanalysis to compare the USA patients with the UK patients. The majority of the UK study participants had GPA and we will therefore specifically analyze this group separately. We will also compare the different types of vasculitis within the VCRC. Where appropriate we will determine a p value using chi-squared test. The information needs importance questionnaire (q16) is a Likert scale with 5 points and will be analyzed using the Mann-Whitney U test for each individual subquestion. P values of <0.05 will be considered significant.

6.2 ESTIMATE OF RESPONDENTS NEEDED

The UK study had 255 GPA patients and we would hope for a minimum of 255 GPA respondents from the VCRC to give 1:1 sample size. The VCRC has 3115 participants in November 2011 (1424 GPA registered participants) so we do not anticipate any problem in obtaining sufficient numbers of responses from non-UK based responders. Some UK GPA patients may be VCRC participants and therefore we will exclude UK based respondents. For the other disease types with in the VCRC we will only perform comparisons for those with samples sizes greater than 250.

7. DATA MANAGEMENT

Data will be entered directly into the electronic case report form. All study data will be collected via systems created in collaboration between the RDCRN Data

Management and Coordinating Center, the VCRC and Boston University and will comply with all applicable guidelines regarding patient confidentiality and data integrity.

7.1 DATA ENTRY

Data collection for this study will be accomplished via an online electronic case report form. Using encrypted communication links, on-line forms will be developed that contain the requisite data fields.

7.2 DATA QUALITY CONTROL

As much as possible data quality is assessed at the data entry point. The majority of the survey questions are close ended questions. Data elements constraints, whether independent range and/or formal limitations or 'relative' referential integrity limitations, can be enforced by all methods employed for data input. QA reports assess data quality post-data entry. As we note, data quality begins with the design of the data collection forms and procedures and incorporates reasonable checks to minimize transcription and omission errors. Of the more important quality assurance measures are the internal validity checks for reasonableness and consistency. In addition to those described above, we propose to build these checks into the initial tables and cross tabulations that should reveal any remaining data quality issues.

8. HUMAN SUBJECTS

8.1 GCP STATEMENT

This clinical trial will be conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki, and that are consistent with Good Clinical Practice and all applicable regulatory requirements.

8.2 RISKS

This study poses minimal risk to participants. There is no physical risk to answering the study questions. The participant will have the option to skip any question(s) which make them feel uncomfortable.

A potential, however extremely unlikely, risk is a risk of loss of privacy. The data collected will be anonymous and will not include personal health information. The investigators believe that there will be no breach in privacy and have designed this survey to ensure risk to privacy is negligible. No PHI will be collected. Additionally, all data collected is stored according to strict security protocols (as described above).

8.3 BENEFITS

There is no direct benefit for participating in the study.

8.4 RECRUITMENT

Participants that are part of the VCRC Contact Registry will be contacted via email and asked if they are interested in participating in this one time survey.

8.5 INFORMED CONSENT

Informed consent will be obtained from each participant before the participant will have access to the study questionnaire and after the participant has been able to ask questions regarding the aims, methods, anticipated benefits, and potential hazards of the study. The participant's willingness to participate in the study will be documented. The participant will need to agree to participate in the study via the electronic consent form. There will be no hard copy informed consent forms (ICFs). The informed consent document will convey to the participants that they are free to refuse entry into the study and free to withdraw from the study at any time without prejudice to future treatment. Written and/or oral information about the study in a language understandable by the participant will be given to all participants.

8.6 PROCESS OF CONSENT

Potential participants will be contacted via email. The consent process will occur online. The introductory email will contain the informed consent document with all of the required elements of informed consent. The participant will need to agree to participate in the study prior to the participant accessing the online survey.

The online system will not collect the subject's name, only the fact that the participant agreed to participate. We are not collecting subjects' names on the consent form/during the ICF process as this would be the only link (PHI) to the subject as the study is designed.

Potential participants will be able to read the consent information in the privacy of their own home or other location where they access the internet. Potential participants may take as much as is needed to read the consent form. In the introductory email, as well as on the VCRC website, study staff contact information (both phone and email) will be provided so participants can contact the study staff with any research related questions. The VCRC Contact Registry and the survey are voluntary. The study will not be presented to the participant by the person who controls the health care of the participants. Potential participants who do not read English will not be able to participate.

8.7 CERTIFICATE OF CONFIDENTIALITY

To help protect participant privacy, a Letter of Confidentiality has been obtained by the National Institutes of Health (NIH). With this Certificate, the researchers cannot be forced to disclose information that may identify a study participant, even by a court subpoena, in any federal, state, or local civil, criminal, administrative,

legislative, or other proceedings. The researchers will use the Certificate to resist any demands for information that would identify a participant, except as explained below.

The Certificate cannot be used to resist a demand for information from personnel of the United States Government that is used for auditing or evaluation of Federally funded projects or for information that must be disclosed in order to meet the requirements of the federal Food and Drug Administration (FDA). Even with the Certificate of Confidentiality, the investigators continue to have ethical and legal obligations to report child abuse or neglect and to prevent an individual from carrying out any threats to do serious harm to themselves or others. If keeping information private would immediately put the study participant or someone else in danger, the investigators would release information to protect the participant or another person.

Department of Health and Human Services (DHHS) personnel may request identifying information for purposes of performing audits, carrying out investigations of DHHS grant recipients, or evaluating DHHS funded research projects.

