

Language matters: a study about language communication with bilingual Swedish speakers in Finnish healthcare

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Abbreviations

BMI	Body mass index, kg/m ²
CT	Computed tomography
GP	General Practitioner
MPQ	McGill Pain Questionnaire
PREM	Patient Reported Experience Measure
sfMPQ	Short form of McGill Pain Questionnaire

Abstract

Language matters: a study about language communication with bilingual Swedish speakers in Finnish healthcare

Aims: To examine patient-reported aspects of communication by bilingual Swedish speaking patients using their second language, Finnish. The effects of discordant language communication were measured in four studies.

Methods: In total, 411 Swedish speaking and 746 Finnish speaking patients participated in four studies. Study I was performed during 2004–2005 in a healthcare center with a structured questionnaire including partly standardized questions about Swedish speaking patients' ability to express their health problems in their second language, Finnish. Furthermore, the occurrence of misunderstandings and effects on adherence to medical instructions caused by discordant language communication were explored.

The effects of concordant and discordant language communication were compared between Swedish and Finnish speaking emergency patients during 2008–2009 using a researcher-designed pre-visit and post-visit questionnaire in study II and III. The pre-visit questionnaire included questions about the socioeconomic status and health conditions based on the FINRISK protocol. The patients' proficiency in their second language was measured on a standardized 5 grade scale. Patients were also asked about the language they used with the physician and their language preference, their experiences of discordant language communication, annual visits to a physician and the reason for the emergency visit.

In the fourth study, performed during 2013–2016, fifty-one Swedish speaking patients with diabetes aged 28–72 years completed the verbal sensory and affective pain vocabulary sfMPQ, twice, first in Finnish (test I) and after 30 minutes in Swedish (re-test II). A Finnish speaking control group (n=10) aged 40–65 years was also tested in order to reveal intrinsic repetition variations.

Results: The first study revealed that 50.7 % of Swedish speaking patients in the healthcare center (n=221) considered communication in their native language very important. One third of the participants reported getting along with Finnish in the absence of a common native language with healthcare providers. Every tenth patient reported miscomprehensions, either often or always. Poor proficiency in Finnish and low education level increased the risk of misunderstandings. Due to deficient language communication 41 % of the patients reported revisits (n=32), talked with another expert (n=40) or discontinued relevant healthcare visits (n=10).

In the second and third studies the effects of concordant and discordant language communication with the physician were compared between 139 bilingual Swedish speaking and 736 Finnish speaking emergency patients. No significant differences between the

language groups in health condition and prevalence of self-reported chronic diseases were observed but the Finnish speakers (24.1 %) reported significantly more annual visits to a physician compared with Swedish speakers (10.7 %). Communication in Finnish significantly decreased Swedish speakers' motivation to adhere to the physicians' medical instructions compared to Finnish speakers communicating in their native language ($p=0.001$).

In the fourth study the sensory and affective verbal description of pain was tested among Swedish speakers with sfMPQ in Swedish and Finnish. The study was performed during 2013-2016 in one healthcare center in South Ostrobothnia and one in the metropolitan area, as well as in the Finnish Diabetes Association. Fifty-one Swedish speaking bilingual patients with diabetes aged 28-72 years and 10 Finnish speaking patients aged 40-65 years with diabetes participated in the study. Swedish speakers with poor proficiency in Finnish scored significantly more differences in affective descriptions of pain compared with Finnish speaking respondents ($p=0.001$).

Conclusions: Poor Finnish proficient bilingual Swedish speaking patients frequently had difficulties in expressing health problems in their second language, Finnish. Patient-reported deficient language communication tended to increase Swedish speakers' revisits but patients also discontinued consultations. A common native language promoted clarification of the health problem and pain communication, enhanced the patient's adherence to medical instructions and trust. Language difficulties could possibly explain why Swedish speakers visit physicians less frequently than Finnish speakers. The effects of discordant language communication on healthcare outcomes were not explored.

Sammandrag

Språket har betydelse: en studie om kommunikationsspråket med tvåspråkiga finlandssvenskar i den finländska hälsovården

Syfte: Att undersöka patientrapporterade effekter av kommunikation på tvåspråkiga finlandssvenskars andrahandspråk, finska. Effekterna av olikspråkig kommunikation undersöktes i fyra studier.

Metoder: Sammanlagt deltog 411 svenskspråkiga och 746 finskspråkiga patienter i fyra frågeundersökningar. I studie I som utfördes 2004–2005 användes ett strukturerat, delvis standardiserat frågeformulär för att undersöka svenskspråkiga hälsocentralpatienters förmåga att uttrycka sina hälsoproblem på sitt andrahandspråk, finska, samt om olikspråkig kommunikation kunde inverka på uppkomsten av missförstånd och på följande av vårdanvisningar.

En jämförelse mellan svensk- och finskspråkiga jourpatienter utfördes med två (före och efter akutbesöket) forskardrivna frågeformulär i studie II och III under åren 2008–2009. Frågorna före besöket omfattade patientens socioekonomiska status och hälsotillstånd och var baserade på FINRISK protokollet. Patientens språkliga färdigheter i sitt andrahandspråk mättes på en standardiserad 5-gradig skala. Därtill frågades efter patientens preferensspråk med läkaren, erfarenheter av olikspråkig kommunikation, antalet årliga läkarbesök samt orsaken till akutbesöket.

I den fjärde undersökningen som utfördes 2013–2016 fyllde svenskspråkiga patienter med diabetes i den sensoriska och affektiva smärtvokabulären sfMPQ två gånger, först på finska (test I) och efter 30 minuter på svenska (re-test II). En jämförelsegrupp med finskspråkiga patienter utförde båda testen på finska för att klargöra repetitionsvariationer.

Resultat: Den första studien visade att hälften (50.7 %) av 221 svenskspråkiga hälsocentralpatienter ansåg kommunikation på sitt modersmål vara mycket viktigt. En tredjedel ansåg sig klara sig på finska vid avsaknad av ett gemensamt modersmål. Var tionde patient rapporterade att missförstånd uppstått ofta eller alltid. Låg utbildningsnivå och svaga färdigheter i finska disponerade för missförstånd. 41 % av patienterna angav att bristfällig språklig kommunikation lett till förnyade hälsocentralbesök (n=32), kontakt med annan expert (n=40) eller till att hälsoproblemet lämnades därhän (n=10).

