# Section 11

# Discussion

## 2024 PEEK Study in Rare and Genetic Conditions

### Introduction

***I think my predominant message would be people with complex disabilities are not the same as people with a list of all those disabilities just sort of added up because for a lot of people with CHARGE, you know, it's like, oh, well, they're not quite deaf enough or they're not quite blind enough to receive this service or, you know, whatever it is, but it's like, yes, but the impact of all of those senses being impaired and erratic means they need so much extra support. Participant 018_2023AUDPA***

Patient Experience, Expectations and Knowledge (PEEK) is a research program developed by the Centre for Community-Driven Research (CCDR). The aim of PEEK is to conduct patient experience studies across several disease areas using a protocol that will allow for comparisons over time (both quantitative and qualitative components). PEEK studies give us a clear picture and historical record of what it is like to be a patient at a given point in time, and by asking patients about their expectations, PEEK studies give us a way forward to support patients and their families with treatments, information and care.

In this PEEK study, a total of 407 participants with rare diseases or carers to people with rare diseases were recruited into the study. There were 391 that completed or partially completed online questionnaires and 402 participants that were interviewed.

### Background

In Australia, a disease is considered rare if it affects less than 5 in 10,000 people. There are more than 7,000 rare diseases that are life threatening or chronically debilitating. Around 8% of Australians (2 million people) live with a rare disease[1].

### Demographics

The demographic data we collect in the PEEK study helps us to understand how our PEEK participants compares to people in Australia, and with people that have rare diseases.

In this PEEK study, the proportions of participants with rare diseases that lived in metropolitan areas, had non-school qualifications, and lived in all states of Australia, were similar to that of Australia. There were fewer that lived were in paid employment, and more that lived in areas with higher socioeconomic status, compared to the Australian population [2-4] .

**Table 12.1: Demographics**

| Demographic | Australia % | Rare diseases PEEK % |
|---|---|---|
| Live in major cities | 71 | 72 |
| Non-school qualification | 65 | 58 |
| Higher socioeconomic status (7 to 10 deciles) | 40 | 50 |
| Employment (aged 15 to 64) | 74 | 58 |
| New South Wales | 32 | 30 |
| Victoria | 26 | 22 |
| Queensland | 20 | 23 |
| South Australia | 7 | 8 |
| Western Australia | 10 | 10 |
| Tasmania | 2 | 2 |
| Northern Territory | 1 | 0 |
| Australian Capital Territory | 2 | 3 |

## Health related quality of life

### Health status

In PEEK studies we collect information about other health conditions that participants manage, as well as health-related quality of life (with the SF36 questionnaire). The purpose of this is to have an idea of the general health of the participants in the study. We can also compare this data with the Australian population, and with other studies with rare diseases participants.

### Other health conditions

The National Health Survey was conducted in 2017 to 2018, it is an Australia wide survey conducted by the Australian Bureau of statistics. Almost half of the Australian population have one chronic condition[5]. Common chronic health conditions experienced in Australia in 2017-18 were: mental and behavioural conditions (20%), back problems (16%), arthritis (15%), asthma (11%), diabetes mellitus (5%), heart, stroke and vascular disease (5%), osteoporosis (4%), chronic obstructive pulmonary disease (COPD) (3%), cancer (2%), and kidney disease (1%)[5]. The Australian Bureau of statistics reports that 10% of Australians have depression or feelings of depression and 13.1% have an anxiety-related condition[5].

In this PEEK study, participants with rare diseases had higher levels of anxiety (57% compared to 13%), depression (43% compared to 10%), and arthritis (33% compared to 15%) compared to the Australian population. In addition, more PEEK participants with

rare diseases had chronic pain compared to PEEK participants with non-rare diseases.

A number of studies have described higher rates of anxiety and depression. Including people with Batten Disease[6], amyloidosis[7], rare diseases in general[8], fibrous dysplasia (FD) or McCune Albright syndrome (MAS) patients[9,10], pulmonary arterial hypertension[11], Leber's Hereditary Optic Neuropathy [12], mast cell disorders[13], mitochondrial disease[14], toxic oil syndrome[15], and neurofibromatosis[16]

**Baseline health**

The Short Form Health Survey 36 (SF36) measures baseline health, or the general health of an individual[17]. The SF36 comprises nine scales: physical functioning, role functioning/physical, role functioning/emotional, energy and fatigue, emotional well-being, social function, pain, general health, and health change from one year ago. The scale ranges from 0 to 100, a higher score denotes better health or function[17].

Population norms for the SF36 dimensions in Australia were assessed in the 1995 National health survey, while this was conducted 25 years ago, it can give an indication of how the breast cancer community in this PEEK study compares with the Australian population[18]. The PEEK participants with rare diseases on average had considerably lower scores for all SF36 domains with the exception of emotional well-being.

Health related quality of life data has been reported in a number of rare diseases in the last five years. Although the diseases are heterogeneous in nature, there are some commonly reported aspects about health-related quality of life. A review of the studies identified in the "Study Position" (see Section 1 of this report) identified that the majority of studies that collected health-related quality of life reported poor health-related quality of life compared to healthy populations, or poor scores for individual domains. People with urticarial vasculitis [19], mast cell disorders [20], idiopathic pulmonary fibrosis [21], and toxic oil syndrome [15] reported poor health-related quality of life across all domains, people with interstitial lung disease[22], idiopathic inflammatory myopathies[23], human T-lymphotropic virus type 1 (HTLV-1)-associated myelopathy (HAM)[24], tuberous sclerosis complex [25], systemic sclerosis , Sjogren's syndrome , lupus[26], Achondroplasia[27], nonsurgical hypoparathyroidism and pseudohypoparathyroidism[28], Beckwith-Wiedemann Syndrome[29], metabolic encephalopathy and arrhythmias[30], rare diseases [31-33], and carers to people with rare diseases[34] all reported poor quality of health compared to the general healthy population, and people with bladder cancer[35], and Fabry Disease [6] reported worse quality of life compared to other chronic conditions.

In this PEEK study, participants with diseases of the immune system, females, those aged 18 to 44, and those aged 45 to 64 tended to have poorer health related quality of life.

Several studies reported negative associations between symptoms and health-related quality of life. People with rare neurodegenerative diseases[37] who had more symptoms had worse quality of life. Fatigue was negatively associated with quality of life for people with sarcoma[38,39], neurofibromatosis 1 [40], PFAPA syndrome [41], and rare diseases[34]. Pain was negatively associated with quality of life for people with neurofibromatosis 1[40], skeletal dysplasia[42], sarcoma[8,39], amyloidosis[7], hereditary fructose intolerance[43], and rare diseases[34]. Poor joint function was associated with poor quality of life for people with fibro dysplasia ossificans[44].

Low scores in cognitive domains were reported for people with neurofibromatosis 1[40], hypoparathyroidism[45], and Sturge-Weber syndrome[46].

A number of studies reported that having a rare disease has a negative impact on emotional domains and mental health domains. Poor scores were reported in emotional domains for people with Skeletal dysplasia[42], Hypoparathyroidism[45], PFAPA syndrome[41], Fabry Disease[36], Acid sphingomyelinase deficiency[47], Duchenne muscular dystrophy[48], Neurofibromatosis 1[40], mitochondrial disease[49], Wilson's Disease[50], rare diseases[33,34], and care givers to people with fibro dysplasia ossificans[44]. Poor scores were reported in mental health domains for people with mitochondrial disease[49], Wilson's Disease[50], autoimmune liver diseases[51], caregivers to people with rare diseases of the respiratory system, rare diseases of the respiratory system[52], and neurofibromatosis 1[53].

People with skeletal dysplasia[42], hypoparathyroidism [45], acid sphingomyelinase deficiency[47], Duchenne muscular dystrophy[48], Pierre Robin sequence[54], amyloidosis[7], and sarcoma[38,39] had low scores for physical domains, and people with amyloidosis[7], hereditary fructose intolerance[43], toxic oil syndrome[15], fibro dysplasia ossificans[44], and skeletal dysplasia[42] had low scores for usual activities or self care.
In this PEEK study, participants on average had poor role functioning/physical, meaning physical health

often interfered with work or other activities. Participants had poor energy and were often fatigues, and they had poor general health.