9. REFERENCES

1. http://rarediseasesnetwork.epi.usf.edu/vcrc/physicians/registry.htm.
2. Mooney J, Poland F, Spalding N, Scott DGI, Watts RA. What do people with primary systemic vasculitis want to know about their illness? 15th International ANCA workshop. Chapel Hill 2011. Clin Exp Immunol 2011;164 (suppl1);118-9.

The NHS Commissioning Board (2013)Clinical Commissioning Policy: Rituximab for Anti Neutrophil Cytoplasmic Antibody-Associated Vasculitis Rituximab ANCA Vasculitis policy – Specialised Rheumatology CRG NHSCB/A13/P/a

Appendix G   **Focus group interview guide**

1.   What struck you most about this story?
      (Facilitate easy discussion not necessarily from each member)

2.   What is it like being told you have vasculitis?

3.   How can this be changed to help more with the experience of being
      told ?

4.   What is it like living with vasculitis?
      Resources? What actions would be helpful? Why?)

5.   What knowledge or information do you think should be available to
      help you manage living with vasculitis?
      *Contacts? Resources helpful? What actions would be
      helpful/unhelpful? Why?)*

Closing Discussion (NB Allow about 10 mns)

   -   Has taking part in today's discussion changed your views? If so,
       what?
   -   Is there anything we have talked about that now strikes you as
       particularly important? If so, what?

Conclusion
Informal – fit with tone and topics covered.
   -   Value the work they have done
   -   Underline the value of the evidence they have produced
   -   Emphasise that the work will be eventually reported widely,
       including articles and workshops and will have real outcomes in
       redesigned information and training for health and social care
       professionals working with people with vasculitis.

Thank you so much for coming to talk to us today.

Appendix H   One to one interview guide

1.   What struck you most about this story?

2.   What is it like being told you have vasculitis?

3.   How can this be changed to help more with the
                      experience of being told ?

4.   What is it like living with vasculitis?
                      Resources? What actions would be helpful? Why?)

5.   What knowledge or information do you think should
                      be available to help you manage living with
                      vasculitis? Contacts? Resources helpful? What
                      actions would be helpful/unhelpful? Why?)

Thank you so much for coming to talk to us today.

Norfolk and Norwich University Hospital **NHS**

NHS Trust

RHEUMATOLOGY DEPARTMENT

East Block Level 2

Norfolk & Norwich University Hospital

Colney Lane

Norwich

What Are The Information Needs Of Patients With Primary Systemic Vasculitis? Development of an Educational Programme

Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Thank you for reading this information sheet.

What is the purpose of the study?

The purpose of the study is to explore the educational needs of patients with primary systemic vasculitis, so that the researchers can develop an education programme that is patient centred and reflects patient's needs.

Why have I been chosen?

You have been chosen to take part because you have been diagnosed with a condition of vasculitis and your doctor thinks you are suitable for the study.

Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part, you will be asked to fill in the tear off slip at the bottom of the patient letter and to return it in the pre paid envelope.
You will then be contacted by the researcher and asked to sign a consent form. If you decide to take part, you are still free to withdraw

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at any time without giving a reason. Any decision that you make to withdraw at any time or a decision not to take part will not affect the standard of care you receive and we will continue to look after you in the same way. Your doctor may withdraw you from this study if it appears to be in your best interest to do so.

What will happen to me if I take part?
You will be invited to participate in two separate discussion groups (called focus groups) or a face to face interview. The focus groups will take place at the Norfolk and Norwich University Hospital in a private room and will last between 1 and 2 hours each. The interviews will be recorded.

The face to face interviews will take place in a private room at the Norfolk and Norwich University Hospital and will last 1 hour. The interviews will be tape recorded. After the tapes have been transcribed you will be contacted by telephone by the researcher to confirm that the data transcription is correct. You will have been sent a written copy of this in advance.

This will have no impact on your continuing care and treatment.

Will I be reimbursed for any expenses?
You will be reimbursed for your travel and parking expenses.

What are the side effects of taking part?
None are known of.

What are the possible disadvantages and risks of taking part?
There are no side effects associated with being involved in the study.

What are the possible benefits of taking part?
We hope that the study will provide information about the educational needs of patients with primary systemic vasculits, so that we can develop an educational programme around patients needs.

What happens when the research study stops?
This will be the first study of the educational needs of vasculitis patients in the UK. It will provide an educational resource for both patients and health professionals. The doctors looking after you will continue to look after you in the same way as before the study.

What if something goes wrong?
The study involves participation in discussion groups and a possible face to face interview. There are no special compensation

arrangements if anything were to go wrong. If you were harmed by someone's negligence then you may have grounds for a legal action but you may have to pay for it. Regardless of this, if you wish to complain or have any concerns about any aspect of the way you have been approached or treated during this study the normal NHS complaints mechanism will be available to you.

Will my taking part in this study be kept confidential?
All information collected in the focus groups and interviews will be kept strictly confidential. The information from the focus groups and interviews will be audio taped and transcribed word for word. The tapes will be stored in a locked cabinet and they will be labelled focus group Norwich, Birmingham or Romford. All of the information will be collected and stored in an anonymous form on a computer that will be only available to members of the study team, who will be present to analyse the data. The study team comprises of doctors, university lecturers and a research nurse. It will not be possible to identify you as an individual from any of the collected information that we are going to use for this research project. You will not be identified in any report or publication arising from the study.

What will happen to the results of the research study?
At the end of the study, the information gathered will be analysed and used to produce a written education package that will be available via the internet. A report will also be written for a medical journal. We will also plan to talk about the research findings at academic meetings. It will not be possible to identify you as an individual in any of these written reports or talks. This will help to ensure that UK doctors and nurses are aware of the results so that patients with primary systemic vasculitis can be educated more effectively. The tapes will be destroyed after 5 years.