I den andra och tredje studien jämfördes effekterna av kommunikationen mellan 139 svensk- och 736 finskspråkiga akutpatienter som kommunicerade med läkaren på sitt modersmål eller på sitt andrahandspråk. Inga skillnader mellan språkgruppernas hälsotillstånd och förekomst av kroniska sjukdomar kunde observeras, men de finskspråkiga patienterna (24.1 %) gjorde signifikant flera läkarbesök årligen jämfört med de svenskspråkiga patienterna (10.7 %) ($p<0.001$). Kommunikation på de svenskspråkiga patienternas andrahandspråk försämrade signifikant deras motivation att följa läkarens anvisningar efter akutbesöket jämfört med de finskspråkiga patienterna, som kommunicerade på sitt modersmål ($p=0.001$).

Den fjärde studien utfördes på en hälsocentral i södra Österbotten och en i huvudstadsregionen samt inom Finlands Diabetesförbund bland svensk- och finskspråkiga patienter med diabetes. I studien testades 51 svenskspråkiga, 28–72 år fyllda patienters verbala beskrivning av smärtintensiteten på finska och svenska med sfMPQ. 10 finskspråkiga patienter i åldern 40–65 deltog i studien för att kunna bestämma den verkliga upprepningsvariationen.

Skillnaderna mellan svensk- och finskspråkiga affektiva ord för beskrivande av smärtintensiteten var signifikanta för patienter med svaga färdigheter i finska ($p=0.001$).

Slutsatser: Tvåspråkiga svenskspråkiga patienter med svaga färdigheter i finska hade ofta svårigheter att uttrycka hälsoproblem på sitt andrahandsspråk, finska. Olikpråkig kommunikation, som upplevdes som bristfällig, tenderade att leda till förnyade läkarbesök, men kunde även leda till att patienten inte sökte vård för sitt hälsoproblem.

Kommunikation på samma språk med läkaren förbättrade klargörande av patienternas hälsoproblem och smärttillstånd samt ökade patienternas förmåga att följa råd och vårdanvisningar. Orsaken till de svenskspråkiga patienternas färre läkarbesök jämfört med de finskspråkigas besöksfrekvens kunde ha sitt ursprung i språkrelaterade svårigheter. Av undersökningen framgick inte, huruvida olikpråkig kommunikation påverkade hälsoutfallet.

Tiivistelmä

Kielellä on merkitystä: tutkimus kaksikielisten ruotsinkielisten kommunikointikielestä suomalaisessa terveydenhuollossa

Tarkoitus: Selvittää kaksikielisten ruotsinkielisten potilaiden toissijaisella kielellä, suomeksi, saaman palvelun vaikutukset potilaiden kuvaamina. Eri kielillä toteutuvan kommunikaation vaikutukset selvitettiin neljässä kyselytutkimuksessa.

Menetelmät: Yhteensä 411 ruotsinkielistä ja 746 suomenkielistä potilasta osallistui neljään tutkimukseen. Ensimmäisessä tutkimuksessa selvitettiin 2004–2005 strukturoidulla, osin standardoidulla kyselyllä ruotsinkielisten terveyskeskuspotilaiden kyky ilmaista terveysongelmiaan toissijaisella kielellä, suomeksi, sekä eri kielillä toteutuvan kommunikaation vaikutusta väärinkäsitysten esiintymiseen ja hoitoon sitoutumiseen.

Toisessa ja kolmannessa tutkimuksessa vertailtiin ruotsin- ja suomenkielisten akuuttipotilaiden äidinkielellä ja toissijaisella kielellä toteutuvan kommunikaation vaikutuksia kahdella, tutkijan muotoilemalla kyselyllä (ennen ja jälkeen akuuttikäyntiä) vuosina 2008–2009. Ennen käyntiä – kyselyn sosioekonomista asemaa ja terveydentilaa koskevat kysymykset perustuivat FINRISK protokollaan. Potilaan toissijaisen kielen osaamistasoa mitattiin standardoidulla 5-asteisella asteikolla. Lisäksi kysyttiin potilaan käyttämää ja toivomaa kommunikaatiokieltä lääkärin kanssa, kokemuksia kommunikaatiosta, joka toteutuu eri kielellä kuin toivotulla sekä vuosittaista lääkäriäkäyntimäärää ja akuuttikäynnin syytä.

Neljänteen tutkimukseen osallistui 51 diabetesta sairastavaa ruotsinkielistä potilasta ja kymmenen suomenkielistä potilasta 2013–2016. Ruotsinkieliset potilaat täyttivät sfMPQ sensorisen ja affektiivisen kipusanaston kahteen kertaan, ensin suomeksi (test I) ja 30 minuutin jälkeen ruotsiksi (re-test II). Suomenkieliset potilaat suorittivat molemmat testit suomeksi todellisten toistamisvaihteluiden osoittamiseksi.

Tulokset: Ensimmäisessä tutkimuksessa 50.7 % vastanneista ruotsinkielisistä terveyskeskuspotilaista (n=221) piti kommunikointia omalla äidinkielellä erittäin tärkeänä. Kolmannes heistä ilmoitti pärjäävänsä suomenkielellä mikäli yhteistä kieltä ei löytynyt. Joka kymmenes potilas ilmoitti, että väärinymmärrystä oli esiintynyt usein tai aina. Heikko suomenkielen taito ja alhainen koulutustaso altisti väärinymmärryksille. Puutteellisen kielellisen kommunikaation seurauksena 41 % potilaista ilmoitti tehneensä uusintakäynnin (n=32), puhuneensa toisen asiantuntijan kanssa (n=40) tai luopuvansa käynnistä (n=10).

Toisessa ja kolmannessa tutkimuksessa eri ja samalla kielellä toteutuvan kommunikaation vaikutuksia vertailtiin 139 kaksikielisellä ruotsinkielisellä ja 736 suomenkielisellä akuuttipotilaalla. Kieliryhmien välisiä terveyseroja tai eroja kroonisten sairauksien esiintyvyydessä ei todettu, mutta suomenkieliset potilaat raportoivat tilastollisesti merkitsevästi ($p < 0.001$) enemmän vuosittaisia lääkärikäyntejä (24.1 %) kuin ruotsinkieliset potilaat (10.7 %). Kommunikaatiokielen ollessa suomi ruotsinkielisten potilaiden motivaatio

noudattaa lääkärin antamia hoito-ohjeita oli merkittävästi heikompi verrattuna suomenkielisiin potilaisiin, jotka kommunikoivat omalla äidinkielellään ($p=0.001$).

Neljännessä tutkimuksessa testattiin ruotsinkielisten potilaiden kivun sanallinen kuvailu sfMPQ avulla. Heikosti suomea puhuvien ruotsinkielisten potilaiden valitsemat ruotsin- ja suomenkieliset affektiiviset sanat erosivat merkitsevästi toisistaan ($p=0.001$).