There were some studies that reported health-related quality of life that was comparable to normal health populations, or that had good scores in certain domains. Children and adolescents with lymphedema reported good levels of health related quality of life[55-58], and children with achondroplasia had scores comparable to a health population for emotional domains[27]. The majority of people with Hereditary fructose intolerance reported no quality of life problems in any domain[43], as did siblings of children with rare diseases[33]. In the long term, people with insulinoma described health-related quality of life that is slightly better than the general population[59]. People with amyloidosis reported no problems with self-care domains[7], people with Wilson's disease had no problems in the physical domains[50], and siblings to children with rare diseases reported better scores in the social domain compared to healthy populations[33].

In this PEEK study, participants on average had good role functioning emotion, meaning that emotional problems rarely interfered with work or other activities for participants in this study. In addition they had good emotional well-being.

**Summary of PEEK results**

PEEK participants had poorer health related quality of life compared to a healthy population

PEEK most affected health related quality of life domains

- Role functioning physical
- Energy/fatigue
- General health

Subgroups most affected

- Diseases of the immune system
- Females
- Aged 18 to 44
- Aged 45 to 64

**Summary of literature**

People with rare diseases had poorer health related quality of life compared to a healthy population

Health-related quality of life domains that are often affected by rare diseases:

- Cognitive
- Social function
- Mental health
- Emotional well-being
- Physical activities

Symptoms that impact quality of life:

- Multiple symptoms
- Pain
- Fatigue
- Poor joint function

## Screening and diagnosis

### Screening and diagnosis

***Heaps of hospital visits and ruling out with some neurologists, I don't know, ruling out other things, and finally got to this diagnosis but it's a long, long years. It takes years.***
***Participant 01_2023AUDNS***

In other studies, people with rare diseases have described the pathway to diagnosis, these are often described in terms of delays, misdiagnosis and without adequate support. A number of studies described that people commonly were diagnosed years after first noticing symptoms and seeking medical attention[7,32,60-66]. Delays to diagnosis can be a result of doctors that are not familiar with the condition and associated symptoms, and the variability of the condition[66-70]. Delays were caused by the healthcare system, such as delays in specialist appointments and conditions of health insurance[32,67]. In addition, delays in diagnosis have been described as a result of patients not seeking medical attention[67-69,71]. For people seeking a diagnosis for a rare condition, many have described having numerous medical appointments with a number of specialists, or changing doctors until they find a diagnosis[64,66,67,70-73], often being misdiagnosed with other conditions[61,64,66-68,71,72,74-76].

Two studies reported promotors to diagnosis, including a study of metachromatic leukodystrophy[69] that reported educators and allied health workers noticed symptoms that led to diagnosis, and a study of rare cancers[71] reported that referral to a specialist cancer centre resulted in a quicker diagnosis.

The majority of participants in this PEEK study described noticing symptoms and seeking medical attention relatively soon. However, for almost half of the participants, the diagnostic pathway was complex and required multiple specialists before they got a diagnosis.

***I recall a long-time physician GP she wrote it on a post it note, slipped it over to me and that was all that that was said about it. I I still remember looking at it going, I don't even know what that says and it took me ages…Super. You know, what does that mean? I mean it was probably 20, 20, 21 maybe. And so the Internet…I mean at least I didn't have a computer in my home. I was living by myself at that point …So there was no, there were no images, photos. What's life like? That was it? It was just a yellow post-it note. I still remember very clearly. That was my diagnosis. Participant 015_2023AUDSK***

**Summary of PEEK results**

Diagnostic pathway

- 60% noticed symptoms and sought medical attention relatively soon
- 47% had a complex diagnostic pathway

**Summary of literature**

Barriers to diagnosis

- Doctors not familiar with the condition and symptoms
- Variability of the condition
- Healthcare system delays
- People not seeking medical attention
- Numerous medical appointments any doctors
- Misdiagnosis

Aids to Diagnosis

- Allied health
- Educators

## Understanding, knowledge and support at diagnosis

***Nothing. I'd never ever heard of it before. I'd never even come up on Google when I was researching like for myself, like what is wrong with me? Because it's just so similar to other cysts and things I guess in the beginning quite easily get confused with that, but no, it didn't even come up. I'd never heard of it. Participant 006_2023AUDSK***

### Understanding and knowledge

Knowledge about chronic disease before diagnosis varies between individuals. Some will gain information from family and friends with the condition, though it can result in misconceptions and misunderstandings[77,78]. Some people will seek out information about a possible diagnosis, or explore the reasons for symptoms, before receiving a final diagnosis[79,80] others, especially those who have symptoms for long periods before diagnosis, will gain information in terms of how to live with or adapt to symptoms they experience[81]. For some people, the first time they have heard of their chronic condition is when they are diagnosed[80]. At the time of diagnosis, it may be useful for the healthcare professional to talk about how much a patient knows about a condition so that appropriate information can be given, and correct misconceptions[80].

Knowledge about rare conditions is important for receiving a diagnosis, piece of mind, and having a basis for a management plan. For people with rare diseases a diagnosis has been described as important but not always able to give adequate answers for treatment and management of their condition[72]. Once diagnosed, people with rare conditions have struggled to find information about their condition, with unanswered questions about causes, treatment, management, symptom control, and how it differs from previous misdiagnosis[74,82].

In this PEEK study, 61% of participants with rare diseases had little to no understanding of their condition when they were diagnosed. In terms of genetic and biomarker testing, 67% of PEEK rare diseases participants had no discussions with their healthcare providers, and 69% did not have this type of test. In addition, more than a quarter were uncertain about the prognosis of their condition.

***Well, it's a bit tricky because I think this particular condition wasn't even discovered until 89. So there aren't a lot of older people with it. They have, well, my son has routine monitoring for the things that it might affect, like his heart and his eyes. And you know, he's ongoing blood testing. So we don't really know what***

***the outlook is. We don't have any information really to go off.***
***Participant 021_2023AUORC***

**Support at diagnosis**

When describing their diagnostic journey, some people with are diseases have described being reassured by healthcare professionals that were confident, that discussed steps of diagnosis and treatment as a team[82]. Others described anxiety due to misdiagnosis and delays, and a lack of information and psychological support to prepare for living with the condition [68,74,76,83-85]. Adding to stress and anxiety, some have described unsympathetic healthcare professionals, and being judged, not believed or blamed by healthcare professionals for their symptoms or symptoms of the person they care for[72,74-76]. While some describe relief of getting a diagnosis, there are others that describe shock, confusion a sense of loneliness, and a fear of unknown treatments ahead of them[67,75,76,84-86]. While a diagnosis may not always have a direct impact on clinical care, a diagnosis can also have a positive impact on behaviour changes for both the person with a rare condition and their family, and remove some difficulties in accessing support and services[86].

In this PEEK study, 79% of participants with rare diseases either had no support or not enough support at diagnosis.

***Not a lot until the specialist told me and actually, he didn't tell me in a very nice way. [laughs] I don't know. I can't remember what field he was in. I can't remember whether he was a rheumatologist or whether he was some sort of specialist in that sense. I really can't remember but now he basically just said I've got scleroderma and I went, what's that? [laughs] I didn't really know anything about anything because my doctor also didn't lead on much as well. I looked it up in the dictionary and got a hell of a fright.***
***Participant 01_2023AUDIS***

**Summary of PEEK results**

Understanding of condition

- Poor understanding of condition at diagnosis
- Poor understanding of prognosis
- Very few had discussions about biomarkers and genetic testing

Support at diagnosis

- The majority had either no emotional support or not enough emotional support at diagnosis.

**Summary of literature**

Supportive factors at diagnosis

- Reassured by healthcare professionals that discussed diagnosis and treatment as a team
- Receiving a diagnosis gives a sense of relief
- Removes difficulty in accessing support

Unsupportive factors at diagnosis

- Delays to diagnosis
- Misdiagnosis
- Lack of information
- Unsympathetic healthcare professionals
- Feeling judged, not believed or blamed for condition
- Fear of unknown after receiving a diagnosis
- Loneliness at diagnosis

## Decision making

**Decision making**

***I went to a rheumatologist, but I never was offered any treatment or like medication or anything in the beginning. I basically just was told there was no cure and I just have to learn to live with it. Which is fair enough probably because it's probably true, but I've been in hospital this year and I met a lady in there who said she's had lots of help. A lot of people get infusions and that, I've never been offered anything like that but that's okay. I'm managing.***
***Participant 013_2023AUDIS***

The decision-making process in healthcare is an important component in care of chronic or serious illness[87]. Knowledge of prognosis, treatment options, symptom management, and how treatments are administered are important aspects of a person's ability to make decisions about their healthcare[88,89], highlighting the importance of healthcare professional communication. In addition, the role of family members in decision making is important, with many making decisions following consultation with family[90].

