Growing up in a family when one of the parents has or had Huntington disease (HD)

«It makes me so angry, it feels like she doesn’t want to be a mum anymore» (Young person)

«Every day, I dreaded my father coming home from work. The whole atmosphere changed when he was there. I was always so scared, this feeling of not being able to fix things” (Adult, looking back)

Background and status of knowledge

Huntington disease (HD) is a neurodegenerative condition, with a prevalence of 4-12 per 100 000 (Pringsheim et al., 2012), approximately 350 individuals in Norway (Solberg et al., 2018). While the prevalence of HD is low, for every person with HD, there are another 20 people who suffer the consequences of the disease (Hayden et al., 1980). Hence, in Norway, 5-10 000 people may be directly affected by HD, many of them children. The disease is characterised by a triad of gradually declining motor skills, cognitive function, and psychological symptomatology (McColgan and Tabrizi, 2018). There is no effective treatment to stop the disease’s progression, and death occurs 15-17 years after onset. HD is an autosomal dominant disease. Hence, each child has a 50% chance of inheriting the genetic defect (Pringsheim et al. 2012). The average age of onset is 40 years, a time when many adults are having and raise children, but psychological and cognitive symptoms are reported may years prior to the clinical diagnosis (Ghosh and Tabrizi, 2018). HD has devastating consequences for the affected person, but also for the whole family (Røthing et al., 2014), including - and sometimes especially - the patient’s children. Yet, little research has focused on the emotional and psychological experiences of growing up in a family affected by HD.

Huntington disease: Symptoms and characteristics

Motor disturbances (involuntary movements, dystonia, balance and gait disturbance) are the most visible signs of HD, gradually leading to a total loss of function. Less recognised signs of HD, however, are cognitive and psychological symptoms shown to develop 5-10 years earlier (McColgan and Tabrizi, 2018), leading to changes in personality and behaviour.

Cognitive symptoms affect all patients with HD, but with individual variations in manifestation and progress (Ghosh and Tabrizi, 2018). Cognitive dysfunction mainly affects verbal learning and memory, planning and processing speed, visual attention, information integration, and executive functioning (McColgan and Tabrizi, 2018).

Psychiatric and/or psychological symptoms, explained by cerebral and neurobiological dysfunction, affect 30-80%, and are often the most distressing aspect of HD for patients and carers (Ghosh and Tabrizi, 2018). Frequent symptoms are depression and anxiety (Duff et al., 2007; Pla et al., 2014), irritability, aggression, and hostility, potentially leading to physical or verbal abuse (Duff et al., 2007; Ghosh and Tabrizi, 2018), disinhibition, impulsivity, socially awkward behavior, and hyper- or hyposexuality (Duff et al., 2010; Eddy et al, 2016). Apathy, characterised by a general loss of interest and passive behaviour, is also common, and tends to worsen over time (Ghosh and Tabrizi, 2018). Patients may also develop a fixed mindset and obsessive compulsive thoughts and behaviour, related to others or themselves (Duff et al., 2007). Paranoid psychoses have also been described (Ghosh and Tabrizi, 2018). An additional feature is that patients often have reduced or no insight into their problems (Duff et al., 2010; Ghosh and Tabrizi, 2018), and awareness of symptoms decreases as the disease develops.
(Duff et al., 2010). Last, but not least, HD gene carriers and patients seem to be at increased risk for suicide ideation and suicidal behaviour (Solberg et al., 2018; van Duijn et al., 2018).