Johtopäätökset: Heikosti suomea puhuvilla ruotsinkielisillä potilailla on usein vaikeuksia ilmaista terveysongelmiaan suomeksi. Potilaan kokema puutteellinen kielellinen kommunikaatio näyttää lisäävän uusintakäyntejä mutta saattaa lisäksi lisätä terveysongelman hoitamatta jättämistä. Yhteinen äidinkieli edistää terveysongelman ja kivun selvittämistä ja parantaa potilaan sitoutumista hoitoon ja luottamusta. Ruotsinkieliset potilaat hakeutuvat mahdollisesti harvemmin lääkärin vastaanotolle kielivaikeuksien vuoksi kuin suomenkieliset potilaat. Erikielisen kommunikaation vaikutusta hoitotuloksiin ei selvitetty.

List of Original Publications

- I Mustajoki M, Saranto K. Hur inverkar språklig asymmetri mellan patient och personal på patientvården? [The influence of language barriers on patient care (abstract in English)] *Journal of Nursing Science* 2009, 21 (2), 1009-119.
Permission for reprinting Paper I has been granted by the publisher.
- II Mustajoki M, Forsén T, Eriksson J. Health behaviour among bilingual Swedish speaking patients in the Finnish healthcare setting. *Accepted 7.4.2020 for publication in Journal of Family Medicine and Primary Care.*
- III Mustajoki M, Forsén T, Kaupila T. The association between patient-reported pain and doctors' language proficiency in clinical practice. *Pain Research and Treatment* 2015, Article ID 263904, 7 p. doi.org/10.1155/2015/263904. *Pain Research and Treatment has ceased publication 2019.*
- IV Mustajoki M, Forsén T, Kaupila T. Pain assessment in native and non-native language: difficulties in reporting the affective dimension of pain. *Scandinavian Journal of Pain* 2018, 18(4), pp. 575-580. doi:10.1515/sjpain-2018-0043.
Permission for reprinting Paper IV has been granted by the publisher.

Introduction

"The doctor understood my symptoms incorrectly and I did not understand for which disease the medication was prescribed" (healthcare delivered in Finnish to a bilingual Swedish patient). Communication problems between patients and clinicians are common in clinical practise but discordant language is dominating patients' comprehension problems. Language discordance is defined as a situation when "the patient and the physician lack proficiency in the same language(s)" (Sears et al., 2013).

As a result of increasing migration to Finland, awareness has gradually been growing in Finnish healthcare settings of the consequences of discordant language communication. Discordant language communication hampers the healthcare visit and treatment adherence and has harmful effects on patient outcomes (Wisnivesky et al., 2012; Inagaki et al., 2017). Patients whose first language is not the majority language are especially exposed to medically significant communication errors (Bowen, 2001). By using a weaker language, the risks of miscomprehension and negligence of health problems seem to increase. Especially women, elderly and less educated minority patients report more language barriers compared to language-concordant patients (Mustajoki, 2001; David and Rhee, 1998).

Patients' understanding of words relevant for their care differs depending on the communication language (Cooke et al., 2000). Thus, healthcare providers familiar with words and meaningful ways of expression in the patient-preferred language bring their patients communication advantages. Concordant language communication ensures better mutual understanding which facilitates patients' active participation in care (Detz et al., 2014).

Communication is, however, not only about language. Other factors also might impair mutual understanding. Membership in a minority group, cultural disparities between the patient and

clinicians or an unfavourable first impression of the physician, the physicians' ability to apply patient-centred care, as well as lack of confidence in the physicians' medical skills influence the communication. Patients originating from a different culture may be exposed to socioeconomic disadvantages causing poorer health status from the start compared to the native population. Due to poor communication patients experience additional stress, fear, dissatisfaction, decreased capability to comply with health instructions. The estimation of pain also becomes more difficult (Wilson et al., 2005; Betancourt et al., 1999).

When the health practitioners' language proficiency in the patient-preferred language is unsatisfactory patients, generally have to communicate in a non-native language (Mustajoki, 2001; Tang et al., 2001; Johnson et al., 1998; James, 1998; Poggenpol et al., 1996). Similar observations have also been noticed among bilingual and culturally integrated Swedish speaking patients in Finland (Mustajoki, 2001). Language discordance does not only affect patients, physicians are more likely to worry about malpractice risks compared with patients with whom understanding is not a problem (Chen et al., 2011).

The implications of language barriers in healthcare are comprehensively documented but the results are complicated by several cultural and socioeconomic factors. The strong influence of these confusing factors on the communication has made it difficult to identify the role of language communication alone. Culturally unbiased studies are scarce as well as those from socioeconomically homogenous societies.

This thesis examines whether bilingual, culturally integrated Swedish speaking primary care patients communicating in their second language, i.e. Finnish, report miscomprehensions and difficulties in expressing health problems, and weak adherence to treatment instructions and medication prescriptions. This thesis furthermore explores the effects of the physicians' concordant language skills on Swedish speaking emergency patients' expression of pain

intensity. The effects of discordant language communication on Swedish speakers' healthcare visit patterns, confidence in the physician and experience of the care quality are also analysed.

Review of the literature

Implications of language barriers in healthcare

Minority and immigrant patients originate generally from a different language group than the majority population and quite often they confront language barriers (Chang et al., 2010; Schenker et al., 2010). The frequency of language barriers has been extensively studied among limited English proficient and culturally disparate patients in different healthcare settings. Research concerning culturally integrated and substantially bilingual minorities, such as the Swedish speaking population in Finland, has mainly been of epidemiological and demographic interest. The effects of language barriers on patient outcome are so far unexplored in Finland.

There were 3,823,000 adult (aged 20-75 years) native Finnish speakers and 200,952 Swedish speakers in mainland Finland in 2018 (Statistics Finland's PxWeb databases, 2019). Both Finnish and Swedish are national languages. The Finnish population statistics demonstrate an on-going language transition among Swedish speakers from Swedish to Finnish (Finnäs, 1986). The Finnish educational system, starting from children's day-care up to university level, ensures education of healthcare professionals in both Finnish and Swedish. The whole population is thus intended to be proficient in the two national languages to a certain extent. Swedish speaking pupils study Finnish during several years at school, but the Finnish-speaking pupils study Swedish for fewer years (Palviainen, 2011).

The number of foreign physicians, primarily native Russian and Estonian speakers, has increased steadily in Finland. No statistics were available about their proficiency in Finnish and Swedish during the period of this research.

The language law of 2004 guarantees that Swedish and Finnish speakers in legally defined bilingual municipalities can use their native language in healthcare (Finlex Databank, 2003).