Confidence to take part in decision-making is increased by knowledge, being prepared with relevant questions

for their consultation, and summaries of previous consultations and results[91,92].

People with rare diseases have discussed their participation in treatment decision making, with a spectrum of involvement and descriptions of healthcare professional communication that are helpful or unhelpful. Some people with rare diseases have described not participating in treatment decisions, this was because they were told what to do without discussion, because of emergency situations, that they were not believed, or that they were happy and reassured to take their doctor's advise [70,93-95]. Others described the importance that their views should always be considered, the need for information provided in plain English and patient participation in multi-disciplinary team decisions via an nurse advocate [96]. One study described the importance of second opinions and being assertive and persistent when making treatment decisions[97], and another described the importance of the doctor-patient relationship in decision making participation[51].

Approximately a third of participants in this PEEK study were not given any treatment options at diagnosis, about a third had multiple options, and almost a fifth had one treatment option. Participation in decision making varied with some reporting that they had taken part in decision making, and others describing being told what to do without discussion, or having some but not enough discussion about the treatment or management of their condition. Some participants described that no treatments were available but they discussed allied health, monitoring, lifestyle changes or complementary therapies.

While some people with rare diseases described feeling informed by their doctor and that all options and relevant information was presented to them [73], others thought that information about treatment options had been withheld, or that their doctor had already made treatment decisions or were pushing for a particular treatment option [93-96]. One study noted that participants that had been diagnosed tens of years ago had no participation in decision making, while those diagnosed more recently were involved [96]. Another study described that participating in a support group improved knowledge about management and supported decision making[70].

Participants in this PEEK study described how decision making had changed over time. Approximately half of the participants described that decision making had changed over time. Participants changed the way that they made decisions over time because they became more informed and assertive, were more aware of their health and limitations, were more cautious or took the impact on family and dependents into account.

***Yes. Look, I just think I have got a lot more agency now. I just feel like now the ball is in my court a lot more than what it was. I suppose I'm more knowledgeable. I feel like when I'm discussing things with the doctors now it's more of an equal level after a team rather than just sitting there being passive. It's probably changed in that respect.***
***Participant 054_2023AUDPA***

**Summary of PEEK results**

Discussions about treatment and management of condition
- 33% no treatments discussed
- 32% multiple treatment options
- 18% on treatment option

Participation in decision making
- Took part in decision making
- Were told what to do without discussion
- Wanted more discussion about treatment and management
- Were offered allied health, monitoring, lifestyle advise or complementary therapies

Changes in decision making over time
- More informed and assertive
- More aware of health and responsibilities
- More cautious
- More focused on family and dependents

**Summary of literature**

Barriers to participating in decision making
- told what to do without discussion
- emergency situations
- happy and reassured to take their doctor's advise
- doctor withholding information or pushing for particular treatment
- Not being believed

Facilitators to Participate in decision making
- belief that own view should always be considered
- information in plain English
- patient participation in multi-disciplinary team decisions via a nurse advocate
- being well informed by doctor about all options
- Support group
- Second opinions
- Being assertive and persistent
- Good patient doctor relationships
- Taking part in support group

**Considerations when making treatment decisions**

***Side effects is a big one for me. Obviously I don't want to put on heaps of weight or feel nauseous, or if I can avoid some horrible side effects, I will and I guess not so much yet. But as I said in the future, like if I can be on them while pregnant or how long I have to be off them before being pregnant, yeah.***
***Participant 095_2023AUDNS***

Important considerations for PEEK participants with rare diseases in decision making were side effects, efficacy, cost, advice of their clinician, and quality of life. In other studies, people with rare diseases have discussed their considerations when making treatment decisions, this included taking the doctor's opinion into account, longevity, treatment effectiveness, location or travel to treatment centre, invasiveness or burden of treatment, impact on family and time off work, cost, type and severity of side effects, duration of side effects, improvement in symptoms, duration of improvements in condition, previous experience of treatments, and other people's experiences[85,95,98-100].

In terms of treatment goals, participants in this PEEK study had goals of quality of life, maintaining their condition, physical improvements in their condition, and to live independently.

**Summary of PEEK results**

Considerations when making treatment decisions

- Side effects
- Efficacy
- Cost
- Advice of their clinician
- Quality of life
- Treatment goals

Treatment goals

- Quality of life
- Maintaining their condition
- Physical improvements in their condition
- Live independently.

**Summary of literature**

Considerations when making treatment decisions

- doctor's opinion
- type and severity of side effects,
- duration of side effects,
- improvement in symptoms,
- duration of improvements in condition, and
- previous experience of treatments
- Longevity
- Treatment effectiveness
- Invasiveness or burden of treatment
- Impact on family and time off work
- Location
- Cost
- Other people's experiences

## Treatment and healthcare provision

**Treatment and healthcare provision**

In this PEEK study, to get an insight healthcare access, information about access to health insurance, health system, and financial consequences from having a rare condition are collected.

Allied health is important to manage the physical, emotional, practical and financial consequences of rare diseases.

A review of the studies identified in the "Study Position" (see Section 1 of this report) gave little insight into allied health use in rare diseases. Some studies described that people with rare diseases would like more access to allied health, in particular psychological support, but also social work, dieticians, physiotherapy and rehabilitation specialists[8,60,105].

The majority of participants in this PEEK study had accessed allied health, the most common forms of allied health accessed were physiotherapy, psychology, occupational therapy, dietary, podiatry and speech therapy. Quality of life from allied health ranged from life was distressing (psychology) to life was average (physiotherapy, occupational therapy, speech therapy and podiatry). Effectiveness of these therapies were rated from ineffective (podiatry) to moderately effective (occupational therapy).

Other studies that reported patient satisfaction with allied health, people with Huntington's disease found speech therapy use as helpful, improving speech and language skills, and that groups sessions enabled them to meet other people in a similar situation[110], in another study, about half of those with a rare disease that accessed psychological support found it helpful[8]. People with Ehlers-Danlos Syndromes in a multi-

national study reported both positive and negative experiences of physical therapy for pain, noting better results from a physiotherapist that had knowledge and familiarity of Ehlers-Danlos Syndromes[70]. A French study of mucopolysaccharidoses described that they were most commonly referred to physiotherapy, followed by speech therapy, Orthoptics, and psychomotor therapy[84].

In other studies, people with rare diseases described the barriers they had to getting the healthcare services and treatments that they needed. Demographic factors such as not speaking the local language, being poor, having a low level of education and living in regional or remote areas were a barrier to access to healthcare services [71,84,101]. In addition, a lack of diagnosis was a barrier to accessing healthcare[2,66]. Having access to a specialist centre was a facilitator of access to healthcare and participants noted that they had improved coordination of appointments, improved access to allied health and support[51,71,102]. Patients or carers who were also healthcare professionals had better access to healthcare due to knowledge and professional contacts[101].

**Patient treatment preferences**

Clinical guidelines that are aligned to patient preferences are more likely to be used and lead to higher rates of patient compliance.[111-113] Patient preferences and priorities vary across different health issues, preferences are associated with health care service satisfaction, they refer to the perspectives, values or priorities related to health and health care, including opinions on risks and benefits, the impact on their health and lifestyle[111,114].

To help inform patient preferences in the rare diseases community, participants in this PEEK study discussed side effects and adherence to treatment. Mild side effects were described by providing examples, or as side effects that are self managed or do not interfere with life. In a similar way, participants describe severe side effects, broadly as those that impact every day life, or using the examples of specific side effects. Side effects were an important factor in treatment adherence.

Participants in this PEEK study described mild side effects using a specific example such as fatigue, gastrointestinal distress, and headaches, side effects that do not interfere with life, and side effects that can be self managed. They described severe side effects using a specific example such pain, fatigue and the emotional impact, and those that have an impact on everyday life or that are life threatening or require hospitalisation.

