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Measuring temperature perception and pain detection thresholds with quantitative sensory testing in a healthy arctic population

Submission date 30/10/2025	**Recruitment status** Recruiting	[_] Prospectively registered [X] Protocol
Registration date 05/11/2025	**Overall study status** Ongoing	[_] Statistical analysis plan [_] Results
Last Edited 05/11/2025	**Condition category** Other	[_] Individual participant data [_] Record updated in last year

Plain English summary of protocol

Background and study aims

The Quantitative Sensory Testing Battery (QST) is a standardized tool for assessing pain-related changes in the somatosensory system, commonly known as the pain phenotype. It evaluates 13 parameters, including thermal and mechanical thresholds, and is widely used to study clinical pain conditions like neuropathic and nociceptive pain, as well as phenomena such as allodynia and hyperalgesia. The QST protocol by Rolke et al. (2006) is a recognized framework, supported by normative data for various age groups and body regions.

However, existing QST normative data primarily come from mid-European populations, with little representation from Arctic populations. While significant differences are not expected, variations in thermal thresholds, such as cold perception and pain, may exist. This project aims to collect QST data from a healthy Arctic population to compare with mid-European norms, focusing on thermal test responses. These findings will enhance QST's relevance as a biomarker for pain phenotypes and support future clinical studies on non-pharmacological pain treatments in Arctic regions.

Who can participate?

This study seeks to collect QST data from healthy individuals residing in an Arctic climate, focusing exclusively on non-clinical populations rather than those experiencing pain. Importantly, the application of QST poses no risk to participants, ensuring the safety and feasibility of the study.

What does the study involve?

Neurophysiological QST, one time: Sensory testing will be conducted following the standardized protocol established by the German Research Network on Neuropathic Pain (DFNS). All measurements will be performed by the same examiner at three standard anatomical locations: the hand, foot, and trapezius muscle, in alignment with QST normative data collection practices.

Questionnaire: Participants will complete a brief questionnaire to collect information on gender, duration of residence in an Arctic region, and a Numeric Rating Scale (NRS) to assess pain sensation.

What are the possible benefits and risks of participating?
Cost-Benefit Analysis for Study Participants
There are no direct benefits for participants, except for receiving their personal QST profile along with an explanation of the results. Participation in the study is entirely voluntary, and participants may withdraw their consent at any time without providing a reason.

Significance and Benefit to Society
QST, particularly its selective subtests, is widely regarded as a reliable psychophysiological biomarker for chronic pain treatment studies. However, existing normative QST data for non-pain populations are predominantly derived from mid-European cohorts, with limited data available from Arctic populations. While significant differences are not anticipated, variations in thermal thresholds—such as cold perception and cold pain—may exist and hold relevance for studies focusing on Arctic populations, such as the Tromsø population study.
Establishing normative QST data for a healthy Arctic population will complement existing mid-European data, enhancing QST's utility as a reliable biomarker for pain phenotypes. This will ensure its applicability across diverse populations and provide a valuable foundation for future pain studies in Norway and Scandinavia.

Risk Evaluation
Quantitative Sensory Testing (QST) assesses pain thresholds rather than pain tolerance, making the procedure non-painful for participants. The test is immediately stopped upon reaching the pain threshold, as the focus is solely on identifying this point, not on measuring tolerance. QST is a globally recognized and standardized tool in pain research, with thousands of measurements conducted over the past decades. There are no known risks associated with the application of QST.

Where is the study run from?
UiT, The Arctic University of Norway, National Research Center in Complementary and Alternative Medicine, NAFKAM, Department of Community Medicine

When is the study starting and how long is it expected to run for?
16.06.2025 – 31.12.2030

Who is funding the study?
UiT, The Arctic University of Norway, National Research Center in Complementary and Alternative Medicine, NAFKAM, Department of Community Medicine

Who is the main contact?
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Contact information

Type(s)
Public, Scientific, Principal investigator

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Additional identifiers

Protocol serial number
REK Nord 910911

Study information

Scientific Title
Quantitative Sensory Testing (QST) of skin sensitivity to temperature and touch in an Arctic population without pain complaints – STARPOP

Acronym
STARPOP

Study objectives
This is an observational study. The aim of the project is to investigate whether an Arctic population without pain has Quantitative Sensory Testing values comparable to healthy Central European participants, with a focus on thermal tests. The findings will enhance the validity of the QST protocol (developed by DFNS) and support future clinical studies.

Ethics approval required
Ethics approval required

Ethics approval(s)
Approved 17/06/2025, REK Nord -Regional Committees for Medical and Health Research Ethics North (REK Nord- Regionale komiteer for medisinsk og helsefaglig forskningsetikk Nord) (UiT Norges arktiske universitet, Postboks 6050 Langnes, Tromsø, 9037, Norway; +47 (0)776 46 140; rek-nord@asp.uit.no), ref: REK Nord 910911

Primary study design
Observational

Study design
Single-centre observational cross-sectional study

Study type(s)

Diagnostic, Other

Health condition(s) or problem(s) studied
Healthy pain-free individuals who live in an arctic climate

Interventions
Neurophysiological quantitative sensory Testing (QST): Sensory testing will be performed according to the standard protocol of the German Research Network on Neuropathic Pain (DFNS), and all measurements will be carried out by the same examiner at the hand, foot, and trapezius muscle (standard measurement locations for QST normative data).

Intervention Type
Other

Primary outcome(s)
1. Neurophysiological Quantitative Sensory Testing (QST): Sensory function at specific body sites (hand, foot, and trapezius muscle) will be measured using a standardized QST protocol from the German Research Network on Neuropathic Pain (DFNS), performed by the same examiner, during the study visit
2. Self-reported pain intensity will be measured using a Numeric Rating Scale for pain at the study visit
3. Demographic/environmental factors will be measured using a short questionnaire, including gender and the duration of residence in an Arctic area, at the study visit

Key secondary outcome(s)
There are no secondary outcome measures

Completion date
31/12/2030

Eligibility

Key inclusion criteria
1. Living at least 10 years in an arctic area
2. No chronic pain syndrome
3. Free of acute pain for at least 1 year prior to the investigation
4. A rating of < 1 on a numeric rating scale on pain

Participant type(s)
Healthy volunteer, Resident

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
18 Years

Upper age limit
75 Years

Sex
All

Key exclusion criteria
1. Not living in an arctic environment for the last 10 years
2. A rating of > 1 on a numeric rating scale on pain
3. Chronic pain syndromes
4. Neurological disease
5. Other severe health issues

Date of first enrolment
01/11/2025

Date of final enrolment
01/12/2027

Locations

Countries of recruitment
Norway

Study participating centre
UiT, The Arctic University of Norway,
Department of Community Medicine, The National Research Center in Complementary and Alternative Medicine, NAFKAM
Tromsø
Norway
9037

Sponsor information

Organisation
UiT The Arctic University of Norway

ROR
https://ror.org/00wge5k78

Funder(s)

Funder type

Other

Funder Name
Investigator initiated and funded

Results and Publications

Individual participant data (IPD) sharing plan
The datasets generated during this study will not be shared, except for the summarized and aggregated results published in the final report. These non-clinical data, presented in aggregated form, will serve as reference data. As such, there is no requirement for additional data sharing.

IPD sharing plan summary
Not expected to be made available

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Protocol file	In Norwegian version 2025	05/11/2025	05/11/2025	No	No