In 2015, 49 % of Swedish speakers were resident in bilingual municipalities dominated by Finnish speakers and 38 % in municipalities dominated by Swedish speakers. The remaining part resided in monolingual Finnish speaking municipalities. The linguistic conditions, the climate of attitudes related to languages, the implementation of linguistic rights in social and health care are evaluated every 4th year in Finland in a report to Government. (Prime Minister's Office, 2017)

Table 1. Linguistic issues examined by the Parliamentary authorized representative 2012–2015 (Report of the Government on the application of language legislation, 2017)

	2012	2013	2014	2015
Complaints	32	50	58	34
Initiatives	9	2	2	2
Remarks		3		2
Issues resulting in action	19 (46 %)	15 (29 %)	24 (40 %)	13 (38 %)
Total	41	55	60	38

The language matters mainly concern the right to use Swedish. The report showed that Swedish speakers only rarely provide official remarks on unsatisfactory linguistic services (Table 1). However, they scored the language communication in their native language in healthcare on a language barometer (4-10, where 10 is best) almost a whole number lower (on average 7.8) compared with the Finnish respondents (on average 8.7) (Lindell, 2016). The Swedish speakers' dissatisfaction with the linguistic service has been demonstrated especially in municipalities dominated by Finnish speakers. Most probably the Finnish populations' poor Swedish proficiency and unawareness of the Swedish speakers' legal rights to have service in their native language have worsened the language climate (Prime Minister's Office, 2017).

Despite different native languages Finns have the same cultural background, which is relatively unusual among minorities elsewhere. The Swedish speaking population is virtually bilingual, which means performing also in Finnish in daily life.

Bilingual Swedish speakers in Finnish healthcare

The bilingual Swedish speakers in Finland primarily live in the coastal region and are mainly culturally integrated with the Finnish speaking majority. The Swedish speakers are generally bilingual but many of them lack specific health vocabulary needed for the communication with healthcare providers (Mustajoki, 2001).

Health differences between the Swedish speaking and Finnish speaking population are well documented in several epidemiological and demographic studies (Fougstedt, 1951; Sipilä and Martikainen, 2010; Saarela and Finnäs, 2011). Swedish speakers' better health has been explained by their historically verified more favourable socioeconomic status. Their nutritional status has probably also been on average more favourable than in other parts of the country which in the long run might have contributed to their better health. Swedish speakers' self-reported higher level of well-being compared with Finnish speakers has been explained by beneficial social capital (Hyypä and Mäki, 2003). The Swedish speaking population in Finland has shown a relatively high degree of Finnish genetic admixture (Virtaranta-Knowles et al., 1991). Smoking is less prevalent and the drinking patterns among the Swedish speaking population, especially on the west coast, are more modest compared with the Finnish speaking majority. The lifestyle habits among both language groups on the south coast are relatively similar (Helakorpi et al, 2009; Paljärvi et al., 2009). It has been suggested that these aspects could explain some of the differences but not comprehensively (Suominen, 2014).

Statistical comparison of health conditions between Swedish speakers and the whole Finnish population do not demonstrate any considerable differences (Suominen 2014; Koponen et al., 2018). For several decades, hypertension was the main reason for Finnish speakers' poorer health compared with Swedish speakers, but this is not any more the case (Suominen 2014). Until now the Swedish speakers' better health has been explained by a composition of simultaneous cultural, environment-related and biomechanical factors. (Suominen, 2014) The possibility that Swedish speakers have embraced a different, and more healthy, behavioural culture compared to the majority population should be examined.

The native language is documented in every patient's electronic health record in Finland. Patients visiting a healthcare center can thus be categorized in language groups for statistical use. In 2018, Finnish speakers made 4.5 visits per person per year compared to 4.3 visits for Swedish speakers (THL, 2018). Statistics concerning healthcare visits classified by language have not previously been recorded but the quantity of visits is supposed to have been unchanged for years. By adding the possibility to record bilingualism in the official language register, unnecessary language barriers in healthcare could be avoided. This is, however, not yet legalized.

Bilingual patients visiting healthcare

Bilinguals appear generally as fluent in both native and non-native language because they are proficient on an everyday conversation level. Recent findings indicate however, that substantially bilingual Finnish-Swedish speakers in Finland do not achieve native-like proficiency compared to persons who have grown up in a monolingual environment (Hut, 2018). Bilingual speakers use each of their languages for proportionately less time than monolingual speakers use their single language (Lehtonen et al., 2012). Slowly and poorly recalled and produced words, even in the primary language, characterize bilinguals compared

to monolinguals. (Fernandes et al., 2007; Bialystok et al., 2009; Portocarrero et al., 2007; Bialystok et al., 2008). In stressful situations, such as emergency illness, even bilingual individuals report the need to communicate in their primary language (Ali and Watson, 2018). Despite this fact, bilingual patients' language preferences remain often unquoted or healthcare providers are over-optimistic about their second language proficiency (Dagsvold et al., 2016).

Bilingual patients' proficiency in the majority language may be more limited than the patients think themselves. The situations, however, vary from time to time and from patient to patient, disturbing healthcare providers' language orientation. Especially when bilingual patients speak the majority language, their language preferences are likely to remain unspecified (Roberts et al., 2007). Language proficiency is often simplified as an "either – or skill". Clinicians tend to generally form a quick opinion of bilingual patients' proficiency in the majority language instead of exploring the patient-preferred language. Bilingual healthcare settings are for this reason recommended to ensure satisfactory language awareness among the caregivers (Roberts et al., 2007). An easy-to-use method for assessing bilingual patients' language proficiency would be very helpful for healthcare providers (Dagsvold et al., 2016).

Patients with limited language proficiency in the healthcare provider-preferred language, generally their native language, should be cared for by a provider who speaks their language. Physicians' self-reported language fluency in the patient-preferred language is strongly associated with optimal patient-centered communication (Diamond et al., 2012). A standardized and validated scale with five levels of descriptive explanations for each level: poor, fair, good, very good, and excellent has been used for assessing physicians' non-native language proficiency (Diamond et al., 2012). Also, partially fluent physicians in the patient-preferred language might be appropriate in some settings and circumstances, but not in others (Mustajoki, 2001).

Patients' perspective on care quality

The quality of care includes the performance of the healthcare practitioners during the healthcare visit. Quality is composed of a wide variety of characteristics defined by patients, physicians, and nurses having different meaning for each of them (Donabedian, 1969).

Physicians are primarily focused on the technical performance in care quality, but the patient perspective requires also social and psychological aspects to be noticed.