Participants in this PEEK study described their adherence to treatment. Most commonly they described following treatment according to the advice of their doctor. Others described sticking to a treatment for a specific amount of time, usually 2 to 3 months, or as long as the side effects are tolerable. Some described that they had not given up on any treatment

Side effects and problematic symptoms will vary across rare diseases, however [7,34,38-40,42,43,71,115], fatigue [34,38-41,71], and mental health problems were commonly reported across disease types[49-53].

**Lifestyle changes**

Many chronic diseases share the modifiable risk factors of poor diet, little exercise, smoking, and excessive alcohol consumption. Participants with rare diseases in this PEEK study most often made changes to their diet and exercise habits, and rated exercise as somewhat effective and diet as somewhat effective. PEEK participants with rare diseases made lifestyle changes at a similar rate to those with non-rare diseases[116-118].

**Complementary therapies**

Complementary therapies include taking supplements, mindfulness and relaxation techniques, massage therapy and acupuncture and many others. PEEK participants with rare diseases most commonly used supplements, mindfulness and relaxation techniques and massage therapy, they rated massage therapy and mindfulness as moderately effective and supplements as somewhat effective. Very few studies described access to complementary therapies, however, a multinational study of people with Ehlers-Danlos Syndromes described managing pain with dry needling, and acupuncture[70].Participants with rare diseases used complementary therapies at a similar rate to those with non-rare diseases.

**Summary of PEEK results**

Description of mild side effects

- Specific example such as fatigue, gastrointestinal distress, and headaches
- Do not interfere with life
- Can be self managed

Description of severe side effects

- Specific example such pain, fatigue and the emotional impact
- Has an impact on everyday life
- Life threatening or require hospitalisation

Adherence to treatment

- According to advice of their doctor
- Specific amount of time, usually 2 to 3 months
- Side effects are tolerable
- Does not give up on any treatment

Allied health

- 71% used at least one allied health service
- 47% physiotherapy
- 39% Psychology
- 35% occupational therapy
- 33% dietary
- 31% podiatry
- 24% speech therapy

Lifestyle changes

- 60% exercise
- 51% diet changes

Complementary therapies

- 46% supplements
- 46% mindfulness or relaxation
- 30% massage therapy

**Summary of literature**

Barriers Access to healthcare

- Do not speak local language
- Low income
- Low education attainment
- Regional or remote
- Lack of diagnosis

Facilitators Access to healthcare

- Access to a specialist clinic
- Patients that are also healthcare professionals

Common side effects and symptoms

- Fatigue
- Pain
- Mental health problems

Allied health Unmet needs

- psychological support
- social work
- dieticians
- physiotherapy
- rehabilitation specialists

**Affordability of healthcare**

***Probably the biggest one is the full-time off work, it's obviously very hard on the family. Also now, I find with fatigue and just chasing up medical appointments and things like that, that I only work part-time now. I work three days a week. Just financially that. I find that with scripts and seeking treatment, very expensive. Just getting accommodation and things like that, going down to specialist appointments, I find very expensive as well. Time-wise, definitely it takes up way too much family time with conversations and just their support Participant 014_2023AUDIS***

Almost half of the Australian population have private health insurance with hospital cover[103]. This can be used to partially or completely fund stays in public or private hospitals. Between 2006 and 2016, the proportion of private health care funded hospitalisations in public hospitals rose from about 8% to 14%[103]. In this PEEK study, a higher proportion had private health insurance compared to the Australian population.

People with rare diseases and carers to people with rare diseases have described lost educational opportunities due to the amount of time they missed at school [53,84,104], with implications on future earning potential. In addition, people with rare diseases and carers to people with rare diseases have described having to take time off work, reducing hours, changing roles or careers or quitting work as a result of a rare disease diagnosis[84,85,104]

In this PEEK study participants with rare diseases noted the cost of managing their condition. Approximately half of the participants in this PEEK study had no out of pocket expenses when they were diagnosed. However, for those that did have costs, for 45% this was a moderate or significant burden. The monthly expenses for managing their condition exceeded $250 for a third

of the participants, and was moderately to significantly a burden for 41% of participants. Costs were from time off work, treatment, specialist appointments, diagnostic tests and scans, and transport, parking and accommodation. In terms of employment changes, approximately a third had quit their job or reduced hours. In other studies, people with rare diseases have described the impact on employment from having a rare disease or caring for someone, describing reducing hours, taking less demanding jobs, or having to quit jobs, in addition to being overlooked for promotions or inclusion on specific projects[105-109]

**Summary of PEEK results**

Costs

- Time off work
- Treatment
- Specialist appointments
- Diagnostic tests and scans
- Transport, parking and accommodation

Changes in employment

- 30% Quit their job
- 30% had reduced hours that they worked

**Summary of literature**

Costs due to work and education

- Taking time off school
- Reduced education opportunities
- Taking time off work
- Reducing work hours
- Changing work role or career
- Quitting workforce

**Clinical Trials**

Clinical trials are essential for development of new treatments. The benefits to participants include access to new treatments, an active role in healthcare, and closer monitoring of health condition. The risks to participants include new treatment may not be as effective, and side effects.

In other studies, people with rare diseases described reasons for and against taking part in clinical research. One study described language, educational and socioeconomic barriers to taking part in research and noted the importance of having a good working relationship with their healthcare professionals in having access to taking part in research. [101]. The other study described that people with rare diseases were motivated to take part in research to help future generations, while those that had already taken part in clinical trials were reluctant to take part in more research as they had already done their part to help[100]. This study also described the opinion of their doctor and their family was important in their decision to take part in research[100].

The majority of participants in this PEEK study had not discussed clinical trials with their doctor, very few had taken part in a clinical trial though approximately half of the participants would take part in a clinical trial if one was available.

A search of the Australian New Zealand Clinical Trials Registry was conducted on 4 January 2023. The search term used was “rare disease”, and included any study that was conducted in Australia, and was open to recruitment in the last five years. A total of 74 studies were identified that had a target recruitment of between 4 and 20,000 participants (median=102), there were 35 studies that were international, and 39 studies that were conducted exclusively with in Australia. The most common types of studies were investigating drugs (n=47), followed by registries (n=9), and allied health (n=5). There were 4 studies investigating devices, 4 tissue banks, 3 surgical studies and 2 diagnostic studies.

There were 47 studies conducted in New South Wales, 44 studies in Victoria, 25 in Queensland, 24 in South Australia, 24 in Western Australia, 7 in the Australian Capital Territory, 7 in Tasmania and 5 in the Northern Territory.

There were 47 studies that included only adults, 8 that included only children and 19 that included both adults and children. The most common disease types that were investigated were rare cancers (n=29), diseases of the nervous system (n=8), endocrine, nutritional or metabolic diseases (n=7), and diseases of the blood or blood-forming organs (n=4).


**Figure 12.1: Distribution of clinical trials for HER2 positive breast cancer in Australia 2016-2021**

**Table 11.2: Clinical trials**

| Summary of clinical trials | | N=74 | % |
|---|---|---|---|
| **Disease area** | Neoplasms/Cancer | 29 | 39.19 |
| | Diseases of the nervous system | 8 | 10.81 |
| | Endocrine, nutritional or metabolic diseases | 7 | 9.46 |
| | Diseases of the blood or blood-forming organs | 4 | 5.41 |
| | Developmental anomalies | 3 | 4.05 |
| | Diseases of the musculoskeletal system or connective tissue | 3 | 4.05 |
| | Rare diseases | 3 | 4.05 |
| | Diseases of the circulatory system | 2 | 2.70 |
| | Diseases of the ear or mastoid process | 2 | 2.70 |
| | Diseases of the skin | 2 | 2.70 |
| | Diseases of the visual system | 2 | 2.70 |
| | Injury, poisoning or certain other consequences of external causes | 2 | 2.70 |
| | Pregnancy, childbirth or the puerperium | 2 | 2.70 |
| | Diseases of the digestive system | 1 | 1.35 |
| | Diseases of the genitourinary system | 1 | 1.35 |
| | Diseases of the immune system | 1 | 1.35 |
| | Diseases of the respiratory system | 1 | 1.35 |
| | Mental, behavioural or neurodevelopmental disorders | 1 | 1.35 |
| **Type of investigation** | Drug | 47 | 63.51 |
| | Registry | 9 | 12.16 |
| | Allied health | 5 | 6.76 |
| | Device | 4 | 5.41 |
| | Tissue bank | 4 | 5.41 |
| | Surgery | 3 | 4.05 |
| | Diagnostic | 2 | 2.70 |

| Summary of PEEK results | Summary of literature |
|---|---|
| Clinical trial discussions and participation<br>• 64% No discussions about clinical trials<br>• 50% would take part in a clinical trial if one was available<br>• 12% had taken part in a clinical trial | Barrier to take part in clinical research<br>• Do not speak local language<br>• Low socioeconomic status<br>• Low education attainment<br>• Previous participation in clinical research<br>Promotor to take part in clinical research<br>• Opinion of doctor<br>• Opinion of family<br>• Desire to help |