Who is organising and funding the research?
The central study organiser is Dr RA Watts at the School of Medicine, Health Policy and Practice, University of East Anglia, Norwich. The study is funded by the Arthritis Research Campaign. The doctors involved are not being paid for recruiting patients into the study. The researcher (Ms Janice Mooney) is planning to use the results of this study as part of her thesis for a PhD degree.

What if I have any concerns?
If you have any concerns or other questions about the study or the way it is being carried out, you should contact the local investigator (see below) at your local hospital or you may contact the Complaints Department at your local hospital, local health authority, or primary care trust.

Contact for Further Information

You should keep this information sheet in a safe place. If you have any further questions about the study, you can contact:

Dr Richard Watts (Consultant Rheumatologist) 01473 702362
Ms Janice Mooney (Researcher) 01603 597108

If you wish to get in touch with someone who can provide further information about the study with impartial advice please contact:

Dr Suzanne Lane (Consultant Rheumatologist) on 01473 702131

Thank you for taking the time to consider participating in this study.

Norfolk and Norwich University Hospital NHS

NHS Trust

Centre Number:
Study Number:
Patient Identification Number for this trial:

CONSENT FORM

Title of Project: What Are The Information Needs Of Patients With Primary Systemic Vasculitis? Development of an Educational Programme

Name of Researcher:

Please initial box

1. I confirm that I have read and understand the information sheet dated (version ....) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected.

3. I understand that relevant sections of any of my medical notes and data collected during the study, may be looked at by responsible individuals from the NHS Trust, where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records.

4. I understand that the focus groups and interviews will be tape recorded and then transcribed with possible use of verbatim quotations. All quotations will be anonymised.

5. I agree to take part in the above study.

_____   _____   _____
Name of Patient   Date   Signature

_____   _____   _____
Name of Person taking consent   Date   Signature
(if different from researcher)

_____   _____   _____
Researcher   Date   Signature

When completed, 1 for patient; 1 for researcher site file; 1 (original) to be kept in medical notes

Appendix J The Chapel Hill Consensus Conference definitions (Jennette et al., 1994)

Table 1. American College of Rheumatology classification criteria for Wegener's granulomatosis (WG), Churg Strauss syndrome (CSS) and Polyarteritis nodosa (PAN) (10-12).

Diagnosis		Criterion	Definition
WG	1	Nasal or oral inflammation	Development of painful or painless oral ulcers or purulent or bloody nasal discharge
	2	Abnormal chest radiograph	Chest radiograph showing the presence of nodules, fixed infiltrates, or cavities
	3	Urinary sediment	Microheamaturia (> 5 red blood cells per high power field) or red cell casts in urine
	4	Granulomatous inflammation on biopsy	Histologic changes showing granulomatous inflammation within the wall of an artery or in the perivascular or extravascular area (artery or arteriole)
CSS	1	Asthma	History of wheezing or diffuse highpitched rales on expiration.
	2	Eosinophilia	Eosinophilia > 10% on white blood cell differential count.
	3	Mononeuropathy or polyneuropathy	Development of mononeuropathy, multiple mononeuropathies, or polyneuropathy (i.e., glove/stocking distribution) attributable to a systemic vasculitis.
	4	Pulmonary infiltrates, non-fixed	Migratory or transitory pulmonary infiltrates on radiographs (not including fixed infiltrates), attributable to a systemic vasculitis.
	5	Paranasal sinus abnormality	History of acute or chronic paranasal sinus pain or tenderness or radiographic opacification of the paranasal sinuses.
	6	Extravascular eosinophils	Biopsy including artery, arteriole, or venule, showing accumulations of eosinophils in extravascular areas.
PAN	1	Weigth loss ≥ 4 kg	Loss of 4 kg or more of body weight since illness began, not due to dieting or other factors.
	2	Livedo reticularis	Mottled reticular pattern over the skin of portions of the extremities or torso.
	3	Testicular pain or tenderness	Pain or tenderness of the testicles, not due to infection, trauma, or other causes.
	4	Myalgias, weakness, or leg tenderness	Diffuse myalgias (excluding shoulder end hip girdle) or weakness of muscles or tenderness of leg muscles
	5	Mononeuropathy or polyneuropathy	Development of mononeuropathy, multiple neuropathies, or polyneuropathy.
	6	Diastolic BP >90 mm Hg	Development of hypertension with diastolic blood pressure higher than 90 mmHg.
	7	Elevated BUN or creatinine	Elevation of blood urea nitrogen (BUN) >40 mg/dl or creatinine >1.5 mg/dl (132μmol/L), not due to dehydration or obstruction.
	8	Hepatitis B virus	Presence of he patitis B surface antigen or antibody in serum.
	9	Arteriographic abnormality	Arteriogram showing aneurysms or occlusions of the visceral arteries, not due to arteriosclerosis, fibromuscular dysplasia, or other noninflammatory causes.
	10	Biopsy of small or medium-sized artery containing poly-morphnuclear neutrophils	Histologic changes showing the presence of granulocytes or granulocytes and mononuclear leucocytes in the artery wall.

