

The impact of fibrodysplasia ossificans progressiva on patients and their family members: plain language summary of the results from an international burden of illness survey

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Summary

How to say...

What is this article about?

Fibrodysplasia ossificans progressiva (also known as FOP) is a very rare genetic condition. In FOP, bone forms in places where it would not normally, such as muscles, tendons, and ligaments. This leads to **loss of movement** over time for people with FOP. Currently, there is very little information on the relationship between the **physical impact**, **quality of life** impact, and **economic** impact of the condition on people with FOP and their families.

- **Fibrodysplasia ossificans progressiva:**
Fy-broh-dis-PLAY-zee-uh AH-sih-fuh-kans proh-GRES-eev-uh

What was done?

To address this gap, the first international FOP burden of illness survey was done between January 18 and April 30, 2021. People with FOP, referred to as the 'patient' population, and their family members took part in the online survey. This was available across 15 countries and in 11 languages. Researchers used multiple **assessments** to measure patients' movement and ability to carry out **daily activities**, **quality of life** for patients and family members, use of adaptive tools (also commonly referred to as **living adaptations**) by patients, and the impact of FOP on employment for patients and family members.

What were the results?

The survey received 463 responses in total (219 patients and 244 family members). The results show that older patients have greater **loss of movement** than younger patients, and this can have a negative impact on their **quality of life**. Also, as movement and the ability to carry out **daily activities** become more difficult, patients tend to rely on more **living adaptations**. There is also a negative impact of FOP on employment decisions. As a result, FOP may have a large financial impact that is highest for older patients and their families. There may also be a large financial impact on healthcare systems.

What do the results mean?

The results of this survey provide valuable information that can be used to improve care, resources, and support for people with FOP and their family members.

To view a glossary of terms used in this summary, please go to the final page of this article

Who is this article for?

This article is intended to help people with FOP, their family members and caregivers, and any individuals or groups that support people with FOP, to understand the findings of the FOP burden of illness survey. Healthcare professionals may also find this summary beneficial, particularly those who may provide care to people with FOP in their clinical practice. Patient organizations and policymakers may use this information to spread awareness of the impact of FOP and to ensure enough support is available for people with FOP and their family members.

Where can I find the original article on which this summary is based?

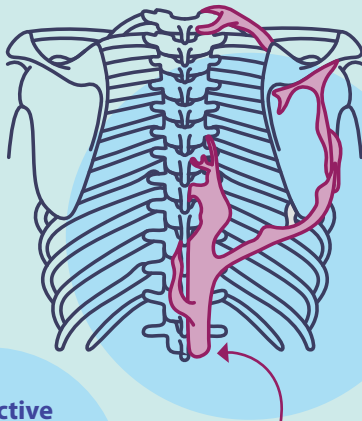
You can read the original article published in the journal *Expert Review of Pharmacoeconomics & Outcomes Research* for free at: <https://www.tandfonline.com/doi/full/10.1080/14737167.2022.2115360>.

What is FOP?

FOP is a very rare genetic condition that is estimated to affect around 1 in every 1,000,000 people. In FOP, bone forms in soft, **connective tissues** throughout the body where it would not normally, such as muscles, tendons, and ligaments.

Rib cage

Skeleton



New bone growth

Connective tissues provide support to the body and its organs and help maintain the body's form.

The formation of extra bone in areas of the body where it does not normally exist can lead to severe **loss of movement**. People with FOP may experience problems moving their joints, including their knees, hips, wrists, ankles, neck, shoulders, elbows, and/or jaw. This can make completing **daily activities** very challenging.

People with FOP are also at increased risk of breaking bones, head injuries, digestive issues, hearing loss, pain, and severe weight loss.

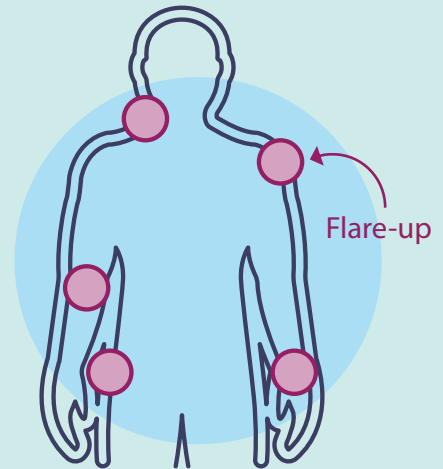


FOP is an inherited genetic condition, meaning that a person with FOP has the condition from birth. In 97% of cases, FOP is caused by the same change in a **gene** called *ACVR1*. A gene is a section of DNA that contains instructions for how to make a biological substance, such as a protein. The *ACVR1* gene controls the growth and development of bones.