**Expectations for future treatments**

***So it would be nice if new treatments also considered more seriously. That the lived experience of a side effect is different perhaps, to the medical definition of a side effect. Participant 024_2023AUDIS***

Participants in this PEEK study described their expectations for future treatments. The most common descriptions were that they expected future treatments to be more affordable, more effective or personalised, include choice, accessibility and discussions about treatments, have fewer or less intense side effects, will be easier to administer or less invasive and that they will have more access to clinical trials and access to new treatments and technologies.

In other studies, people with rare diseases described their expectations or priorities for future treatments. They described wanting effective treatments that were affordable and accessible, prevents clinical deterioration , improves life expectancy, treatments with fewer side effects treatments that are easier to administer, they wanted treatments that were holistic, in particular paying attention to mental and emotional health, treatments that gave symptom relief, that reduced short and long term side effects and improved quality of life, in addition, they noted the importance of prevention and early detection. [55-58,83,100,119-122]

***Yeah, yeah. Look, I suppose cost, cost is certainly a a challenge or a barrier for some I think access to information about. What the options are and what the possible side effects of each pathway so that you can make informed decisions about what you're willing to, what you're willing to risk, but also kind of what your probabilities of success are. Yeah, I think, I think more information and more knowledgeable practitioners.***
***Participant 007_2023AUDSK***

| Summary of PEEK results | Summary of literature |
|---|---|
| Future treatments<br>• More affordable<br>• More effective or personalised<br>• Choice, accessibility and discussions about treatments<br>• Fewer or less intense side effects<br>• Easier to administer or less invasive<br>• More clinical trials and access to new treatments and technologies | **Future treatments**<br>• Effective treatments<br>• Affordable treatments<br>• Accessible treatments<br>• Holistic treatment<br>• Symptom relief<br>• Improves quality of life<br>• Prevents clinical deterioration<br>• Improves life expectancy<br>• Fewer side effects<br>• Easier administration |

**Information sources**

People with rare diseases have described getting their information from a variety of sources, this includes social media, the internet, patient organisations, conferences, podcasts, videos, their healthcare professionals, medical journals, other patients, and from their own lived experiences[66 ,70,73,84,93,94,109,123-126]. One study noted that people who got information from a specialist treatment centre were more satisfied with their information compared to those that got information from a regional hospital.[71]

This is similar to the information sources for participants with rare diseases in this PEEK study. PEEK participants with rare diseases got information from a range of sources, including the internet, Facebook and social media, health charities, treating clinician, medical journals, other patients experience, books, pamphlets and newsletters. Most described a preference for talking to someone, online information or a combination of both, and also a preference for written information. Talking to someone was preferred because it gave them time to ask questions, online information was very accessible and written information made it easy to highlight information and refer back to.

**Information that was not helpful**

In other studies, people with rare diseases described information that was not helpful, this included not having enough information, a lack of information about what to expect, information that is withheld or underplayed, and information that is misleading, not relevant or inaccurate [96,125,127,128]. However, people with rare diseases described being able to critically evaluate information[124]. .

Similarly, PEEK participants with rare diseases found information from Most commonly, participants in this PEEK study described that no information not helpful. Others described unhelpful information as information from their GP or specialist, other people's experiences, and a lack of new information.

**Information that was not helpful**

In this PEEK study, participants described the following types of information as helpful; other people's experience and peer support, what to expect (for example disease course and treatments), talking to their doctor, and information from health charities.

In other studies, people with rare diseases described information from other people's experience as helpful, and having enough time to discuss information with their doctor as helpful[70,84]

**Timing of information**

In other studies, people with rare diseases described the need for information and support at all stages of their healthcare management, though it was described as most important at an earlier stage when seeking or having obtained a diagnosis [93,94,109].

Similarly, PEEK participants with rare diseases most commonly were receptive to information at diagnosis or after the shock of diagnosis had worn off, and continuously throughout their experience, some took more time to be receptive, needing up to wait for a year or more after diagnosis.

**Information topics**

In this PEEK study more than half of the participants searched for information about disease cause, treatment options, disease management, and complementary therapies. More than a third had searched for how to interpret test results, clinical trials, diet advice, physical activity and psychological or social support.

In other studies, people with rare diseases described the topics of information they needed or searched for independently. The topics included emotional and mental health support, disease management, treatment options, and side effects[34,70,71,129]. One study described that participants were satisfied with factual medical information about treatments and side effects[71].

**Summary of PEEK results**

Information sources
- Internet
- Facebook and social media
- Health charities
- Treating clinician
- Medical journals
- Other patients experience
- Books, pamphlets and newsletters

Information that is not helpful
- No information not helpful
- GP or specialist
- Other people's experiences
- Lack of new information

Information that was helpful
- Other people's experience, peer support
- What to expect
- Talking to their doctor
- Health charities

Timing of information
- From the beginning
- Continuously
- A year after diagnosis
- After the shock of diagnosis

Information topics most commonly searched for
- Disease cause
- Treatment options
- Disease management
- Complementary therapies
- How to interpret test results
- Clinical trials
- Diet advice
- physical activity
- psychological or social support

**Summary of literature**

Information sources
- Social media
- Internet
- Patient organisations
- Conferences, podcast and videos
- Healthcare professionals, treatment centre
- Medical journals
- Other patients
- Own lived experiences

Information that is not helpful
- Lack of information
- Information that is withheld or downplayed

Information that was helpful
- Able to critically evaluate information
- Other people's experience, peer support
- Enough time to discuss with doctor

Timing of information
- All the time
- Most important at diagnosis

Information searched for
- Emotional and mental health support
- Disease management
- Treatment options
- Side effects

**Expectations for future information**

***It's not like we haven't got any information, it was just what the doctor told us. I think if there was something that could be provided a point of diagnosis in writing that would be really helpful or somewhere to go and look for information, so maybe be directed to a website or something. Because again, you know, you kind of have to do all of that yourself. I think information being available and relevant to the Australian community would be really important. Participant 021_2023AUORC***

Participants in this PEEK study described their expectations for future information. They described wanting information to be more accessible and easy to find, they wanted information about their disease trajectory and what to expect, they wanted information specific to their condition, and they wanted to raise community awareness.

In other studies, people with rare diseases described their expectations or priorities for future information. This included details about what treatments are available and explanations when certain treatments are not suitable, what to expect, especially short and long term symptoms, information about transitioning from hospital to home, written information specific to their case, including treatment plans and test results, and information that is clear and jargon free [93,94,96,109,125,127,128,130-132]. In addition, people with rare diseases described wanting more community awareness and more education for healthcare professionals about rare diseases[97,133].

**Summary of PEEK results**

Future information

- Accessible and easy to find
- What to expect
- Specific to subgroup or condition
- Raise community awareness

**Summary of literature**

Future information

- All available treatments
- Explanations about suitability of treatments
- What to expect
- Short and long term symptoms
- Transition from hospital to home
- Written information specific to own case
- Plain language
- Community awareness
- Healthcare professional education

## Communication and care coordination

### Self-management

Self-management of chronic disease encompasses the tasks that an individual must do to live with their condition. Self-management is supported by education, support, and healthcare interventions. It includes regular review of problems and progress, setting goals, and providing support for problem solving[134]. Components of self-management include information, activation and collaboration[134].

Information is a key component of health self-management[135,136]. The types of information that help with self-management includes information about the condition, prognosis, what to expect, information about how to conduct activities of daily living with the condition, and information about lifestyle factors that can help with disease management[135,136].