Appendix K First Thematic Framework

Physical
- Exhaustion
- Unwell
- Debilitating
- Reduced mobility
- Impairment
- Side Effects medication

Treatment
- Medications
- Chemotherapy
- Side effects
- Monitoring
- Regimes

Long time to diagnosis
- Vague symptoms
- Seen by many doctors
- Please take me seriously I'm ill
- Validation of symptoms
- Reassurance and support
-

DIAGNOSIS

- Information at diagnosis
- Serious
- Rare
- Symptoms
- Prognosis
- How diagnosed
- Treatment options

- Investigations and results
- Biopsies
- Blood tests
- Anca
- X-rays
- Test results

Appendix L Example of Chart Road to Diagnosis

Res	Chart 1		Road to Diagnosis			
	1:1Time To Diagnosis	1:2 Investigations	1:3 Symptoms	1:4 Validation of symptoms	1:5Dr's Behaviour	1:6 Confirmation
NP7	3 yrs	Lots of tests The biopsies	Vague that's a good heading			
NP6	Sent down lots of odd paths, I went away with another diagnosis Took 3/12's	Kidney biopsy, blood tests, eye biopsy	Lethargy, not being able to do anything, tired, quite ill. Feeling worse and worse VAGUE		Only when my liver started going wrong and that it showed in the blood test, they stared to take me seriously I'm not critising GP's. who have a tough job in my opinion You are going to have to go to experts, we don't know what's wrong with you	
NP2	About 3 years	Blood tests urine tests , full of tests	Sleeping all day and night	I told you I was ill. I thought I was going to die, I'm not depressed, nothing wrong with my marriage, please do something I felt so ill, then I collapsed	Treated like I was mental going off my head	
NP4	2-3 months		Being ill			
NP3			really ill, hardly walk up stairs		Lucky had young medic I've got one dr in our practice who is unhelpful, he said I don't know why you have come to see me because I know nothing about you're complaint	
NP2			pains in stomach, knees swollen, couldn't walk		I'm bitter about it we called dr out, said why haven't you come down the surgery. He got hold of my arm dragged me off the settee, walked	

					me across the room' there you can walk 'Then he apologized to my husband	
NP5	We all seem to have had problems, starting with dr's, backwards and forwards to dr's	We'll do a blood test straight away, you're going into hospital for 3 days for tests, had kidney biopsy, liver biopsy	Had flu, lethargy, joint pains, didn't want to eat, sleep, went deaf	You don't look so well, the heat in you're body, there's something going on here- we'll do a blood test straight away		I think I know what you've got, its very rare, very unusual, I'm going to ask then to test for Wegeners
NP1					Do you know it costs £50 to call me out this afternoon, would you have called me. I know all about a call out. I was furious We 're really angry how my wife was treated	
BP1					You go to you're doctor and he can't help you	
BP3	I was diagnosed 6/12 later					
BP4	My GP was very quick and sent me almost as soon as possible I was really lucky my gp was extremely quick to get me into hospital	Blood tests, kidney biopsy			Dr x looked after me for 3 years , it was great	
BP5	Gp was on the ball, got me an appointment the next day	Blood tests, tests galore, muscle biopsy	Mysterious symptoms, difficult to walk, difficult to eat, difficult to use my hands, difficult to get up and down stairs, hearing going, ache all over. Polyps in my nose again l241 Foot drop	I was presented with pan as soon as I was diagnosed, that was a good start		

BP2		X-rays, some tests	High temperatures, hearing had gone , chest infection, sinuses , UTI, attacked my kidneys and lungs l353		
RP3	2 years	biopsy	you were still walking around, I didn't know why I felt so ill, earache, hole in my nose			My husband was really, we are going somewhere else to get a second opinion
RP5	2/12		Just paralysis	I wrote to my father and said unless you get me out of this hospital I won't have long to live Luckily a dr there had seen this case before and he said you're about one of the 6 in the world.		Do you think you should get another second opinion
RP4			Couldn't walk		
RP1		Blood tests, more blood tests, ecg, checked liver, checked bowel, checked nose, taken biopsies, excise lump	Felt feverish, fainted, pains, can't eat, can't drink,	How can it be in my mind, I get fever	I'm sorry they are showing nil nothing is wrong with you hr said it must be in you're mind The result is everything is clean but you have a lump it may be vasculitis I trust him implicitly he is a wise man so he must know what he is doing	The Dr says I've got vasculitis, then I've got vasculitis I still don't know to be frank 554 Well I don't know maybe I should have another opinion, but I am in the complete dark, zero dark
I 1	I kept going to the dr's	Bt's,	Lost use of hands feet, stomach ache, lost weight		Angry- I an ill, kept going back, saw someone else, getting worse and worse, they were still giving you different things , you can see things aren't working	
12	4 days, that is the luckiest thing ever				Excellent at hospital	
13	3 days, absolutely wonderful,	Blood tests biopsy	Picked up on bt		Excellent at hospital	Serious

	Gp great					
I4	3 years	Lots tests			Excellent dr	Rare
15	3 weeks	Urgent scan, chest x-ray	Dry throat, blisters in mouth, rash, joint pains, bleeding in lungs	Oh you have nothing wrong with you, then my leg blew up, then I came into hospital, thought DVT, did chest x-ray I was bleeding into my lungs, realized I'd got a big problem	Looked after me wonderful in hospital	
16	18 months	6 operations on nose				Relief, now know what it is
17						
18	Long time				Passed from one consultant to another, begged last one don't pass me over, excellent dr	Serious

Appendix M Mapping concepts from first qualitative phase sent to participants

Information on Diagnosis
• Symptoms
• Serious
• Rare
• Prognosis
• How diagnosed

Investigations and results
• Biopsies
• Investigations
• Test results
• Blood tests

Treatment
• Chemotherapy
• How doctors make treatment decisions
• Side effects medication
• Monitoring

Management
• Life changes
• Drugs
• Uncertainty
• Research
• Results
• Follow up
• Access to information / knowledgeable practitioners
• Self help
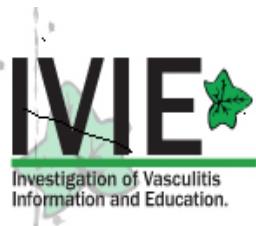
Janice Mooney – arc Research Office

Department of Rheumatology
Norfolk & Norwich University Hospital
Colney Lane
Norwich
NR4 7UY

Dear

Regarding the study that you took part in 'What Are The Information Needs Of Patients With Primary Systemic Vasculitis? Development of an Educational Programme' I am pleased to provide you with information on the study progress to date. I have collected and analyzed the three focus groups and data from the one to one interviews so far.