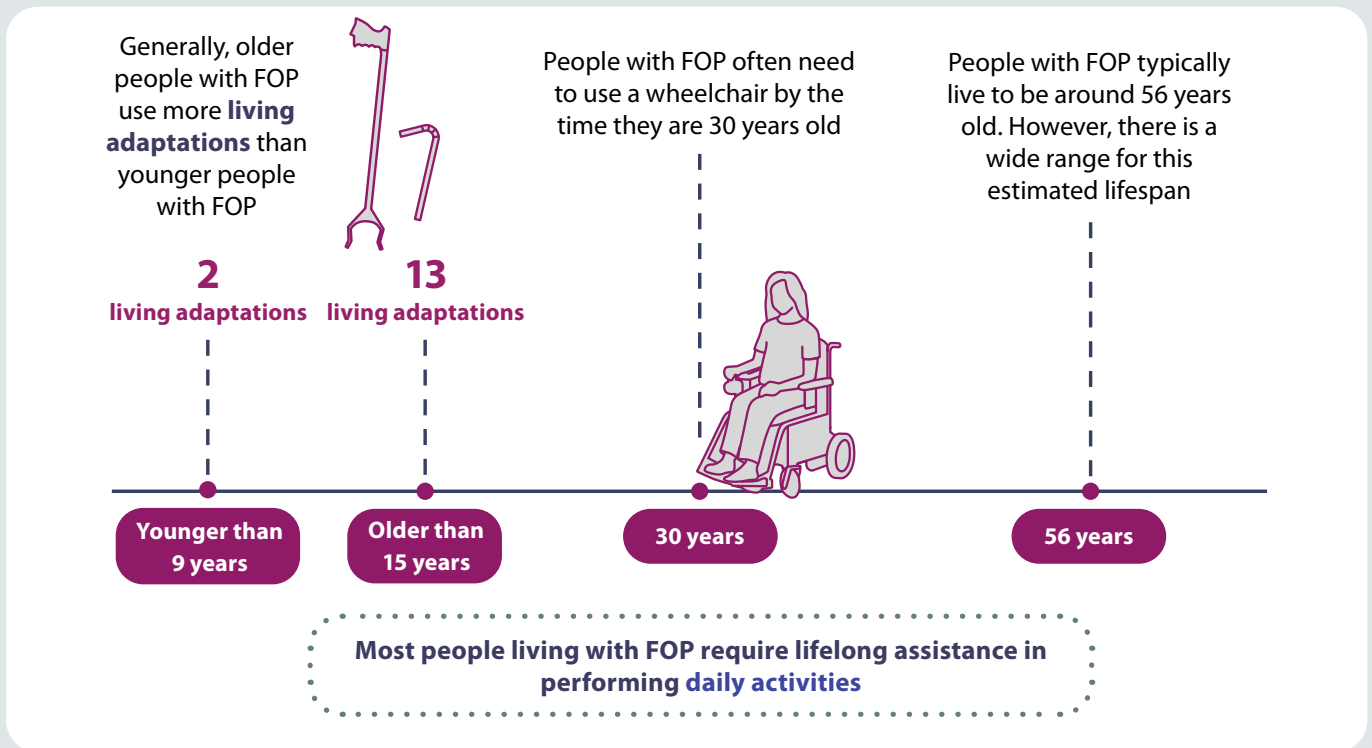
People with FOP sometimes experience **flare-ups** which can cause swelling, pain, decreased movement, stiffness, and/or warmth in their soft tissues.

Flare-ups can develop unexpectedly or can be caused by muscles becoming tired, small injuries, falls, injections, or a virus, such as the flu. Some flare-ups may lead to new bone growth that is permanent. However, new bone growth can also occur without flare-up symptoms.



Information on this page comes from resources that can be found on the International FOP Association (IFOPA) website: www.ifopa.org.

How does FOP impact people at different ages?



What is a burden of illness survey?

Burden of illness surveys are valuable tools for understanding the complex impact of a health condition. Assessing the “burden” of an illness can provide a picture of the challenges of living with a condition. Burden of illness surveys help researchers, healthcare professionals, and policymakers understand the impact of a condition from multiple points of view.

Why was this survey needed?

For most people with FOP around the world, there are no approved medications aimed at preventing or reducing the extra bone growth they experience over time. Care for people with FOP centers around preventing the condition from getting worse by protecting the person with FOP from experiencing trauma to their body. This may include avoiding certain activities, managing symptoms, and helping with **daily activities**. Therefore, understanding the supportive care that people with FOP need is key to improving health and wellbeing by providing solutions that address specific unmet needs.