The patient-reported experience and care satisfaction is included in these nontechnical dimensions of care quality. Most patients ideally expect the general practitioner to be knowledgeable and easy to understand (Bowling et al., 2012). Patient experience is an important component in the care quality and a prerequisite for care improvements but is not routinely measured in healthcare settings. Patient Reported Experience Measures (PREM) are divided into patients' satisfaction with, or experiences of, access to services and medical appointments, and information issues. PREMs can comprise outcomes as patients' descriptions of their present health status and patients' satisfaction with treatment outcomes. (Nilsson et al., 2016) The positive relationship between patient satisfaction and health is well known, meaning that satisfied patients seem to become healthier, and healthy patients become more satisfied. There is a strong association between the emotional or social aspects of health-related quality of life and satisfaction with clinical appointments and the communication with healthcare providers. (Nilsson et al., 2016)

The patients' impression of the care quality originates from their expectations of the service relative to the actual performance (Tiainen 2015; Gleeson et al., 2016). During the healthcare visit patients are expected to present a distressing health problem but absence of a common language causes comprehension problems either for patients, or for physicians, or for both when the interview is performed in a common, non-native language (Mustajoki, 2001;

Schenker et al., 2010). Providing comprehensible disease-related information and medical instructions to the patients is difficult without satisfactory proficiency in the patient-preferred language (He et al., 2018). Criticizing patients for not using the healthcare provider-preferred language will substantially impede the patients' perception of the care quality (Hanefeld et al., 2017). The positive effects of concordant language communication on the healthcare process require awareness of the patient-preferred language, which should routinely be explored. Failure to do so might cause unappreciative connections between healthcare outcomes and language communication problems. (Fernandez et al., 2004; Detz et al, 2014)

A positive first impression of the physician's communication significantly enhances the patient-experienced healthcare quality compared to a negative first impression. The physician's speech is one fundamental part of the first impression and a prerequisite for achieving a successful and trusting patient-physician relationship. (Rimondini et al., 2018)

Discordant language communication in healthcare

Language concordant communication in primary healthcare has predominantly positive effects on health outcomes such as adherence to medical instructions, improved healthcare experience and utilization of primary healthcare (Diamond et al., 2019). Concordant language enhances care quality in pain management and improved outcomes in diabetes care. Better patient-reported satisfaction and utilization of healthcare, as well as mitigation of concern, fear and pain have also been demonstrated in previous studies (Diamond et al., 2019). Lack of a mutual language has an adverse effect on patient satisfaction and will also reduce adherence to prescribed treatment (van Wieringen et al., 2002; Rocque and Leanza, 2015; Fernández et al., 2017).

The findings regarding the positive effects of concordant language are, however, not entirely consistent. This has been explained by different study designs and by use of partial

concordant language. Assessment of healthcare providers' competencies in patient-preferred language has also been lacking in previous studies summarized in the systematic review.

(Diamond et al., 2019)

A significant part of healthcare benefits, especially when treating chronic diseases, are related to patients' comprehension of, and consequent ability to follow, medical instructions.

Communication-related frustrations are, however, common among patients with chronic diseases. Impaired comprehension of medical advice due to language barriers results in poor treatment adherence and higher rates of readmission (van Wieringen et al., 2002). By improving the healthcare providers' linguistic competency or using language concordant physicians, comprehension problems and frustrations could be avoided (Chang et al., 2010; Horvat et al., 2014; Smith et al., 2017; Ali and Watson, 2018).

Physicians have to spend more time during the visit in understanding the patient in case of linguistic asymmetry. Language discordant physicians communicate less about lifestyle issues and provide less medical advice. On the contrary, concordant language communication enables patients to be active and come up with necessary questions and concerns.

(Meeuwesen et al., 2006) Discordant language communication is also more time consuming compared to relationships based on a common language. Altogether, linguistic asymmetry between patient and physician impedes the creation of a successful relationship (Meeuwesen et al., 2006)

Use of the patient-preferred language is a prerequisite for developing a well-functioning communication environment. Discordant language communication is, however, not unusual in monolingual healthcare settings visited by bilingual patients with different preferred languages (Mustajoki, 2001). Swedish speakers have frequently expressed dissatisfaction with communication in Finnish, but this has not so far resulted in noticeable amendments in

Finnish healthcare (Lindell, 2016). Systematically linking patients and clinicians proficient in the patient-preferred languages could, however, improve the interaction in all healthcare settings (Chang et al., 2010).

Struggling with language barriers, getting by with limited language skills and fear of causing the monolingual healthcare providers inconveniences are frequent problems reported by patients less proficient in the provider-preferred communication language. These patients also express a considerable need for healthcare providers specifically proficient in their native language. (Mustajoki, 2001; Sloots et al., 2010; Steinberg et al., 2016)

Poor second language proficient patients consistently experience difficulties in contacting emergency medical services but the possible adverse effects on their health condition are unknown. However, emergency patients communicating in a discordant language are very likely to be confronted with corresponding problems documented in other healthcare settings. (Tate, 2015)

Discordant language communication severely hampers understanding of patients' health problems (Bährer-Kohler, 2016; Fields et al., 2016). Highly proficient bilinguals might also lack specific health vocabulary needed for the communication with monolingual healthcare providers (Itzak et al., 2017). Problems in mutual understanding cause patients more distress than severe failures in the technical performance of the medical care (van Wieringen et al., 2002). Misunderstandings between the patient and caregiver also disturb building of a trusting relationship (Rimondini et al., 2018).

The frequency and effects of discordant language communication have been extensively studied among limited English proficient patients in different healthcare settings. Less English proficient patients are more likely than English proficient participants to report suboptimal clinician-patient interactions (Schenker et al., 2010). Cultural disparities between

the healthcare practitioner and the patients multiply communication problems (Chang et al., 2010). Besides the physicians' language skills, communication style also influences the clinician-patient interaction. For achieving more advantageous communication conditions, focusing on improving the physicians' communication skills has been recommended (Teutsch, 2003; Grassi et al., 2015). From the patient's point of view a patient-centered approach is the most fundamental part of the physicians' communication skills (Peck and Denney, 2012).

Language barriers cause orientation problems for patients unfamiliar with the complex health care system. The assistance of professional interpreters or language-switching facilities have comprehensively been used in monolingual healthcare settings visited by patients speaking another language than the majority population (John-Babstiste et al., 2004; Fernandez et al., 2011; van Rosse et al., 2016; Rostanski et al., 2016; Inagaki et al., 2017; Parker et al., 2017). But it is not possible to arrange this laborious and expensive interpretation facility in daily nursing, for example. Arranging remote access to interpretation support could facilitate the mutual communication in a discordant language relationship, especially during important separate appointments. Multilingual natural native language interaction with semantic web knowledge bases is also under development. In the first phase this digital aid is aimed at facilitating discordant language communication in first aid and delivery (Damova et al., 2014).