The impact of Huntington disease on the family

The symptoms described above can lead to overwhelming psychological strains for relatives of those affected by HD (Domaradzki, 2015; Parekh et al., 2018). Children could be particularly vulnerable in this situation. A loss of function, changes in personality and behaviour, or unexpected aggression outbursts and rude verbal statements (Røthing et al., 2014), can be frightening for a child. Further, as the disease progresses, a gradual role reversal takes place between the young person and the affected parent, and the child’s responsibility increases (Kavanaugh, 2014). Children may put their own needs and schoolwork aside, and avoid taking friends home (Sparbel et al., 2008; Røthing et al., 2014; 2015), disturbing the establishment of peer relations and transitions to independence (Forrest Keenan et al., 2007). An additional burden are feelings of shame and embarrassment when being seen with the affected person, due to staring or unkind comments from strangers, motor symptoms commonly being attributed to alcohol intoxication (Ellison, 2017). Hence, growing up with a parent with HD can have a profoundly negative impact on the child’s health, psychological development, education, and social life (Domaradzki, 2015; Ellison, 2017; van Walsem et al., 2017). Yet, most caregiver research has focused on adult and spousal caregiving, and has therefore included mostly adult relatives and few children. Hence, very little research has investigated the emotional impact of this experience seen from the child’s perspective.

Growing up with a neurodegenerative disease in the family can be challenging for a child, and may lead to exposure to adverse childhood experiences, that can be strongly associated with a later development of mood and anxiety disorders, and may also increase the risk for other personal or social difficulties throughout life (Mandelli et al., 2015; Raymond et al., 2018). Still, only one study has investigated this issue in HD, demonstrating that 53% of HD offsprings were exposed to adverse events in childhood or adolescence (van der Meer et al., 2012). Some adverse childhood experiences, such as serious disease or death are unpreventable for HD. Other experiences, on the other hand, such as those associated with parental dysfunction or psychiatric problems in a parent, could be prevented to some extent with timely interventions and adequate support. Evidence-based knowledge about the risk for adverse childhood experiences in children growing up in families affected by HD in Norway is therefore needed. This knowledge would contribute to build awareness about psychological risk in families affected by HD, and inform interventions and adequate support.

The affected person’s closest relatives are usually the first to notice changes. Still, early signs may not necessarily be identified as initial symptoms of HD, which means relatives, and particularly the children, may lack explanations for the changes they observe. Children are sensitive to moods and hidden messages, quick to blame themselves if they lack alternative explanations, and may thus be especially vulnerable during this phase. A lack of knowledge may strengthen the emotional impact of HD. Research should therefore explore how early phases of HD could be used to set support in place for those affected and their families.

In many families, the presence of HD is well-known. In other families, however, older relatives may have been misdiagnosed, death may have occurred before a diagnosis of HD, or the existence of the disease is not mentioned (Ghosh and Tabrizi, 2018), sometimes because of social stigma and shame (Ellison, 2017; Wexler, 2010), as described by Wexler (2010; p. 18): “I wanted to understand my mother’s shame, and the origins of her devastating silence”.
When HD appears without warning, families have been formed without plans for the future and decisions regarding children have not been discussed in advance within the couple.

Clinical experience shows that even adults who have suffered under a family’s silence about HD, and are aware of the benefits of openness for the child, still find it challenging to address the issue with their own children. An additional challenge that is specific to HD is the ethical dilemma of openness: the advantages of being open and spreading information about HD to local care providers is associated with informing others about the child’s or other family member’s genetic risk status. A Norwegian study showed that caregivers wanted to regulate the dissemination of this information, to protect themselves or other affected family members against the knowledge of potential future challenges, but also from negative social reactions (Røthing et al., 2014; 2015). Currently, no guidelines exist that could support parents and help care providers in finding the difficult balance between disclosure and protection.

A huge additional burden with HD is that young people have a 50% chance of inheriting the disease, and hence to go through what they have seen and experienced regarding HD. Being a young person in a family with HD requires resilience (Ellison, 2017), and we therefore need to investigate how to empower young people in families with HD.