I have included a diagram titled First Thematic Framework of Road to Diagnosis of PSV in which I have grouped together the common themes from the focus groups for your information. I would be grateful if you could look at it and consider if you feel it represents some / all of the things discussed.
I have also included a sheet on Information on Diagnosis which again was drawn
If you could either write the comments on the sheets included or write your comments on a separate sheet and return in the prepaid envelope provided or I can discuss the results with you in a telephone conversation if you prefer.

Janice Mooney – arc Research Office
Department of Rheumatology
Norfolk & Norwich University Hospital
Colney Lane
Norwich
NR4 7UY

Thank you for spending the time to do this.

Appendix O Adaptaion of the TINQ

Adaptation of the TINQ	Adab et al 2004	Thorpe et al 2008	Themes from first phase
What the symptoms are	Yes, but more specific	Yes but non specific	Yes
What causes my vasculitis	Yes	No	Yes
If my vasculitis is hereditary	No	No	Yes
If it is contagious	No	No	Yes
How it is diagnosed	No	No	Yes
The reasons why doctors suggest certain tests.e.g. x-rays, scans and biopsies	No	No	Yes
How will I feel during / after investigative tests	No	No	No
The results of tests carried out	No	No	Yes
What the results of blood tests mean	No	No	Yes
How often I should have blood tests	No	No	
The names of drugs used to treat vasculitis	Yes but changed to vasculitis	No	Yes
How my treatment is given	Yes, but more specific	No	Yes
How my treatment was chosen	No	No	Yes
If there is evidence to support my treatment	No	No	Yes
How to prepare for my treatment	No	No	No
The possible side effects of treatment	Yes	Yes	Yes
If there are ways to prevent /ease treatment side effects	No	Yes	Yes
What side effects I should report to the doctor/nurse	No	Yes	Yes
If I have side effects how to deal with them	No	Yes	Yes
Who I should call if I have any concerns during treatment	No	Yes	Yes
How long will I require treatment	No	No	Yes
How the illness will affect my life	Yes	No	Yes
How my vasculitis will be monitored	No	Yes	Yes
How my illness could affect my life in the future	Yes	No	Yes
If there are any changes I should make to my lifestyle	No	Yes	Yes
If I can continue with my usual sports/hobbies	No	Yes	Yes