Self-management of chronic disease encompasses the tasks that an individual must do to live with their condition. Self-management is supported by education, support, and healthcare interventions. It includes regular review of problems and progress, setting goals, and providing support for problem solving[134]. Components of self-management include information, activation and collaboration[134].

### Activation (skills and knowledge)

Patient activation is the skills, knowledge, and confidence that a person has to manage their health and care; and is a key component to health self-management. Components of patient activation are support for treatment adherence and attendance at medical appointments, action plans to respond to signs and symptoms, monitoring and recording physiological measures to share with healthcare professionals, and psychological strategies such as problem solving and goal setting.

Patient activation is measured in the PEEK study using the Partners in Health questionnaire[137]. PEEK participants with rare diseases had very good knowledge about their condition, were average at coping with their condition, were good at recognizing and managing symptoms, and were very good at adhering to treatment.

### Communication and collaboration

***Yeah, really good. His team is great. We've got a phone number that we can call or text anytime 24/7 if we have any questions and we get responses straight away. And yeah, as I said earlier that every time we meet with his team and we've got questions, they've always been really, they've been really clear with this and able to answer everything that we've come to them with.***
***Participant 029_2023AUORC***

Collaboration is an important part of health self-management, the components of collaboration include healthcare communication, details for available information, psychosocial and financial support [135,136] Communication between healthcare professionals and patients can impact the treatment adherence, self-management, health outcomes, and patient satisfaction[138-141].

An expert panel identified the fundamental elements of healthcare communication that encourages a caring, trusting relationship for patient and healthcare professional that enables communication, information sharing, and decision-making[142].

Building a relationship with patient, families and support networks is fundamental to establishing good communication[142]. Healthcare professionals should encourage discussion with patients to understand their concerns, actively listen to patients to gather

information using questions then summarising to ensure understanding[142]. It is important for healthcare professionals to understand the patient's perspective and to be sympathetic to their race, culture, beliefs, and concerns. It is important to share information using language that the patient can understand, encourage questions and make sure that the patient understands[142]. The healthcare professional should encourage patient participation in decision-making, agree on problems, check for willingness to comply with treatment and inform patient about any available support and resources[142]. Finally, the healthcare professional should provide closure, this is to summarise and confirm agreement with treatment plan and discuss follow up.

In this PEEK study, most participants described overall positive communication with healthcare professionals, though some of these described exceptions. Approximately a third described an overall negative experience of healthcare communication. When participants described positive communication, this was primarily because of two way, supportive and comprehensive conversations. Reasons for negative communication included healthcare professionals with a lack of knowledge about condition, having a lack of time in appointments, dismissive or one way conversations, and a lack of coordinated care and follow up.

In other studies, people with rare diseases described the positive impact that learning about the condition had on communication with healthcare professionals [133]. In addition, communication was improved when healthcare professionals were open, freely gave information, were confident and reassureing[73,82]. Other studies described barriers to communication including distrust of healthcare providers or healthcare system, healthcare professionals with inadequate knowledge of condition, healthcare professionals make assumptions about patient needs/preferences, and being embarrassed by condition or symptom, and embarassemnt[71,101]. In addition, people with rare diseases described that feeling that healthcare professional does not believe in patient symptoms, feeling judged by healthcare professionals, healthcare professionals that are biased to treatments and healthcare professionals that withheld information were all barriers to communication[72,74-76,93-96].

***Inadequate. I really felt that most of the time I was driving the understanding research, how to get help, who to get help from, what to do from professionals and that they would sort of. Not explain things like I was intelligent enough to like absorb the information. Yeah, and and therefore would miss things out and and not give me full picture.***
***Participant 087_2023AUENM***

**Summary of PEEK results**

Positive communication

- Two way, supportive and comprehensive conversations

Negative communication

- Lack of knowledge about condition
- Lack of time in appointments
- Dismissive, one way conversations
- Lack of coordinated care and follow up

**Summary of literature**

Positive communication

- Proactive patients learning about condition
- Healthcare professionals that are open and freely give information
- Healthcare professionals that are confident and reassuring

Negative communication

- Distrust of healthcare providers or healthcare system
- Healthcare professionals with inadequate knowledge of condition
- Embarrassment
- Healthcare professionals make assumptions about patient needs/preferences
- Feeling that healthcare professional does not believe in patient symptoms
- Feeling judged by healthcare professionals
- Healthcare professionals that are biased to treatments
- Healthcare professionals that withhold information

**Expectations of future communication**

***Yes, I would like them not to Google the condition when you sit in front of them. Maybe if they if, just say, 'Look, I don't know this condition. I've not heard of it. But let me do some investigation and then I'll inform myself' But at the moment, most of the time, the parents or myself, even we go into a doctor and I've never heard that and they Google it in front of you. So if they're Googling you, what chance have we got?***
***Participant 025_2023AUDPA***

In this PEEK study, participants wanted future communication to include healthcare professionals with better understanding of condition, more empathy, more transparent and forthcoming, for healthcare professionals will listen to patient, and to have a multidisciplinary and coordinated approach

Similarly, in other studies, people with rare diseases described their expectations or priorities for future healthcare professional communication. They described wanting a single point of communication to answer any questions they may have, more time in appointments, regular follow up, coordinated care, and that healthcare providers have empathy and kindness, help build trust between patient and provider, and work as a team with patient and family[72,96,97,143].

| **Summary of PEEK results** | **Summary of literature** |
|---|---|
| Future communication<br>• Healthcare professionals with better understanding of condition<br>• More empathy<br>• Communication will be more transparent and forthcoming<br>• Healthcare professionals will listen to patient<br>• Multidisciplinary and coordinated approach | Communication<br>• Single point of contact<br>• Coordinated care<br>• Empathy, trust and kindness<br>• Adequate time<br>• Regular follow up<br>• Work as team with patient and family |

**Care coordination**

***I guess as an overall picture, I would love some kind of coordination because 22Q is so broad and affects so many different aspects of the body. And you know, we say all these individual specialists separately, but none of them talk to each other. That lack of communication is pretty major…And I'm kinda hoping that the new 22Q clinic will help with some aspects of that, but like I said, we haven't quite got that far yet.***
***Participant 021_2023AUDPA***

Parents of children with rare diseases described the barriers they faced in accessing specialist doctors, allied health, education and social support services. Sometimes the barriers were caused by not having a formal diagnosis, without a formal diagnosis they were not eligible for aid, though, some found that secondary diagnosis for example attention deficit hyperactivity disorder, or autism spectrum disorder allowed them to access services[72]. Others described he barrier of a lack of care-coordination, this led to families not knowing about what services were available[72]. Some described bureaucratic barriers, and having to argue with their doctors to get referrals[72].

People with rare diseases have described the difficulties in managing their condition in the healthcare system, and as a consequence have become their own health experts with unique knowledge about symptoms [93,94]. For some, self-advocating for their healthcare needs is a necessity, and adopt strategies such as preparing for medical appointments with questions and being assertive during medical appointments. [125,144]. Communication and collaboration with healthcare professionals was measured in this PEEK study by the Care Coordination questionnaire[145]. The participants in this study experienced good quality of care, and average coordination of care. They had a moderate ability to navigate the healthcare system, and experienced moderate communication from healthcare professionals.

**Summary of PEEK results**

Care coordination

- Moderate communication with healthcare professionals
- Moderate navigation of the healthcare system.
- Participants scored rated their care coordination as moderate.
- Participants rated their quality of care as good.

**Summary of literature**

Care coordination barriers

- Lack of formal diagnosis
- Lack of knowledge about available services
- Bureaucracy

Care coordination facilitator

- Having a secondary diagnosis when no formal diagnosis is given
- Patient becomes own health expert
- Being prepared and assertive in medical appointments

## Care and support

### Care and support

***No, I couldn't. The hardest thing is I couldn't get any support because I had no diagnosis. You know, and that's like I spoke to the NDIS the other day. And they don't even have pageants on their thing because it's for older people so, and because I'm only 51, they put me under osteoarthritis or something like that. So I've got some stuff I've got a doctor to fill out, and I've got some stuff I've got to fill out and everything like that to actually send it off to them. But until I got diagnosed, I couldn't get any help from anybody. Participant 014_2023AUORC***

In other studies, people with rare diseases described their support needs, including practical, psychological, social, information, financial, and healthcare coordination, access to healthcare support [32,125,130,133]. Others described the importance of family and friends for support [146]. People with rare diseases have described the importance of patient groups, often on social media for information and support. [70,109,125] Some described practical information about home care services, financial advice, managing symptoms[6,125,144]. Patient groups and social media were often described in terms of emotional support, allowing people with rare diseases to connect with other people in a similar situation[144]. However, finding the correct support group could be difficult for those with undiagnosed conditions, with having to determine the relevance of information for their condition, though the similarities of symptoms and managing symptoms was helpful[123]

In this PEEK study, a quarter of participants described not receiving any support, and more than 10% described the challenges they faced in accessing support. Others described getting support from the hospital or clinical setting, from family and friends, charities and other patients. Some described getting support from domestic services or home care.