**Lack of knowledge among care providers**

The local healthcare system lacks knowledge about HD, and may not understand the immense impact of the disease on family life (Aubeeluck et al., 2012; van Walsem et al., 2015), leading to an absence of tailored initiatives that can protect the children. Patient narratives illustrate how children of people with HD take over the responsibility for care, without this being captured by the healthcare system. Further, clinical experience shows that affected patients do not see the need for help, due to their reduced insight in their own deficits and competencies, even when they are aware of having HD (Duff et al., 2010), which may create a discrepancy between family members’ and the patient’s narrative of living with HD. In this situation, health care professionals need to find a way of supporting the child, while also facing the patient’s potential denial and lack of awareness of the family’s support needs.

With all the challenges described above, it is vital to have support in place for young people affected by HD. Support services based on concerns specifically related to HD, while also being consistent with national healthcare systems are required. Research is therefore needed that will fill the gap between Norwegian health regulations set in place to protect children in vulnerable situations, and the specific circumstances of children in families affected by HD. It could be argued that the number of people affected by HD is low. However, the psychological strain they go through is considerable, but could be prevented by early interventions and support, as soon as HD has been diagnosed. By reducing the number and the impact of adverse events relatives go through, future health problems may be prevented, with corresponding health-economic consequences.

**Specific aims of the current project**

A PhD project would contribute to enhanced research competence within an under-researched, but clinically important field. Knowledge generated through the project will

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1 «Health professionals should contribute to (...) adequate follow-up of children of patients with psychological (...) or other diseases that put the child at risk due to the parents' condition » (Helsepersonelloven, § 10 a), and "The aim of this regulation (§ 10) is to ensure that children stay in their role as children, and do not take on adult responsibilities when carers are not able to provide adequate parenting» (Barn som pårørende, Helsedirektoratet, 05/2010).
provide the foundation for the development of guidelines to parents and local care providers responsible for the follow-up of families affected by HD, potentially improving current care. More specifically, the aims will be to investigate:

- How do young people and adults describe growing up in a family where one of the parents has/had HD? What are/were their emotional, psychological and everyday experiences? What is/was helpful and supportive for them?

- How were participants informed about the disease and its consequences during childhood? What are their current reflections regarding the balance between openness about the disease and potential wishes to withhold information about genetic risk?

- How many of the participants report events that could be categorised as adverse childhood experiences, and how did they cope with these?

**Methods and design**

**Participants**

The PhD study will be based on a qualitative dataset of approximately 60 interviews. Participants are young people aged 12-18 who live in a family affected by HD (with parental consent for those aged 12-16) and adults who look back on their childhood experiences. The present study would, as far as we know, be the largest prevailing qualitative study with an exclusive emphasis on the child’s experience with HD.

**Preliminary data collection (January – December 2018)**

A recruitment study, funded by the Norwegian National Advisory Unit on Rare Disorders, is currently under progress. So far (May 2018), 38 participants have been recruited (7 young people and 31 adults). A total sample of 60 participants is planned (approximately 15 young people and 45 adults). Recruitment will be completed before December 2018. Participants are recruited through the National Association for HD (Landsforeningen for Huntington sykdom), counsellors at Centre for Rare Disorders, genetic counselling units across the country, and the internet (websites and social media). The large dataset will make it possible to investigate specific subgroups’ perspectives on given issues. Subgroups may be young people vs. adults, those with unknown risk status vs. those who know whether they have inherited the disease, or aspects related to gender (child’s gender or affected parent’s gender).

Participants have also completed quantitative measures of quality of life and mental health (generic and HD-specific for carers; also used during courses run by Centre for Rare Disorders), adding a quantitative perspective to the project. Hence, 80-100 questionnaires will have been collected during 2018 that would be available for analyses.

**Future plans: The PhD study (April 2019 – March 2022)**

Based on the study’s three aims, the PhD project will include three specific studies:

**Study 1:** The first study will investigate participants’ emotional, psychological, and everyday care experiences. The study will also describe participants’ experienced support during their childhood, and their suggestions to health care providers regarding a child’s support needs when a family is affected by HD.