Family members and caregivers are also affected by FOP, but this impact is not well understood. FOP is a lifelong condition with symptoms usually beginning in childhood and changing with increasing age and disability. Understanding how FOP impacts family members and caregivers is extremely important to make sure they receive appropriate support.

This FOP burden of illness survey is the first international study to explore the **physical, quality of life, and economic** impacts of FOP on people with the condition and their family members.

Information on this page comes from resources that can be found on the International FOP Association (IFOPA) website: www.ifopa.org.

How was this survey created?

The FOP burden of illness survey was co-created by FOP community advisors and a team of researchers. The international FOP community was key to spreading the word about the survey through FOP community advisors' personal outreach and FOP organizations. Specifically, the **International FOP Association (IFOPA)** and the following national FOP organizations helped to find survey participants: Fundación FOP (Argentina), FOP Brasil (Brazil), Canadian FOP Network, FOP France, FOP eV (Germany), FOP Italia Onlus (Italy), J-FOP (Japan), FOP Mexico, FOP Polska (Poland), FOP Russia, Korean FOP Overcome Family (KFOPOF; South Korea [Republic of Korea]), Asociación Española de Fibrodisplasia Osificante Progresiva (AEFOP; Spain), Svenska FOP-föreningen (Sweden; members from Sweden, Norway, Denmark, and Finland), and FOP Friends (United Kingdom).

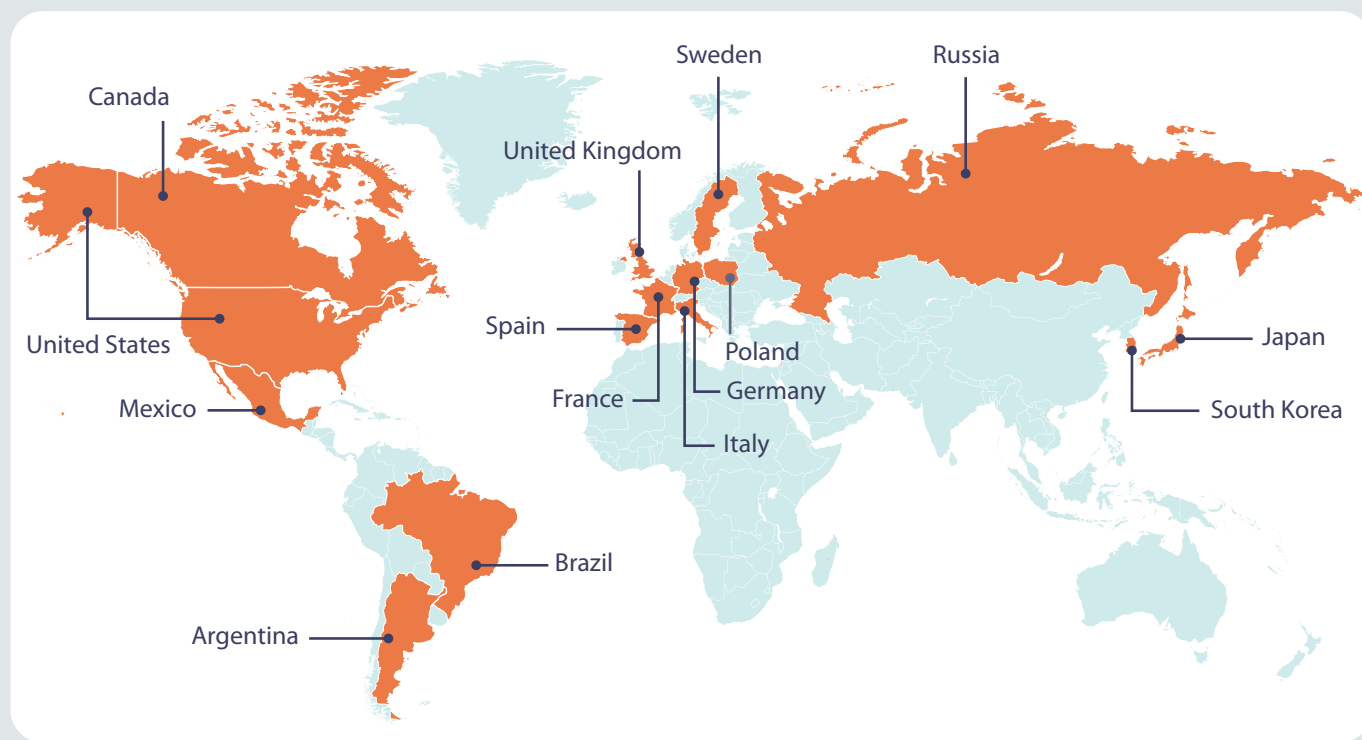
International FOP Association (IFOPA): The IFOPA is an international organization that funds research, provides education and support programs, and raises awareness of FOP.