Discordant language communication should be acted upon because of the increasing probability of unnecessary repeated visits or to avoid creating more necessary healthcare visits (John-Babstiste et al., 2004; Jacobs et al., 2006). Although all language barriers cannot be eliminated, written health instructions in patient-preferred languages should be ensured. By enabling access to comprehensible information for non-native patients, healthcare outcomes could to some extent be improved (Wilson et al., 2005). Current patient-outcome

measures are, however, most often developed for well-educated native language proficient patients but not for non-native speakers. Considerable amendments are needed since the present method of translation causes severe assessment errors. (Katz et al., 2016)

Discordant language communication a safety risk?

Little attention has been drawn in research to the association between discordant language communication and safety risks, although international guidelines state that patients' language must be assessed and documented (van Rosse et al., 2016). Safety risks caused by miscomprehension due to discordant language have recently been documented in Finland. Finnish speaking physicians were unable to deliver information about computerized tomography (CT) findings and malignant disease to Swedish speaking patients in their native language. In one case a patient unable to comprehend Finnish received only a written report in Finnish about the CT results. How much the patient understood of the report remained unclear. (Roine et al., 2019)

Patients with a limited understanding of health issues are often unable to navigate the healthcare system; they have difficulties understanding medication instructions which can cause adverse medication reactions (Wilson et al., 2005; Sørensen et al., 2012; Hersh et al., 2015; Fleary et al., 2018). Health literacy is defined as understanding basic health information and services needed to make appropriate health decisions and it impacts patients' ability to communicate health issues. Screening patients routinely for health literacy has, however, not been shown to improve outcomes (Sudore et al., 2009). But discordant language communication combined with weak health literacy reduces the ability to benefit from healthcare. However, high health literacy does not automatically imply understanding of medical terms. Patients should for this reason be provided with both written and verbal

information in their native language (Sudore et al., 2009; Wynia and Osborn, 2010; Hersh et al., 2015; White et al., 2016).

Patient-centred approach improves communication

The patient-physician relationship is notably sensitive to emotional reciprocity. The verbal dominance of the patient and the physician during the visit is a sensitive marker of interaction dynamics. Actively participating patients present their health problem, seek important information and reflect on alternative treatments while the physician is less verbally dominant during the medical dialogue (Peck and Denney, 2012).

Patients appreciate compassionate and empathic two-way communication with their physician (van Wieringen et al., 2002; Rocque and Leanza, 2015; Fernández et al., 2017). A highly language-proficient physician, communicating with empathic words, is also optimally responsive to patients' problems and concerns (Fernandez et al., 2004; Schouten et al., 2007). Patients' verbal description of pain is needed for identification of the subjective pain experience. Objective data should be utilised only for understanding the underlying mechanisms of pain. A compassionate approach by the physician to patients with pain promotes the patient's description of subjective pain and prevents them from feeling that they are not being listened to or understood. (Wideman et al., 2019)

A patient-centered orientation is associated with better patient recall of information, treatment adherence, satisfaction with care, and health outcomes (Johnson et al., 2004). The effects of empathic and warm communication on treatment expectations, as well as on objective improvement in health have been demonstrated in many studies (Arora et al., 2004; Rasmussen et al., 2009; Verheul et al., 2010; van Osch et al., 2017). However, patients reporting the failure to meet expectations regarding medical advice and their participation in treatment decisions are an indication of communication deficiencies (Bowling et al., 2012).

Unsatisfactory proficiency in the patient-preferred language has been shown to complicate delivering important medical information (He et al., 2018).

Patients with language-concordant healthcare providers are more likely to feel that they are involved in the decision-making and they experience more respect and compassion (Detz et al., 2014). Language concordance facilitates the ease of discussion of complex issues and concerns (Parker et al., 2017). A comparison between bilingual demented patients and mono/bilingual caregivers show that the patients' ability to function is better with bilingual caregivers using the patient-preferred language (Ekman, 1993). Especially language-concordant physicians have a positive impact on patient-reported health conditions (Chang et al., 2010; Ali and Watson, 2018).

The patient-centered method supports shared decision-making but requires at least certain comprehension of the information which is unlikely to be achieved in a dialogue limited by considerable language divergence.

Describing pain in a non-native language

Pain experience is defined as a subjective unpleasant sensory and emotional experience. Self-reporting is therefore considered the gold standard for pain measuring (Katz and Melzak, 1999; Martinez et al., 2015). Patients communicate pain in a broad collection of qualitative words that need to be understood by the healthcare providers (Wideman et al., 2019).

However, patients who do not share a common language with caregivers do not find pain-related words in a non-native language (John-Babstiste et al., 2004; Jacobs et al., 2006). When pain cannot be described this worsens the patient's symptoms and causes frustration and an experience of not being heard (Coran et al., 2013). In order to avoid non-optimal pain medication as a consequence of poor pain assessment, healthcare practitioners ought to facilitate patients' description of pain. Assessing pain intensity in a clinical setting is,

however, challenging and easily underestimated by the healthcare personnel (Melotti et al., 2009). Despite existing measures, pain assessment has not been routinely practiced in every healthcare setting (Anderson et al., 2000). Relying only on numeric forms excludes the requirement for assessing subjective pain (Wideman et al., 2019).

In addition to language barriers, patients have reported other barriers to effective pain management including discriminatory attitudes of health professionals typically occurring in racial, ethnic and sociodemographic disparate relationships, resulting in suboptimal patient-provider communication (Shah et al., 2015; Strong et al., 2015; Adams et al., 2016; Katz et al., 2016). Physicians have tended to underestimate pain in educationally disparate patient-physician relationships. Physicians also seemed to underestimate pain significantly more frequently compared with nurses (Aydın and Uysal Aydın, 2018). In describing painful events men and women seemed to use different words. Women used more words and focused on sensory aspects of their pain event while men used fewer, less descriptive words and focused on events and emotions. Common pain-related issues for all patients were functional limitations caused by pain, difficulties in describing pain, and the dual nature of pain. (Strong et al., 2009)

For assessing pain, a diverse range of specific pain descriptors has been developed and most of them have been derived from the McGill Pain Questionnaire (MPQ) (Melzack, 1987). This commonly used instrument is sensitive to language and culture and has been translated into several languages, including Swedish and Finnish (Ketovuori and Pöntinen, 1981).