Appendix P Permission to adapt the TINQ

```
To: sales
Subject: Permissions Request Received

Permissions Request Received:
ISBN: 9780826198594
Title: Measurement Tools in Patient Education, Second
Edition -
Author: Barbara K. Redman, PhD, RN, FAAN

Name: Janice Mooney
Company: University of East Anglia
Address: Edith Cavell Building
         Colney Lane, Norwich , 0  NR4 7tl
         United Kingdom

Phone: 01603597108  Email: j.mooney@uea.ac.,uk

Pages:
249-255 ( only 32 item bit of questionnaire)

Reason:
to adapt the tool for use in primary systemic
vasculitis patients as part of my PhD thesis

Dear Janice,

Thank you for your request to reproduce material from
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Vasculitis Informational Needs Questionnaire

Dr Richard Watts and Janice Mooney are independent researchers working at the University of East Anglia and are carrying out a research project funded by the Arthritis Research Campaign (arc).This is called 'What are The Information Needs of Patients with Primary Systemic Vasculitis? Development of an Educational Package. The purpose of the study is to explore the educational needs of patients with vasculitis, so that we can develop an education programme and materials that best reflect your needs.

Please take time to help, by filling in this questionnaire. You do not need to give your name, and your answers are strictly confidential. You can tick to show your answer, or write in comments if you prefer.
It may take approximately 10-15 minutes of your time to complete.
We are grateful to the Stuart Strange Trust for giving us permission to include this questionnaire alongside the newsletter.

1.   What is your date of birth?   **Day** ☐☐ **Month** ☐☐ **Year** ☐☐

2.   Are you?   **Male** ☐   ☐
Female

3.   Is English your first language?   **Yes** ☐   **No** ☐

4. Which postcode area do you live in?   ☐☐☐☐☐☐☐

Add the first four letters of your postcode
If you do not know it please write the town below

5. Please give your ethnic group? Please tick one.

A White	☐	**B Mixed**	☐
British	☐	White and Black Caribbean	☐
Irish	☐	White and Black African	☐
Any other white Background	☐	White and Asian	☐
		Any other mixed background	☐

C Asian or Asian British		**D Black or Black British**	☐
Any other Asian background	☐	**E Chinese or other ethnic group**	☐

**6. What is the highest level of education you have completed?
Please tick one box**

GCSEs	☐	Master's Degree	☐
A /AS levels or highers	☐	Doctoral Degree	☐
College	☐	None of the above	☐
Bachelor's Degree	☐	Other (please describe	☐

7. What is your vasculitis diagnosis, please tick one box?

Wegener's Granulomatosis	☐	Microscopic Polyangiitis	☐
Polyarteritis Nodosa	☐	Churg Strauss Syndrome	☐
Takayasu Arteritis	☐	Behçet's Disease	☐
Giant Cell Arteritis (Temporal Arteritis)	☐	Henoch-Schönlein purpura	☐
Other (please describe)	☐		

8. **How long did it take for your vasculitis to be diagnosed, from first reporting your symptoms to a health professional or doctor?**

less than 3 months ☐   1-2 years ☐

3- 6 months ☐   3-5 years ☐

7-12 months ☐   more than 5 years ☐

9. **How long is it since you have been diagnosed with vasculitis?**

less than 6 months ☐   3-5 years ☐

7-12 months ☐   6-10 years ☐

1-2 years ☐   11-15 years ☐

more than 15 years ☐

10. Had you ever heard of your kind of vasculitis before you were diagnosed?   **Yes** ☐   **No** ☐

11. When you were first diagnosed with vasculitis were you provided with information about your vasculitis?

Yes ☐   **No** ☐

12. Who provided you with this information about your vasculitis?

Doctor ☐   Nurse ☐   Relative ☐   ☐
Other

13. How was this information about vasculitis provided?

Verbally ☐   Disease specific leaflet ☐

Arc vasculitis leaflet ☐   Pages from internet ☐

Verbally together with a ☐   Written material ☐
produced
written leaflet   by hospital

14. Where or how did you find out about your kind of vasculitis?

Internet ☐   Friend ☐

Doctor ☐   Support group ☐

Nurse ☐   Written material ☐

Course ☐   Other ☐

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15. If English is not your first language, have you been able to find information about vasculitis in your own language?

Yes ☐   No ☐   Not Applicable ☐

IMPORTANT INFORMATION FOR YOU

16. Please read each of the following statements. Please tick the number that best describes how important it is/was for you to be provided with this information.

1. Not important
2 .Slightly important
 3.Moderately important
4. Very important
5 . Extremely important

It is important for me to know:

The name of my vasculitis				
1	2	3	4	5

Statement	1	2	3	4	5
The name of my vasculitis	1	2	3	4	5
What the symptoms are	1	2	3	4	5
What causes my vasculitis	1	2	3	4	5
If my vasculitis is hereditary	1	2	3	4	5
If it is contagious	1	2	3	4	5
How it is diagnosed	1	2	3	4	5
The reasons why doctors suggest certain tests. e.g. x-rays, scans and biopsies	1	2	3	4	5
How will I feel during / after investigative tests	1	2	3	4	5
The results of tests carried out	1	2	3	4	5
What the results of blood tests mean	1	2	3	4	5
How often I should have blood tests	1	2	3	4	5
The names of drugs used in the treatment of vasculitis	1	2	3	4	5
How my treatment is given	1	2	3	4	5
How my treatment was chosen	1	2	3	4	5

If there is evidence to support my treatment regime	1	2	3	4	5
How to prepare for my treatment	1	2	3	4	5
The possible side effects of treatment	1	2	3	4	5
If there are ways to prevent /ease treatment side effects	1	2	3	4	5
What side effects I should report to the doctor/nurse	1	2	3	4	5
If I have side effects how to deal with them	1	2	3	4	5
Who I should call if I have any concerns during treatment	1	2	3	4	5
How long will I require treatment	1	2	3	4	5
How the illness will affect my life	1	2	3	4	5
How my vasculitis will be monitored	1	2	3	4	5
How my illness could affect my life in the future	1	2	3	4	5
If there are any changes I should make to my lifestyle	1	2	3	4	5
If I can continue with my usual sports/hobbies	1	2	3	4	5
If there are groups available to talk to other people who have vasculitis	1	2	3	4	5
If I can continue with my usual social and physical activities	1	2	3	4	5
Where I can get help to deal with feelings about my illness	1	2	3	4	5
How to talk to family/friends about my illness	1	2	3	4	5
How to access other services eg. benefits, social services	1	2	3	4	5
How to access psychological support	1	2	3	4	5

17. Please tell us about an example of any type of information you found useful, if any please state below.