Who took part in the survey?

The survey was available on an online platform across **15 countries** and in **11 languages** (English, French, Italian, German, Japanese, Korean, Polish, Portuguese, Russian, Spanish, and Swedish).



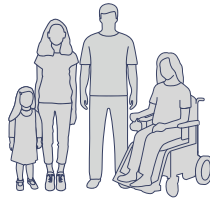
The survey was available from **January 18 to April 30, 2021**. Therefore, survey completion overlapped with the coronavirus (COVID-19) pandemic, which may have influenced the results.



People who took part in the survey:

People with FOP of any age (referred to as the 'patient' population)

- For people with FOP aged younger than 13 years, the survey was completed by a family member on their behalf



A **primary caregiver** is a family member who reported that they were the main person caring for the person with FOP.

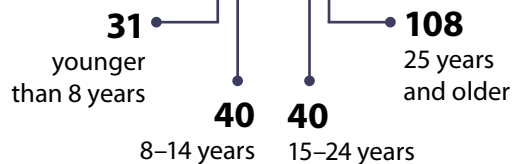
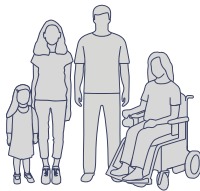
Family members of people with FOP (parents/legal guardians, siblings, and **primary caregivers**) aged 18 years and older

- Primary caregivers were asked to answer additional, specific survey questions. Importantly, the FOP community provided feedback after the survey was completed that, in some households, family members may share caregiving responsibilities. Therefore, asking just one family member to answer these additional 'primary caregiver' questions may have been difficult for some families



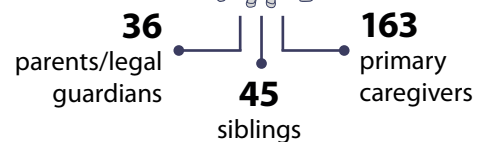
463 survey responses

219 patients



The average age of patients was **24 years old**

244 family members



The average age of family members was **47 years old**

For primary caregivers specifically, the average age was 49 years old and 85% identified as female

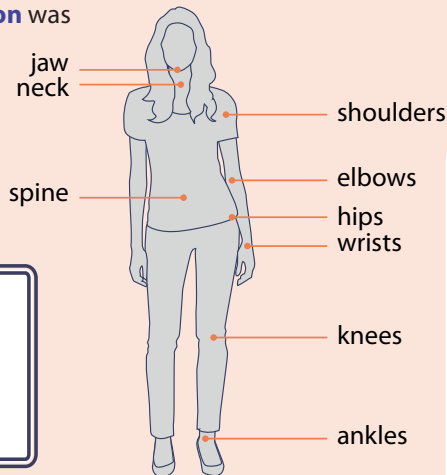
What were the overall survey results?



Physical impact of FOP on patients

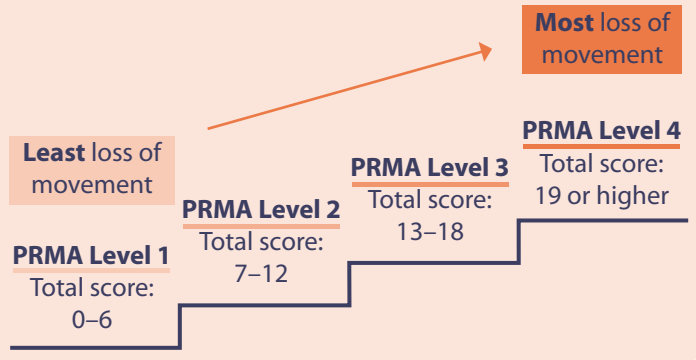
Patient-Reported Mobility Assessment (PRMA): measures the ability of people with FOP to move their joints

- Completed by all patients (219 patients)
- Total scores ranged from 0 to 30, with **higher scores representing more loss of movement**
- Total scores were grouped into four levels, with Level 1 representing **least** loss of movement and Level 4 representing **most** loss of movement
- **Range of motion** was assessed across the following joints/body regions:

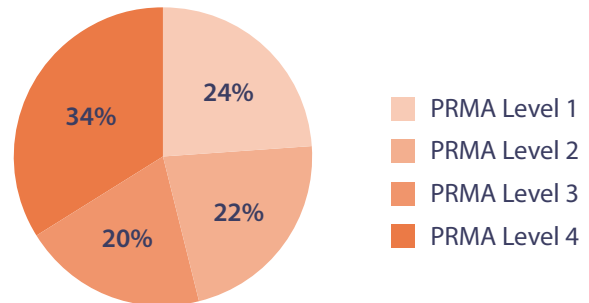


Range of motion:

The amount a person can move a part of their body.