In bilingual settings, where the patient and practitioner may not share a common language, adequate pain assessment relies exclusively on the patient-preferred language (Roberts et al., 2003). However, patients have been found to use several pain words not conceptually equivalent with MPQ descriptors (Roberts et al., 2003; Wilson et al., 2009). Personalized

pain descriptors, so-called free descriptors – prosaic key words –communicate the pain experience more appropriately (Wideman et al., 2019). This method is a recommended complement to standardized pain measures and should invariably be used in the patients' native language (Strong et al., 2009)

The physicians' communication skills are of considerable importance in clarifying pain (Cleeland et al., 1997; McCaffery and Pasero, 1999; McNeill et al., 2001). Hospital patients and outpatients in general practice have expectations concerning information about painful medical procedures (Rankinen et al., 2007). Patients expect the physician to be clear and easy to understand (Bowling et al., 2012). This requires at least satisfactory communication in a language both the patient and the physician comprehend.

Pain treatment includes comprehensible information about adverse effects of medication, lifestyle instructions and several psychological methods to enhance pain control. Despite this demanding advisory function, healthcare providers do not generally consider language barriers as a significant obstacle in the prescription of pain medication or in medication adherence (Ciauzzi et al., 2011). But once the complexity of treatment increases, providing care in a second language tends to cause physicians unease, and in addition, a problematic condition may not become obvious when the communication language is poor (Evans et al., 2018).

Summary of the literature review

The research concerning discordant language communication in healthcare has mainly been focused on minority patients with an immigrant background and lower socioeconomic status. These patients are exposed to higher risk of cumulative disadvantages in healthcare, among others communication difficulties, compared to the majority population. The previous research has not focused upon the effects of discordant language communication with

bilingual patients. Findings from the regularly performed Language Barometer (Lindell 2016) in Finland have consistently indicated communication problems among the bilingual Swedish speakers. Previous literature has provided only little or poor evidence for estimating communication problems associated with bilingualism.

Previous research has focused on healthcare providers in various healthcare settings. The definition of a healthcare provider or caregiver has not been consistent. It has generally included either only physicians, or nurses only, or a combination of the two. The research is noticeably rich in studies about nurses' communication requirements, but language communication issues have had relatively low priority in medical research in general.

From the review of the literature several patient- and physician-related unfavourable effects caused by discordant language communication have been identified: patients report poor healthcare quality and patient satisfaction; less patient-reported trust in the physician; weakened adherence to medication and medical instructions; repeated healthcare visits or avoidance of visits and inaccurate pain assessment. Bilingualism does not automatically prevent patients from experiencing similar disadvantages in healthcare. Studies comparing verbal standardized pain measures and freely expressed, prosaic words in bilingual patients' native language, have not been reported.

Aims of the Study

The purpose of the current thesis was to examine the effects of discordant language communication between bilingual Swedish speaking patients and healthcare providers. The patient-reported effects were measured in four studies.

The main questions were:

- Study I Does communication in a second language, Finnish, cause difficulties for bilingual Swedish speaking patients to describe health problems and pain, misunderstandings and revisits, weaken the confidence in healthcare practitioners' professional skills and decrease the motivation to adhere to medical instructions?
- Studies II and III Does discordant language communication impact on bilingual Swedish speaking emergency patients' healthcare utilization? Does discordant language communication with bilingual Swedish speaking emergency patients increase fear, pain, uncertainty about the physicians' skills and care dissatisfaction? Does physicians' native (Finnish) and non-native (Swedish) language proficiency influence reported patient-experienced pain?
- Study IV Do bilingual Swedish speaking patients describe pain intensity differently in native and non-native language?

Participants and Methods

Data and results for this thesis were collected from four studies. Three studies were based on language communication-specific questionnaires targeting Swedish speakers visiting healthcare centers in south and southwest Finland where the Swedish speaking indigenous population is intermingled with the Finnish speaking majority. The fourth study was based on testing the congruity between answers in verbal pain questionnaires in Finnish and Swedish on Swedish speaking patients with diabetes.

Study I

The Study I was performed in Espoo healthcare center in south Finland for three months during 2004-2005 among Swedish speaking patients. The study focused on patient-reported effects of healthcare delivered in a second language on Swedish speakers' healthcare quality, occurrence of misunderstandings, patient satisfaction, as well as patient adherence to medical instructions and medication prescriptions. Furthermore, the Swedish speaking patients' ability to describe health problems in a discordant language was examined.

In total 221 Swedish speaking bilingual adult outpatients responded to a questionnaire in the study (Supplement A). Half of them (50.2 %) were over 70 years old, 20.2 % under 60 and 29.6 % were 60-69 years old. Slightly more female patients (57 %) than men participated. One-fourth (25.5 %) had an elementary school or a lower secondary school certificate, while 49.5 % had a vocational qualification and 25 % had an academic degree. The respondents conducted a self-assessment of their proficiency in Finnish on a 5-grade Likert scale (from very good to very poor). A structured questionnaire based on 12 standardized questions, two open questions about the category of misunderstandings and health problems and one multiple choice question about language communication improvement was used. Nine of the questions were validated in three previous surveys targeting adult Swedish speaking hospital

patients and outpatients in primary healthcare in Finland. The questionnaire was completed with 6 questions based on the most frequent responses noted in open answers in the standardized questionnaire. The pre-test of the final questionnaire on 10 patients did not indicate that any changes were required. Patient-reported health problems that were difficult to describe in a non-native, second language, Finnish, and the category of misunderstandings when communicating with healthcare personnel in Finnish were measured. The importance of having language concordant service, the impact of discordant language communication on adherence to prescriptions and the care quality were also assessed. The patients' impression of the healthcare quality and confidence in the native or non-native language spoken by healthcare providers were furthermore included in the questionnaire.

Study II and III

Studies II and III were based on the same sample and were conducted in 15 healthcare centers and outpatient departments along the Finnish south coast and in one healthcare center in South Ostrobothnia during 2008-2009.

Study II focused on exploring whether discordant language communication was associated with health conditions and utilization of healthcare among Swedish speaking emergency patients, using the pre-visit questionnaire (Supplement B). The pre-visit questionnaire was completed by 875 Swedish and Finnish speaking emergency outpatients aged 18-65 years who visited a physician. Patients older than 65 years, mainly retired and less exposed to the second language were not included, nor were those younger than 18 because they visit healthcare generally with their parents. Patients with life-threatening symptoms and mental disturbances were also excluded. Eligible patients who agreed to participate in the study were provided with information in the patient-reported language, Swedish or Finnish.