**Study 2:** The second study will explore challenges associated with the communication of HD within families, and with health care professionals responsible for the follow-up of families.
affected by HD. The emotional and psychological consequences of how and when knowledge about HD is delivered during childhood will be explored, in addition to the difficult balance between disclosure (openness and information) and protection (restricting or controlling information about genetic risk status).

**Study 3:** The third study will examine the presence of adverse childhood experiences reported by the participants. Information from the interviews will be used to register events such as psychiatric illness, divorce of parents, physical or emotional violence, alcohol or drug abuse, or parental suicide attempt.

**Inclusion and exclusion criteria**

The ongoing recruitment study shows that older participants are able to look back and contribute with specific, emotionally laden, and vivid memories from their own childhood. Therefore, no age restriction is given for adult participants. Given the genetic specificity of HD, some participants may have inherited the disease, and may have symptoms of HD. Since HD does not affect long-term memory (Ghosh and Tabrizi, 2018), individuals may recall their childhood without major interference from the disease. We believe inclusion of this subgroup is ethically important, and that their contribution may shed a different light on findings. A short screening of insight and awareness of symptoms and life situation is included in the interview guide, in order to evaluate validity. Patients with communication skills or cognitive function indicative of difficulties in participating in in-depth interviews will be excluded.

**Methodology**

The PhD project will be based on qualitative methodology, in accordance with priorities given by user representatives (reference group) during the recruitment study.

**Qualitative component:** A qualitative perspective is perfect for research based on small samples and under-investigated research fields. Qualitative approaches are also exploratory and suitable for the investigation of individual variations, experience-based narratives, and interpersonal relationships. The method is therefore well suited for this particular project.

Individual semi-structured interviews were/will be conducted, focusing on both challenges and protective factors. This allows for an open exploration of the interviewee’s experiences, while the structure helps the interviewer to focus on the issue. Face-to-face interviews have/will be preferred, but telephone interviews are also an option for participants who may favor this option. The interview guide was informed by relevant literature and clinical experience (see attached Interview Guide for details). Broad interview topics include: the childhood narrative and family situation, relationship to parents, the child’s understanding or lack of understanding of HD, openness about the disease, and support experiences. Interviews were/will be recorded, transcribed verbatim, and subjected to thematic analysis, according to the six-step protocol outlined by Braun and Clarke (2006). Interviews require approximately one hour of each participant’s time. The PhD-candidate will have the responsibility for analyses, which will be reviewed also by the research team. Feedback from the analyses will be sent to the reference group and participants as a check of the credibility of the analyses.

**Quantitative component:** As mentioned, quantitative data have been collected that could shed light on the qualitative data. Work with the quantitative data will be performed through collaborations between students and the research team, and lead to additional publications. This work will not involve the PhD candidate directly, and statistical plan or power analyses are therefore not included in this project description. This work will contribute to build an
active research network around the PhD candidate. Quantitative data include the Questionnaire Huntington's Disease Quality of Life Battery for Carers (HDQoL-C; Aubeeluck & Buchanan, 2007), in addition to a generic quality of life measure, the WHOQOL-BREF, a shortened 26 item version of the WHOQOL-100 (WHOQOL Group, 1998).

**Schedule for the completion of the project (April 2019 – March 2022)**

**Blue:** PhD study (funding from Norwegian ExtraFoundation for Health and Rehabilitation)

**Grey:** Collaboration with students and colleagues Centre for Rare Disorders (internal funding)

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<tr>
<th>Pilot</th>
<th>2019</th>
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<th>2021</th>
<th>2022</th>
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<tr>
<td>Ethics</td>
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<td>Advisory group meeting</td>
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<td>Information and recruitment</td>
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<td>Qualitative data analyses (Study 1-3)</td>
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<td>Dissemination of results</td>
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**Ethical perspectives**

Ethical approval was granted for the recruitment study, and further approval will be sought in line with the planned study. Ethical challenges described beneath are primarily related to the preliminary data collection.