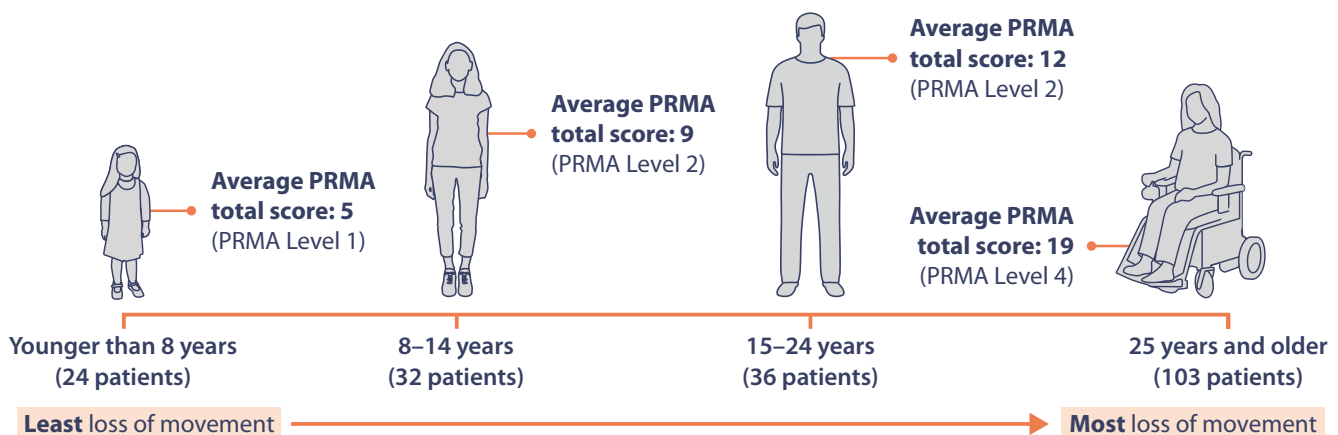


- Around one-third (**34%**) of patients had the **most severe** loss of movement (PRMA Level 4)



- **Loss of movement became more severe with each increasing age group**

- On average, patients younger than 8 years old had the least severe loss of movement (PRMA Level 1)
- On average, patients aged 25 years and older had the most severe loss of movement (PRMA Level 4)



- The researchers also assessed patients' abilities to carry out **daily activities** using another questionnaire called the FOP Physical Function Questionnaire (FOP-PFQ). Through this and the PRMA, they found that as ability to move decreased, ability to carry out daily activities decreased as well



Impact of FOP on patients' and family members' quality of life

EuroQoL health-related quality of life questionnaire (EQ-5D-5L): measures health-related **quality of life**

- Completed by:
 - Patients aged 13 years and older
 - Family members
- Responses to questions were converted into a single index score ranging from 0 to 1, with 1 representing full health



- Questions are related to:



Self-care



Anxiety/
depression



Mobility

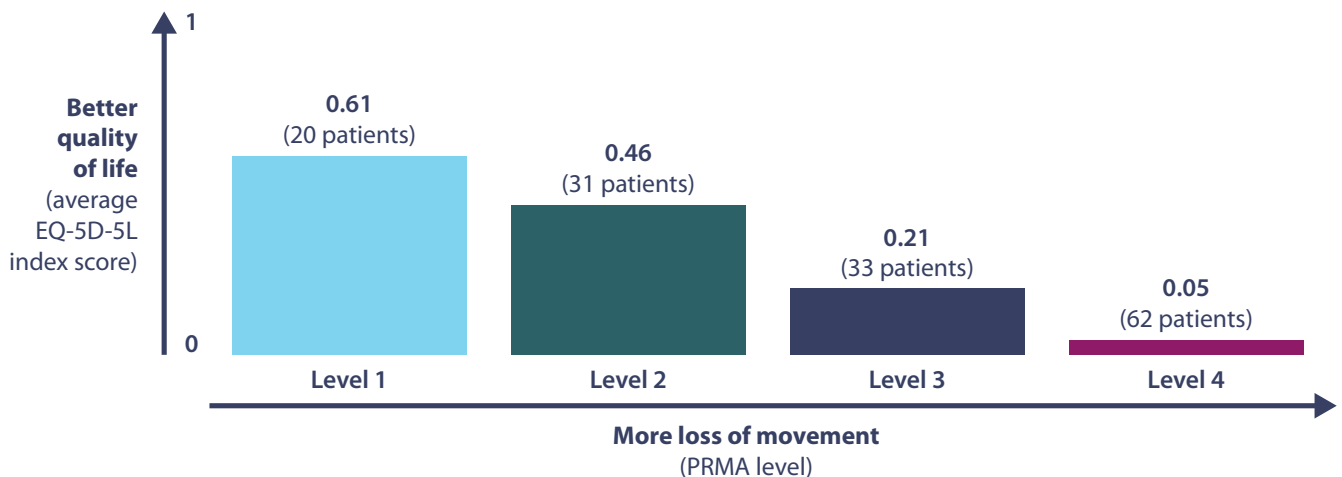


Usual
activities



Pain/
discomfort

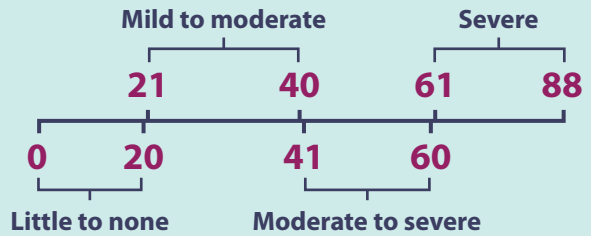
- Patients who had **more loss of movement** tended to report **worse quality of life**
 - Patients with the **least** loss of movement (PRMA Level 1) had an average EQ-5D-5L index score of **0.61**, which is around **halfway between** the best and worst possible **quality of life** scores
 - Patients with the **most** loss of movement (PRMA Level 4) had an average EQ-5D-5L index score of **0.05**, which is a **very low quality of life** score



- Loss of movement** of the patient with FOP did not appear to affect the related **family members' or primary caregivers' quality of life**
 - Family members had an average EQ-5D-5L index score of **0.85**
 - Primary caregivers had an average EQ-5D-5L index score of **0.83**
- The researchers also assessed **quality of life** using another questionnaire called the Patient-Reported Outcomes Measurement Information System (PROMIS). This assessment found similar links between loss of movement and quality of life for patients

Zarit Burden Interview (ZBI): measures health and/or mental wellbeing

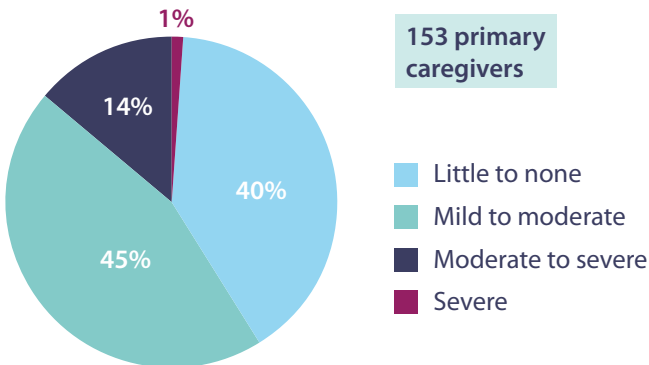
- Completed by family members acting as the primary caregiver for a person with FOP
- Total scores ranged from 0 to 88 and were grouped by level of impact: severe, moderate to severe, mild to moderate, and little to none



- Overall, close to half (**45%**) of primary caregivers reported a **mild to moderate impact** of caring for their family member with FOP on their health and/or mental wellbeing
 - Fewer primary caregivers (**40%**) reported little to no impact

- When the results were analyzed based on the age of the patient being cared for:
 - More than half of primary caregivers (**57%**) caring for a patient younger than 8 years old reported a mild to moderate impact on their health and/or mental wellbeing
 - More than half of primary caregivers (**58%**) caring for a patient aged 25 years and older reported little to no impact
 - This finding may be explained by resilience. This is the ability to recover and adapt from challenging experiences, through learning and support from the FOP community over time. More research into this topic is needed

Impact of FOP on the health and/or mental wellbeing of primary caregivers



Example questions

- Do you feel stressed between caring for your relative and trying to meet other responsibilities for your family or work?
- Do you feel that because of the time that you spend with your relative that you don't have enough time for yourself?