**Summary of PEEK results**

Experience of care and support

- Did not receive support
- Had challenges accessing support
- Hospital or clinical setting
- Family and friends
- Charities
- Other patients
- Domestic services or home care

**Summary of literature**

Support given

- Patient groups
- Home care services
- Financial advice
- Managing symptoms
- Emotional support
- Family and friends

Support needs

- Practical
- Psychological
- Social
- Information
- Healthcare coordination,
- Access to healthcare support
- Financial

**Expectations for future support**

***The mental health services, I believe we all need them. Like, even if we say we don't like, when I first got diagnosed, I probably would have said no, I don't need that. Then like thinking about it, living with it, like with the diagnosis. And I'm like, yeah, OK, now I feel pretty crappy about myself.***
***Participant 003_2023AUDSK***

Participants in this PEEK study described their expectations for future support. They described wanting more access to support services, wanting access to specialist clinics to talk to healthcare professionals, healthcare professionals with better knowledge of their condition, they wanted care to be multidisciplinary and coordinated and access to peer support.

Other studies people with rare diseases described their expectations or priorities for future support. This included access to emotional and psychological support, access to peer support, and access to services that helped with activities of daily living[8,132,144,147,148].

| **Summary of PEEK results** | **Summary of literature** |
|---|---|
| Expectations of future support<br>• More access to support services<br>• Specialist clinics or services where they can talk to professionals<br>• Multidisciplinary and coordinated approach<br>• Healthcare professionals with more knowledge<br>• Peer support | Expectations of future support<br>• Emotional and psychological support,<br>• Peer support<br>• Support for activities of daily living<br>• Caregiver support |

## Quality of life

**Quality of life**

***Well, it's certainly affected my quality of life because I can't even cook as I enjoy doing or go out for meals and enjoy. I do that, but I don't know what I'm eating. Oh, fatigue, I don't think I've mentioned that, but fatigue has been a big thing in a general way with scleroderma. I get very tired and I, by and large, have a nap almost every afternoon. If I'm sitting at the computer, my head hits the computer because I'm just asleep, really. That's certainly something that's made a difference. What was the question again then? How it has affected me?***
***Participant 012_2023AUDIS***

The majority of participants in this PEEK study described a negative impact on their quality of life, the most common reasons were the emotional strain on family, a reduced capacity for physical activities, reduced social interactions, managing side effects and symptoms, being unable to travel or adapt to travel and the emotional stress on themselves.

Similarly, in other studies, people with rare diseases described negative impacts on their quality of life from the physical limitations it has on activities of daily life and on the ability to be social, the restrictions it places on the ability to travel, take holidays, or enjoy hobbies, and the emotional stress that it places on themselves and close family members[43,83,107,125,149,150]. In addition, people with rare diseases described the impact that symptoms such as pain have on quality of life, as well as frequent illness, communication problems, loss of autonomy, feelings of hopelessness and loss of control, and having to rely on others[66,70,71,84,99,115,133,146]. Others described that their quality of life was affected because of the stigma of having a rare disease, their body image, feelings of frustration about the unfairness of having condition, worry about the future, and the fear of relapses or flare-ups[66,70,71,84,99,115,133,146].

**Summary of PEEK results**

Quality of life

- 63% had an overall negative impact on quality of life
- The emotional strain on family
- Reduced capacity for physical activities
- Reduced social interactions
- Managing side effects and symptoms
- Unable to travel or adapt to travel
- Emotional stress on self

**Summary of literature**

**Quality of Life**

- Activities of daily living
- Travel restrictions
- Enjoyment of hobbies
- Emotional stress
- Impact on socialising
- Impact of symptoms – pain, motor skills
- Communication problems
- Hopelessness and loss of control
- Having to rely on others
- Stigma
- Body image
- Frustration at unfairness of illness
- Worry about future
- Fear of relapse or flare up

**Activities to maintain general health**

***Well, I if I with the fibromyalgia, I have to sometimes I hit a wall of tiredness. And I just have to have a sleep. So I do if I'm get if I I'm not like that all the time, but when I do get like that. I do. Don't get up and go and have a lay down for an hour or so and I'll get up and I feel better. So that's what I do for myself. If I'm not, you know, unwell, I'll have a I will rest and I my body tells me I need to go and lay down.***
***Participant 88_2023AUENM***

In this PEEK study, people with rare diseases described regular activities they do to maintain both mental and general health. They described consulting a mental health professional, remaining social, making lifestyle changes such as diet and exercise, hobbies, mindfulness and meditation, the importance of family and friends, accepting help and pacing themselves, complying with treatment and being organised and planning ahead.

In other studies, people described ways that they coped with having a rare disease or caring for someone with a rare disease. Some described being informed, organised and planning day to day activities, and having house rules to protect people with immunocompromised conditions[85,146]. Others described the importance of taking care of mental health by seeking help from healthcare professionals or remaining positive and using mindfulness techniques[71,85,97,146]. Some described the importance of enjoying life by getting out and about, or enjoy hobbies, sports and activities[85,146]. Having support from family, support groups and respite carers was an important coping mechanism, as was contributing back to society and helping others[70,84,85,146].

**Summary of PEEK results**

- Activities to cope with rare disease
- Consult a mental health professional
- Remaining social, lifestyle changes and hobbies
- Mindfulness and meditation
- Importance of family and friends
- Exercise
- Self care; rest, accept help and pacing
- Complying with treatment
- Healthy diet
- Being organised and planning ahead

**Summary of literature**

Activities to cope with rare disease

- Day to day planning
- House rules to protect immunocompromised child
- Keep informed/seek information
- Seek counselling/Take care of mental health
- Positive attitude and mindfulness
- Get out and about
- Enjoy hobbies, sports and activities
- Contribute to society and help others
- Join a support group
- Supportive family
- Caregivers get respite carers

**Relationships**

***To some extent it has. But I think now looking back, it's more my mental health that's been affected and and affects the social interactions. But I mean, you know, not I wouldn't say or like greatly because our friends, our close friends and family understand and we've educated them about it and stuff. So they're pretty accepting.***
***Participant 14_2023AUDPA***

In this PEEK study, participants most commonly described that having a rare disease had a negative impact on their relationships. This was from people not knowing what to say or do and withdrawing from relationships, the dynamics of relationships changing due to anxiety, exacerbations and/or physical limitations of condition, and social isolation. When participants described a positive impact, this was from family relationships being strengthened, and people that were well-meaning and supportive.

In other studies, people with rare diseases described negative impacts on relationships. Some described difficulties in forming romantic relationships, others the negative impact on intimate relationships[71,146]. The impact on the primary caregiver was difficult and in some cases led to divorce or separation, it also has a negative impact on other family members, in particular healthy siblings, and flare-ups or treatments can be disruptive to family life [84,115]. Friendships and the ability to socialise can be difficult, other people do not want to talk about health conditions, especially if embarrassing, some described difficulties in making friends and described experiencing teasing and bullying[71,99,146]

**Summary of PEEK results**

Impact on relationships

- 44% described an overall negative impact on relationships
- 9% described an overall positive impact on relationships

Negative impact

- People not knowing what to say or do and withdrawing from relationships
- Dynamics of relationships changing due to anxiety, exacerbations and/or physical limitations of condition
- Social isolation

Positive impact

- Family relationships being strengthened
- Well-meaning and supportive

**Summary of literature**

Relationships

- Not forming romantic relationships
- Divorce and separation
- Impact on intimate relationships.
- Impact on relationship with family member who is caregiver
- Negative impact on siblings
- Flare-ups and having treatments disruptive to family life
  People don't want to talk about diseases
- Want others to see past their condition but are often treated differently
- Affect on ability to make and maintain friendships
- Impact on social life
- Experienced teasing and bullying

**Burden on family**

***No, the system's a burden, my son. Is not a burden. The system every. Every corner of the system is a burden. No, absolutely not. What I say my son is a burden or or or charged in terms of burden. It's the system, it's the hurdles, it's the challenges, it's the inner, it's the gap, you know, it's the lack of services, it's everything is. It's like a research. It's lack of experts. All of those are, you know, what makes having CHARGE syndrome a burden on my family.***
***Participant 28_2023AUORC***

In this PEEK study, participants described that the rare disease was a burden on family because of the extra household duties and responsibilities that their family must take on, the extra assistance needed to get to appointments, and the emotional strain it placed on their family.