18. Please tell us your order of preference for each of these methods of delivering educational materials by ticking one score for each item. (e.g. tick 1 for your top preference, tick 8 for the item you least prefer)

	1	2	3	4	5	6	7	8
Internet	❍	❍	❍	❍	❍	❍	❍	❍
Doctor verbally	❍	❍	❍	❍	❍	❍	❍	❍
Written materials	❍	❍	❍	❍	❍	❍	❍	❍
Audio visual materials	❍	❍	❍	❍	❍	❍	❍	❍
CD	❍	❍	❍	❍	❍	❍	❍	❍
1-2 day course	❍	❍	❍	❍	❍	❍	❍	❍
Educational group with other individuals	❍	❍	❍	❍	❍	❍	❍	❍
Conversation with doctor with written materials	❍	❍	❍	❍	❍	❍	❍	❍

19. Does your household have access to the internet, so that you can search for information on the net?

Yes ☐   No ☐

It would be very helpful if you could return this questionnaire within the next 10 days in the pre-paid envelope enclosed to.

Janice Mooney – arc Research Office

Department of Rheumatology

Norfolk & Norwich University Hospital

Colney Lane

Norwich

NR4 7UY

Thank you very much for your co-operation

Appendix R Vasculitis Informational Needs Questionnaire VCRC

Janice Mooney and Dr Richard Watts are independent researchers working at the University of East Anglia in the United Kingdom and are carrying out a research project. This is called 'What are The Information Needs of Patients with Primary Systemic Vasculitis? Development of an Educational Package'. The purpose of the study is to explore the educational needs of patients with vasculitis, so that we can develop an education program and materials that best reflect your needs.

Please take time to help, by filling in this questionnaire. You do not need to give your name, and your answers are strictly confidential. You can check to show your answer.

It may take approximately 10-15 minutes of your time to complete.

1. What is your date of birth?	____/____/____ (dd/mmm/yyyy)
2. What is your gender?	O Male O Female
3. In what country do you live?	-_____
4. Is English your first language?	O Yes O No

For question 5, these questions may seem redundant, however, all

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three sections need to be completed.

5. Please give your ethnic group? *(Select one)**

O	Hispanic, Latino or Spanish Origin	O	Not Hispanic, Latino, or Spanish Origin
O	Unknown or not reported	O	Refused

Race *(check all that apply):**

☐	American Indian or Alaska Native	☐	White
☐	Asian	☐	Refused
☐	Black or African American	☐	Unknown
☐	Native Hawaiian or Other Pacific Islander		

Please provide your ethnic group again. *(Check all that apply)**

☐	African	☐	Latin American
☐	African American	☐	Middle Eastern
☐	Asian (Indian/Pakistani/Bangladesh)	☐	Native Hawaiian/Pacific Islander
☐	Black American	☐	Turkish
☐	Black Caribbean	☐	White Caucasian American
☐	Chinese	☐	White Caucasian European
☐	Japanese	☐	Other ethnic group
☐	Korean		

6. Please check the highest level of education you have completed?

O	No schooling completed	O	Some college credit
O	Nursery grade to 4th	O	Associate degree

	grade		
O	5th to 8th grade	O	Bachelor's degree
O	9th to 12th grade (NON DIPLOMA)	O	Master's degree
O	High school graduate	O	Doctoral degree

7. What is your vasculitis diagnosis? *(Please check one)*

O	Granulomatosis with Polyangiitis (also called Wegener's Granulomatosis)	O	Microscopic Polyangiitis
O	Polyarteritis Nodosa	O	Churg Strauss Syndrome
O	Takayasu's Arteritis	O	Behçet's Disease
O	Giant Cell Arteritis (Temporal Arteritis)	O	Henoch-Schönlein purpura
O	Other (please describe)		_____ ___

8. How long did it take for your vasculitis to be diagnosed, from first reporting your symptoms to a health professional or doctor?

O	Less than 3 months	O	1-2 years

O 3-6 months	**O** 3-5 years
O 7-12 months	**O** 5 years or more

9. How long is it since you have been diagnosed with vasculitis?

O	Less than 6 months	**O**	6-10 years
O	7-12 months	**O**	11-15 years
O	1-2 years	**O**	16 years or more
O	3-5 years		

10. Had you ever heard of your kind of vasculitis before you were diagnosed?

O Yes	**O** No

11. When you were first diagnosed with vasculitis were you provided with information regarding your vasculitis?

O Yes	**O** No

12. Who provided you with this information regarding your vasculitis? *(Check all that apply)*

- ☐ Doctor
- ☐ Nurse
- ☐ Relative
- ☐ Other

13. How was this information provided? *(Check all that apply)*

☐	Verbally	☐	Disease specific pamphlet
	Vasculitis		Pages printed from internet
☐	Foundation pamphlet	☐	
☐	Verbally together with a	☐	Written material produced by hospital

	written pamphlet
☐	Other

14. Where/how did you find out about your kind of vasculitis?

(Check all that apply)

☐ Internet	☐ Friend
☐ Doctor	☐ Support group
☐ Nurse	☐ Written material
☐ Course	☐ Other

15. If English is not your first language, have you been able to find information in your own language?

O Yes   **O** No   **O**   Not applicable

IMPORTANT INFORMATION FOR YOU

16. Please read each of the following statements. Please check the number that best describes how important it is/was for you to be provided with this information

1. Not important	2. Slightly important	3. Moderately important
4. Very important	5. Extremely important	

It is important for me to know:	1	2	3	4	5
The name of my vasculitis	O	O	O	O	O
What the symptoms are	O	O	O	O	O
What causes my vasculitis	O	O	O	O	O
If my vasculitis is hereditary	O	O	O	O	O
If it is contagious	O	O	O	O	O
How it is diagnosed	O	O	O	O	O
The reasons why doctors suggest	O	O	O	O	O

certain tests.					
e.g. x-rays, scans and biopsies					
How will I feel during / after investigative tests	O	O	O	O	O
The results of tests carried out	O	O	O	O	O
What the results of blood tests mean	O	O	O	O	O
How often I should have blood tests	O	O	O	O	O
The names of drugs used in the treatment of vasculitis	O	O	O	O	O
How my treatment is given	O	O	O	O	O
How my treatment was chosen	O	O	O	O	O
If there is evidence to support my treatment regime	O	O	O	O	O
How to prepare for my treatment	O	O	O	O	O
The possible side effects of treatment	O	O	O	O	O
If there are ways to prevent / ease treatment side effects	O	O	O	O	O
What side effects I should report to the doctor/nurse	O	O	O	O	O
If I have side effects how to deal with them	O	O	O	O	O
Who I should call if I have any concerns during treatment	O	O	O	O	O
How long will I require treatment	O	O	O	O	O
How the illness will affect my life	O	O	O	O	O
How my vasculitis will be monitored	O	O	O	O	O
How my illness could affect my life in the future	O	O	O	O	O

If there are any changes I should make to my lifestyle	O	O	O	O	O