Emotional and social impact questionnaire: assesses stress, worries/concerns, and personal activities and relationships

- Completed by all family members (244 family members)
- FOP-specific, designed for this survey

- The questionnaire showed that of family members:
 - **85%** found it very/extremely stressful when their family member (the patient with FOP) had a flare-up
 - **68%** were often/always worried that the patient with FOP may hurt themselves

- Socially, most family members (**73%**) thought that caring for the patient with FOP had little to no negative impact on their social interactions
- On average, family members spent **8 hours per day** providing care or support. They most often reported the following activities as those for which they 'always' assisted their family member with FOP:



Shopping (41%)



Dressing (44%)



Leaving the house (39%)



Preparing/cooking meals (49%)



Bathing/showering (48%)

Example questions

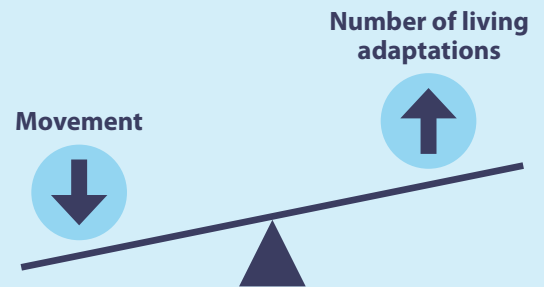
- How stressful are the challenges of FOP to you?
- How stressful is it when your family member with FOP has a flare-up?



Economic impact of FOP on patients and family members

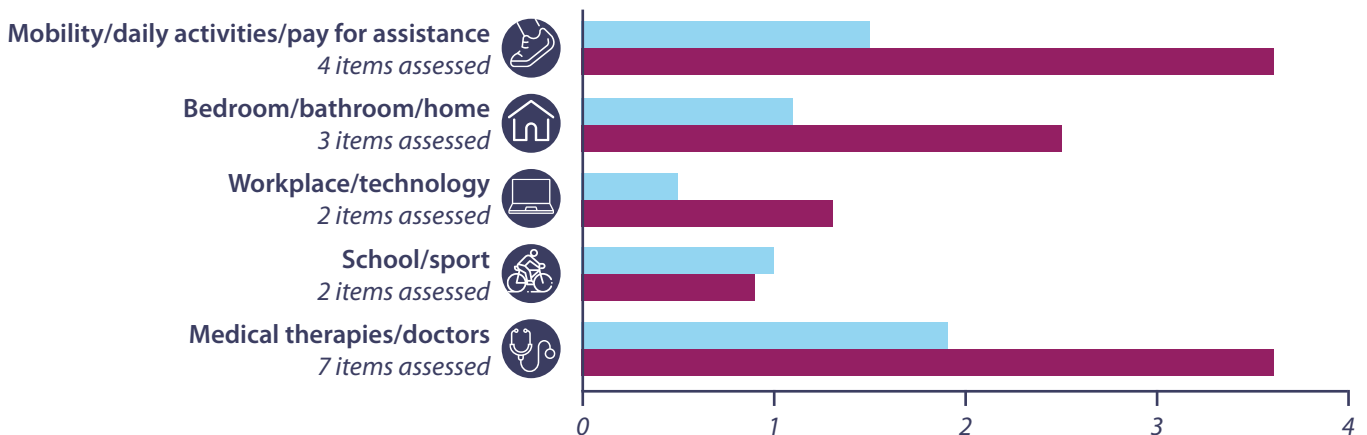
Living adaptations

- A questionnaire developed specifically for this survey was used to understand the everyday use of **living adaptations** by people with FOP
 - Examples include canes, hearing aids, reaching sticks, and wheelchair ramps
- Patients who had **more loss of movement** tended to use **more living adaptations**
- 97%** of patients with the **most severe loss of movement** reported needing **living adaptations** to assist with **daily activities**



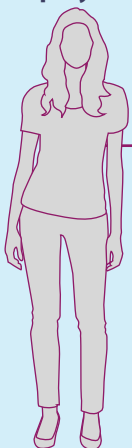
Average number of living adaptations used by patients

■ **Least** loss of movement (45 patients) ■ **Most** loss of movement (64 patients)



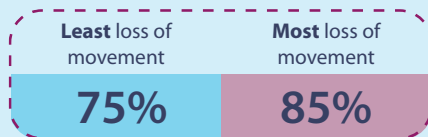
Please refer to the original article for detailed information on the types of items in each category of living adaptation.