In other studies, people with rare diseases discussed the burden on their family, in particular feeling guilty and wanting their family members to have a break from being a carer and time to be just family[146]. Parents of children with rare disease described burden in terms of not meeting the needs of other family members, especially when child with rare diseases is hospitalised [85].

| Summary of PEEK results | Summary of literature |
|---|---|
| Burden<br>• The extra household duties and responsibilities that their family must take on<br>• Extra assistance needed getting to appointments<br>• Emotional strain placed on their family | Burden<br>• Guilty about family needing to be carer<br>• Caregiver not meeting needs of other family members |

**Anxiety associated with condition**

The rates of depression and anxiety are higher in people with chronic conditions compared to the general population. In a meta-analysis of 20 qualitative studies, it was reported that people with chronic conditions experienced anxiety or depression as either as independent of their chronic condition or as a result of, or inter-related with the chronic disease, usually however, anxiety and depression develops as a consequence of being diagnosed with a chronic disease[151].

In this PEEK study, anxiety associated with breast cancer was measured by the fear of progression questionnaire[152]. On average participants in this PEEK study had a moderate fear of progression, they were most concerned that at some point in time will no longer be able to pursue hobbies because of illness. In other studies, people with rare diseases described the fear and anxiety that they have about their condition. The fear of the condition getting worse and the implications that will have on the ability to lead a normal or independent life, as well as contributing to feelings of depression

In other studies, people wih rare diseases described aspects of rare diseases that caused them anxiety, this included having dependency on others, limitations for daily activities, limitations for social interactions, side effects of treatment, and for caregivers, they described being stressed in general and about the shortened life of their child[34,99,146,153].

| Summary of PEEK results | Summary of literature |
|---|---|
| Anxiety associated with condition<br>• Moderate fear of progression<br>• Often concerned that at some point in time will no longer be able to pursue hobbies because of illness | Anxiety associated with condition<br>• High levels of caregiver stress<br>• Dependency on others<br>• Limitations for daily activities<br>• Limitations for social interactions<br>• Shortened lives<br>• Side effects of treatment |

**Characterisation**

In this PEEK study, a total of 407 participants with rare diseases or carers to people with rare diseases were recruited into the study. The majority of participants lived in major cities, they lived in all levels of economic advantage. Most of the of participants identified as Caucasian/white, aged mostly between 35 and 64. Half of the participants had completed some university, and most were employed either full time or part time. Almost half of the participants were carers to family members or spouses.

Physical health interfered with work and other activities for participants in this study, they had poor energy levels and poor general health.

This is a group that had health conditions other than their condition to deal with, most often anxiety, sleep problems, and chronic pain.

Most participants sought medical attention after noticing symptoms and were diagnosed after their a complex pathway involving a number of specialists.

This is a cohort that was diagnosed by a specialist at a specialist clinic or in hospital. The majority did not have any out of pocket expenses at diagnosis, however, for those that did have out of pocket expenses it was a moderately significant burden.
This is a group that did not have enough emotional support at the time of diagnosis. This is a cohort that did not have conversations about biomarker/genomic/gene testing, though are interested in these types of tests.

This is a study cohort that had no or limited knowledge about their condition before they were diagnosed. This patient population that had uncertainty about their prognosis, or described their prognosis in terms of symptoms and function or changes in symptoms and function.

This is a patient population that had no discussions about treatment or were given multiple treatment options. Some participated in decision making but others were told what to do without discussion.

This is a study cohort that took into account side effects and efficacy as part of many considerations when making decisions about treatment.

Within this patient population, about half of the participants had changed decision making over time, this was linked to being more informed and assertive.

When asked about their personal goals of treatment or care participants most commonly described wanting quality of life or return to normality.

This is a group who felt they were mostly treated with respect throughout their experience.

Approximately two-thirds of this cohort had private health insurance, half were public patients treated in mostly in the public hospital system. This is a group that did not have trouble paying for healthcare appointments, prescriptions, and paying for basic essentials. Their monthly expenses due to their condition were somewhat of a burden.

Participants in this study had to quit, reduce hours, or take leave from work. Carers and family did not have to change employment status. The loss of family income was a burden.

Participants on average used one allied health service, one complementary therapy and made one lifestyle change.

More than a third had conversations about clinical trials, and the majority would take part in a clinical trial if there was a suitable one for them.

This is a patient population that described mild side effects using an example such as fatigue and as those which can be self-managed and do not interfere with daily life.

This is a study cohort that described severe side effects as symptoms such as pain, they also described severe side effects as those that impact everyday life and the ability to conduct activities of daily living.

This is a patient population which described adhering to treatments according to the advice or their doctor or that they would stick with it for 2 to 3 months. This is a study cohort that needed to see physical signs disappear to feel that treatment is working as well. If treatment did work, it would allow them to return to everyday activities

Participants in this study had very good knowledge about their condition, were average at coping with their condition, were good at recognizing and managing symptoms, and were very good at adhering to treatment.

Participants were given information about treatment options, disease management and , disease cause from health care professionals, and searched for the same topics most often. This is a group who accessed information from non-profit, charity or patient organisations most often.

This is a patient population that access information primarily through the internet, Facebook or social media, and from health charities.

This is a study cohort that found information from other people's experience to be helpful, and that no information was unhelpful.

This is a group that preferred online information, or talking to someone. This is a study cohort that generally felt most receptive to information from the beginning, at diagnosis.

Most participants described receiving an overall positive experience with health professional communication (some with a few exceptions) which was holistic, two way and comprehensive. For those that had a negative experience it was mostly because their healthcare professionals had a lack of knowledge about their condition.

The participants in this study experienced good quality of care, and average coordination of care. They had a moderate ability to navigate the healthcare system, and experienced moderate communication from healthcare professionals.

This is a patient population that did not have any formal support or found support in the clinical setting or from family and friends.

This is a patient population that experienced a negative impact on quality of life largely due to emotional strain on family, and changes to relationships.

Life was a little distressing for this group, due to having a rare disease

This is a study cohort that experienced at least some impact on their mental health and to maintain their mental health they used coping strategies such as consulting a mental health professional or remaining social, lifestyle changes and hobbies.

Within this patient population, participants described the importance of self-care, and complying with treatment in order to maintain their general health.

Participants in this study had felt vulnerable when having sensitive discussion about their condition. To manage vulnerability, they used self help methods such as resilience, acceptance and staying positive.

This cohort most commonly felt there was an overall negative impact on their relationships, due to people withdrawing from relationships or not knowing what to say.

Participants felt they were a burden on their family, due the extra household duties and responsibilities that their family must take on.

Most participants felt there was some cost burden which was from the costs of taking time off work and from the cost of treatments.

The participants in this PEEK study had moderate levels of anxiety in relation to their condition.

Participants would like future treatments to be more affordable, and more effective.

This is a study cohort that would like information to be more accessible and to provide more information about disease trajectory.

Participants in this study would like future communication to include health professionals with a better knowledge of their condition, and for more empathy.

Participants would like future treatments to include access to appropriate real-world support services.

This patient population was grateful for healthcare staff, including access to specialists.

Participants' message to decision-makers was the need for timely and equitable access to support, care and treatment

This is a patient population that wished had been more assertive, been an advocate, more informed and asked questions.

The aspect of care or treatment that participants in this study would most like to change is to accessed their specialist sooner, however, many wouldn't change any aspect of their treatment or care.

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