When approached for information and written consent, potential participants have/will be given time to consider what they are being asked to do and will be given the opportunity to ask any questions. Participants will be informed that participation is entirely voluntary, that they can withdraw from the project at any time, that their decision of whether or not to participate in the study will not affect the care they receive, and that they will not be personally identified in any subsequent report or journal article. In order to ensure safeguarding, transcriptions and quotes will be anonymised with great care.

Due to the potential emotive topics of the interview (difficult childhood experiences, demanding care situations, hereditary aspects of HD), the interviews have/will be conducted by a clinical psychologist or a psychology student under supervision of a clinical psychologist. Some of the interviews have/may be conducted by telephone, which could potentially reduce the psychologist’s awareness of distress in the participants. Participants will be informed about this issue prior to giving informed consent. In the unlikely event that a participant should become highly distressed, the interview will be stopped, and the participant will be given the opportunity to take a break, or to terminate the interview altogether. So far, no safeguarding issues have been registered. On the contrary, participants have shared that they strongly believe in the importance of this work, and hope their contribution may improve the follow-up service for others in a similar situation.
Participants have/will be offered a follow-up phone call after the interview. This is mentioned at the end of the interview, and participants are told that the interviewer will ask about how they felt after the interview, and whether they have remembered issues or experiences they would like to add. Participants are informed about notes being taken and added to the transcriptions. If needed, subsequent follow-up or relevant referrals are suggested.

Relevance for participants and patient involvement

Relevance for participants: A number of benefits are anticipated for families affected by HD. In addition to children and young people growing up in families with HD, findings will also potentially benefit other family members. Given the genetic specificity of HD, the disease leaves its brand on each generation, grandparents, parents, and children, in addition to siblings across all generations. Hence, many children with non-affected parents grow up with cousins, aunts, or uncles affected by HD. Even if the presence of HD does not affect these children as markedly as those whose parents have HD, clinical experience suggests that the presence of the disease in the larger family system may still lead to emotional and psychological challenges. Additionally, non-affected parents may struggle with the after-effects of their own childhood experiences under the shadow of HD, they may worry and have care responsibility for other affected relatives, or they may feel shame and survivor’s guilt if siblings have inherited the disease (Coustasse et al., 2009). Evidence-based knowledge from the present study would therefore be relevant for many more than the project’s primary target group.

Knowledge from the present study may also inform other similar research areas where children are known to be at emotional and psychological risk, such as families affected by early dementia, other neurologic or degenerative diseases, or alcohol and drug addiction.

This project will provide the opportunity to feed users’ views directly back into the healthcare service, and results will potentially guide and improve provision of care of children who grow up in families with HD. Findings will be discussed and acted upon through the national HD association and the reference group. The project will bring evidence-based awareness into the local system about the situation of a vulnerable group of children and young people. The Centre for Rare Disorders’ national responsibility for the follow-up of this group will contribute to information being more easily disseminated to relevant local support services.

Patient involvement: The study will be run in close collaboration with the National Association for HD. A reference group was set in place during the recruitment study. It includes two user representatives and the HD association’s leader, in order to secure user involvement in all aspects of the study (Sacristán et al., 2016). The same reference group will be involved in all aspects of the PhD study, in order to ensure user participation. Research priorities were discussed with the group, after a preliminary analysis of the available data, and their three top priorities are included in the present application. Collaboration with the reference group and the National Association for HD will ensure that research questions are driven by user-reported priorities. The project has/will also be presented at HD associations’ yearly meetings, in order to include feedback from other members of the association.

Dissemination and communication of results

Academic publications: Findings will be disseminated in the form of at least three academic publications and presentations at national and international conferences. The PhD thesis will include three publications that will be submitted to international peer reviewed journals such as Clinical Genetics, Journal of Huntington Disease, or Orphanet Journal of Rare Diseases:
Paper 1: Growing up under the shadow of Huntington disease: The (adult) child’s perspective and experiences, and suggestions for support.

Paper 2: Communicating information about HD: The difficult balance between openness and the individual’s wish for regulation of information about genetic risk.