Employment



Out of 134 patients aged 18 years and older, **83%** felt that FOP had impacted their career decisions

More patients with **greater loss of movement** reported an **impact on career decisions**



Out of 156 primary caregivers, **51%** felt that they needed to change their career in some way to look after their family member with FOP

Future research into how primary caregivers' careers are impacted by FOP is needed



What do the results of this survey mean?

- This survey collected detailed information on the **physical, quality of life**, and **economic** impacts of FOP on people with the condition and their family members. These findings greatly increase our understanding of FOP and how it affects people's daily lives
- This survey showed that **loss of movement** caused by FOP may have an extreme, negative impact on patients' **quality of life**. Also, caring for a person with FOP has a mild to moderate impact on primary caregivers' health and/or mental wellbeing overall, particularly for those looking after younger children with FOP
 - Future research into the long-term impact of providing care for people with FOP is needed
- As the ability to move joints and complete **daily activities** decreases, this survey showed that people with FOP tend to need more **living adaptations**
 - This suggests that the financial costs of FOP for individuals and their family members may be greater for older patients
- Finally, this survey showed that FOP has a large impact on career decisions for people with FOP and their family members, which may also have a negative financial cost for individuals, families, and society

What are the strengths of the survey and potential areas for future research?

- The FOP burden of illness survey presents the experiences of a large number of people living with FOP and their family members from around the world
- Including the patient voice in research was key to this study; FOP community advisors played an active role in the development of the survey and in the interpretation of the results
- This survey provides valuable information that can be used to improve care, resources, and support for people with FOP and their family members
- It is important to consider that the survey was not available in every country. Therefore, the survey results may not reflect the experiences of all people with FOP and their family members, particularly those living in **underserved communities**
 - The phrase "underserved communities" refers to any community, whether in a developed or developing region, that does not have the same access to information, diagnosis, specialist care, living adaptations, and/or support from patient organizations as other communities
 - Further research into the impact of FOP in underserved communities is needed
- The survey was only available online, and therefore may not have been accessible to those in the FOP community with limited access to the internet
- This survey asked participants to reflect on their experiences over the past 12 months. As people with FOP experience periods of time in which they have no active symptoms, responses to the survey may not represent a person's overall life experience. Also, the 12-month period the survey captured overlapped with the COVID-19 pandemic. This may have influenced the results, as activities and behaviors reported in the survey may have differed from pre- and post-pandemic patterns

Where can readers find more information on this survey?

The original article discussed in this summary entitled 'The Impact of Fibrodysplasia Ossificans Progressiva (FOP) on Patients and their Family Members: Results from an International Burden of Illness Survey' was published in the journal *Expert Review of Pharmacoeconomics & Outcomes Research*. You can access it in full for free at: <https://www.tandfonline.com/doi/full/10.1080/14737167.2022.2115360>

- Additional information on the FOP burden of illness survey can be found at www.clinicaltrials.gov/show/NCT04665323
- Additional information on FOP and FOP support networks can be found on the IFOPA website: www.ifopa.org

Glossary of terms used in this summary

- **Loss of movement** is a decreased ability to physically move the body freely and easily
- The **physical** impact of FOP is how the condition affects a person's ability to move their body and complete daily activities
- The **quality of life** impact of FOP is how the condition affects the way a person thinks about their own physical and mental health, and their overall wellbeing
- The **economic** impact of FOP includes the financial, day-to-day cost of having FOP and/or providing care for someone with FOP. It also includes the impact of the condition on society as a whole through healthcare costs and loss of employment opportunities
- **Assessments** are the questionnaires used in this survey to gather information on the physical, quality of life, and economic impacts of FOP. Researchers used a mixture of FOP-specific and more general questionnaires to help them compare FOP to other conditions. Most questionnaires included in the survey had been used in previous research. Others were developed specifically for this survey
- **Daily activities** are the actions that a person carries out in their everyday lives. These may include dressing, showering/bathing, eating, and walking. In this survey, the ability to carry out these activities without help from anyone (such as a family member) or anything (such as a wheelchair) was assessed
- **Living adaptations** are the changes that help people with FOP carry out daily activities. They include tools, objects, and/or devices (such as hearing aids and drinking straws), as well as changes to living spaces (such as wheelchair ramps). In this survey, five groups of living adaptations were assessed. These included tools and/or changes for: mobility and completing daily activities (including paid or unpaid assistants who help with these); home; workplace/technology; school/sport; and medical therapies/doctors

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The survey was carried out by Engage Health (Eagan, Minnesota, USA). Translation of the survey was managed by the specialist vendor TransPerfect Life Sciences and validated by local affiliates of the Sponsor.

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