If I can continue with my usual sports/hobbies	O	O	O	O	O
If there are groups available to talk to other people who have vasculitis	O	O	O	O	O
If I can continue with my usual social and physical activities	O	O	O	O	O
Where I can get help to deal with feelings about my illness	O	O	O	O	O
How to talk to family/friends about my illness	O	O	O	O	O
How to access other services eg. welfare, social services	O	O	O	O	O
How to access psychological support	O	O	O	O	O

17. Please tell us about an example of any type of information you found useful, if any please state below.

_____

_____

_____

_____

_____

____

18. Please list in order of preference the most suitable method for you of delivery of educational materials, with a check in the box from 1-8, number 1 the least preferred and number 8 the most.

	1	2	3	4	5	6	7	8
Internet	O	O	O	O	O	O	O	O
Doctor verbally	O	O	O	O	O	O	O	O
Written materials	O	O	O	O	O	O	O	O
Audio visual materials (DVD/tape)	O	O	O	O	O	O	O	O
Compact Disc (CD)	O	O	O	O	O	O	O	O
1-2 day course	O	O	O	O	O	O	O	O
Educational group with other individuals	O	O	O	O	O	O	O	O
Conversation with doctor with written materials	O	O	O	O	O	O	O	O

19. Does your household have access to the internet, so that you can search for information on the internet?

O   Yes   O   No

If NO, does your household have other access to a computer for leisure or non-commercial use (e.g. through friends, colleagues, or the library)?

O   Yes   O   No

Thank you very much for completing the Vasculitis Informational Needs questionnaire.

Janice Mooney Richard Watts

Appendix S Reliability of the Vasculitis Informational Needs Questionnaire (VINQ)

Item of question	Cronbach's Alpha if item Deleted
Item 1	.948
Item 2	.947
Item 3	.947
Item 4	.948
Item 5	.949
Item 6	.947
Item 7	.946
Item 8	.946
Item 9	.947
Item 10	.947
Item 11	.946
Item 12	.946
Item 13	.946
Item 14	.946
Item 15	.946
Item 16	.946
Item 17	.947
Item 18	.947
Item 19	.946
Item 20	.947
Item 21	.947
Item 22	.947
Item 23	.947
Item 24	.946
Item 25	.947
Item 26	.946
Item 27	.946
Item 28	.948
Item 29	.946
Item 30	.947
Item 31	.947
Item 32	.949
Item 33	.949
Total	**Cronbach' s Alpha = 0.957**

Appendix T Quotes from comments made by respondents in the VINQ
Examples of useful information found   Quote

Internet   I understood my disease so much better after viewing

                                  the information at   http://www.ancavasculitis.co

                                  Material re research results published on internet

                                  The NIH online site and the Mayo Clinic online site
                                  have very good   information

                                  Grateful Med (Med-Line)

                                  Vasculits website for information on symptoms,
                                  treatments

                                  After the original Rheumatologist information the
                                  internet has provided the main information

                                  Research articles accessed on internet

                                  Google search, government health site,

                                  PubMed has articles

                                  internet research on the side effects of the drug
                                  regimen prescribed as well as information regarding
                                  my disease

                                  Information on Wegener's, e.g. expected course/life
                                  span, etc.

                                  I found helpful information with an internet search

                                  NIH information on web

                                  UNC Kindney Center Site

                                  www.wegenersgranulomatosis.net

                                  Internet was terrific source of information, more so
                                  than doctor

                                  Medline plus was very useful

                                  I found the www,vasculitisfoundation.org website the
                                  best for information on GPA

	Websites of major hospital rheumatology departments
Support groups	Vasculitis foundation on the internet
	Support groups on facebook
	Stuart Strange Trust (UK)
	I have received the most help from my support group for PAN - the information there is not just what
	I received a large package of written material from the Vasculitis Foundation that was very useful.
	Personal contact by phone with someone from vasculitis support group
	My support group and personal physician most helpful!
	The wegeners Association was really helpful with information etc
	The Vasculitis Foundation (when I finally found them!) was extremely helpful...sending me pamphlets
	Internet sites about my specific vasculitis
	I found a lot of information on the Internet, more than was given to me by my doctor
	I received the info packet from the vasculitis foundation, which was fabulous.
	Stuart Strange Trust, Now changed to Vasculitus UK
	Information from vasculitis groups online, medical journal articles, my own medical records
	When I found the group of Wegeners patients online it was so helpful. They actually answered more of my questions
	I recently went to another site and reread info on the disease, this was helpful
	online forum, medical websites
	Found out lots of information from Wegener's Support Forum and Vasculitis websites

	Facebook Support Group, Book titled "Vasculitis: Sick and Tired of being Sick and Tired"
	Facebook support group. I felt less isolated and less of a freak.
	I found online support sites very useful. Because there is so little information out there, it helps and support group via the internet
Medical books /Papers	In depth web -site research and medical books
	Reading about autoimmunity
	Scientific reprints from journals, proceedings from scientific meetings published on the web
	Published medical studies available over the internet especially effectiveness of treatment regimens
	Information in health center library (1986)
	Academic research papers
	I work in a hospital so I found the medical journals very helpful
Specialist nurse	Simple access to specialist nurse
	Specialist nurse helping with clinical trial was the most help for me
Written material	ARC leaflet about Vasculitis
	The print out my nurse friend sent to me early on in my illness
	Mayo clinic print out of css
	Living with vasculitis brochure from Stuart Strange