Paper 3: Adverse childhood experiences: Implications for psychological and emotional health when growing up in a family affected by HD and for the development of interventions.

Additional publications: Collaborations within the research team and with psychology graduate students interested in the project is expected to lead to two additional publications:

Additional paper 1: Quality of life and psychological health in relatives of patients with HD: A quantitative study investigating background factors such as gender (parent with HD’s gender, and relative’s gender), and age.

Additional paper 2: The impact of adverse childhood experiences on quality of life: A triangulation of quantitative and qualitative data in families affected by HD.

Development of guidelines: Results will inform the development of internet-based guidelines (e-learning course) and information material that will be disseminated into actual local care services, targeting young people growing up in families affected by HD. Guidelines will summarise findings from the present study and educate local care providers about the existence and specific experiences of these young carers. Guidelines will include educational components about HD and how to support young people, and information about available resources. The development of guidelines is scheduled for the last 6-9 months of the PhD project, starting after the submission of the third paper. The aim will be to complete this work before the PhD defense, in order to take advantage of the attention created by this dual work.

Counsellors with clinical experience of HD at Centre for Rare Disorders will take the main responsibility for this work, in collaboration with the centre’s information and communication team and Rare Disorder’s National Communication Services (www.sjelden.no), involving the research team when necessary, and in collaboration with regional genetic counselling services. Anne Kristine Bergem (MD, specialist in clinical psychiatry; Oslo Metropolitan University) will also participate in this work. She has long clinical experience with adults having mental health issues and children as next of kin, has worked in the organisation “Barns Beste” (National Competence network for children as next of kin), and has produced several films, podcasts and e-learning material. She had also written five books on this topic.

National and international collaboration

Project Manager and main supervisor: Kristin Billaud Feragen, Psych. PhD, Research Coordinator at Center for Rare Disorders, will be the main supervisor. She is in charge of all research activity at Centre for Rare Disorders, and the primary investigator of several studies where the impact of a medical diagnosis on psychological health is investigated. She has experience with supervision of several qualitative and quantitative PhD-projects (see CV for details). She has been responsible for and managed all aspects of the recruitment study on which the current application is based (funding, interviews, preliminary analyses).

Co-supervisor (Oslo University Hospital): Marleen van Walsem, Psych. PhD, is a clinical psychologist at the Oslo University Hospital, Dept. of Neurohabilitation, and a guest researcher at University of Oslo, Faculty of Medicine, Department Health and Society. She is
an expert on HD from a neuropsychological and clinical perspective. She finished her PhD “Unmet healthcare needs, health-related quality of life and assistive technology for cognition in Huntington’s disease” in 2017. She has experience with supervision of master students. She is involved in several projects about HD and Traumatic brain injury.

Co-supervisor (Department of Psychology, University of Oslo): Tine K. Jensen, Psych. PhD, is a professor at the University of Oslo, Department of Psychology and a senior researcher at the Norwegian Center on Violence and Traumatic Stress Studies in Oslo, and is a specialist in clinical child psychology. She has been the primary investigator of several studies where the mental health of children exposed to difficult life circumstances has been explored. She has extensive experience in analysing child interviews using various qualitative methods. She has supervised eight PhD and two post-doctoral candidates and over 30 master theses.

Counselors at Centre for Rare Disorders: Kristin Iversen, Gunvor Ruud, and Olga Solberg have long clinical experience with HD, will/are involved in recruitment, available for follow-up of participants if needed, and will actively participate in the development of guidelines.

International collaboration: Dr Aubeeluck, Associate Professor of Health Psychology and Director of Admissions, Faculty of Medicine & Health Sciences, University of Nottingham, United Kingdom (UK), who developed the quantitative instrument (HDQoL-C), will also collaborate on the project. The UK has developed several programs for young people providing care to a parent with HD (Forrest Keenan et al., 2007). Hence, collaboration will be highly useful for the project and strengthen feasibility.

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