Data were gathered about culturally homogenous bilingual patients communicating in their second language in healthcare by using a researcher-designed instrument. The pre-visit questionnaire included 43 closed questions of which sixteen were about socioeconomic and health conditions based on the WHO MONICA protocol used in the periodical National FINRISK Study in Finland. The patient-assessed health conditions included a list of common diseases confirmed or treated by a physician, weekly exercise habits, smoking history and evaluation of daily alcoholic beverage consumption. The questionnaire included questions about the patient's present native language, the second, non-native language and the preferred language with the physician and also the importance of concordant language communication with the physician and the number of visits annually to a physician. In addition, 26 questions about patient-related experiences of discordant and concordant language communication with the physician and the reason for the emergency visit were included.

The Swedish speaking patients also estimated their non-native language (Finnish) proficiency on a standardized and validated 5-grade scale: 0 (nearly not at all), 1 (some ability to speak Finnish), 2 (moderate, e.g. fair ability to speak Finnish), 3 (good, e.g. Finnish almost as good as mother language Swedish) and 4 (Finnish as good as mother language Swedish) (Diamond et al., 2012).

Study III examined whether discordant language communication with bilingual Swedish speaking emergency patients increases fear, pain, uncertainty about the physicians' skills and care dissatisfaction. Furthermore, the study explored whether physicians' native (Finnish) and non-native (Swedish) language proficiency influenced patient-expressed pain using a post-visit questionnaire (Supplement C).

Two weeks after the visit the patients completed a post-visit questionnaire, distributed by post, including 30 closed questions specifically aimed at exploring the occurrence of

language barriers between the patients and the physician. Furthermore, the consequences of language barriers were measured by assessing medication prescriptions, written regimen in native language, prescribed sick leave and pain intensity during the visit and twenty-four hours after.

Study IV

In Study IV the congruity between answers in the verbal pain questionnaire in Finnish and Swedish was tested on bilingual Swedish speaking patients with self-reported diabetes. Monolingual Finnish speaking controls were also tested twice in Finnish in order to reveal intrinsic repetition variations.

The study was performed during 2013-2016 in one healthcare center in South Ostrobothnia and one in the metropolitan area as well as in the Finnish Diabetes Association. Fifty-one Swedish speaking bilingual patients aged 28-72 years and 10 Finnish speaking patients aged 40-65 years participated in the study. The Swedish speaking patients did not differ from the Finnish speaking comparison group regarding age, gender or duration of diabetes. All Finnish speaking respondents had a vocational qualification.

The Swedish speaking patients rated their proficiency in Finnish on a 5-grade scale: 0 (speak hardly at all), 1 (some ability to speak Finnish), 2 (fair ability), 3 (Finnish almost as good as mother language Swedish) and 4 (Finnish as good as mother language Swedish). One third of the Swedish speaking patients with diabetes (n=51) reported Finnish language proficiency close to their native language. Nine participants defined themselves as poor Finnish proficient, 11 having moderate and 14 good Finnish proficiency. The educational level of the Swedish and Finnish respondents varied somewhat between the language groups. No significant differences in age, gender or duration of diabetes were noted (p values >0.05).

Low educational level, generally only compulsory education, among the Swedish speaking participants was associated significantly with poor proficiency in Finnish. Those who reported Finnish proficiency next to their native language had at least a vocational qualification.

Both groups completed a numerical pain rating assessment (scale: 0-10) and the Pain Detect-questionnaire in their native language for measuring the intensity and mechanism of pain – neuropathic or not. Thereafter, the patients completed the standardized and validated short-form McGill Pain Questionnaire (sfMPQ) (test I), including fourteen sensory adjectives (i.e. the intensity and location of pain) and affective pain adjectives (i.e. the meaning of pain) (Ketovuori and Pöntinen, 1987; Melzack, 1987). The Finnish speaking controls and the Swedish speakers completed the Test I in Finnish. Thirty minutes later the Finnish speakers repeated the sfMPQ in Finnish (Re-test II) to reveal intrinsic repetition variations. The Swedish speakers repeated the sfMPQ in Swedish (Re-test II). Choosing the same adjective in both tests was scored zero (0), choosing a different adjective in the same question was scored one (1). Each patient could reach a score discrepancy for sensory pain between 0 and 10, and 0 – 4 for affective pain.

Statistical analyses

Data from the questionnaire in Study I were analysed with SPSS, using χ^2 -test. Statistical significance was set at $p < 0.05$. Furthermore, correspondence analyses by Benzécri were performed for displaying the set of data in two-dimensional graphical form (Benzécri, 1992). Answers to open questions about healthcare needs and problems difficult to express in the second language, as well as misunderstandings due to language barriers, were inductively sorted in categories with consistent content, whereupon an analysis of contents was performed (Tuomi and Sarajärvi, 2002).

The bivariate associations between discordant language communication and healthcare visits, health conditions and patient-reported health were calculated with SPSS and by using a logistic regression model in Studies II and III. The models were adjusted for age, gender, income and educational level. Descriptive statistics were used for analysing patient characteristics. Differences between language groups were calculated using logistic and linear regression. Statistical significance was set at $p < 0.05$.

The Swedish speaking participants, divided into four Finnish language proficiency groups (poor ability to speak Finnish, fair ability to speak Finnish, Finnish almost as good as mother language Swedish and Finnish as good as mother language Swedish), were compared with each other and with the Finnish speakers with parametric ANOVA followed by Bonferroni-test, non-parametric ANOVA with Dunns' test or with χ^2 -test, when appropriate. The statistical significance was set at $p < 0.05$.

Ethics

Study I was approved by the Social and Health Services Committee in Espoo. Study II, III and IV were approved by the Ethics Committee of the Helsinki and Uusimaa Hospital District.

The studies were planned and accomplished according to the legal requirements on medical research including data-protection rules and the international conventions concerning examination of patients in healthcare. No register of individuals was established.

Participating in the studies was voluntary and patients were provided with information about the study as well as an agreement-form in their native language, Finnish or Swedish. Patients dropped their completed and sealed questionnaires in a locked box in the waiting-room.

Results

Communication language and healthcare quality

Half (50.7 %) of Swedish speaking outpatients in primary healthcare (n=221) considered communication in their native language very important. One third of the participants described getting along with Finnish because they have no other common language with healthcare providers. Every tenth respondent who reported miscomprehensions caused by communication in their second language, Finnish, declared poor proficiency in Finnish (p=0.001). Low education further weakened the communication conditions for these patients. Consequently, they reported greater need for concordant language communication compared with highly Finnish proficient respondents. Difficulties in describing health problems in Finnish negatively influenced the patients' opinions of the healthcare providers' readiness to provide service in Swedish (p=0.002). Communication difficulties such as describing symptoms and pain, comprehension of diseases, aim and administration of medication and laboratory tests in the second language were also significantly more frequently reported by elderly than younger patients (p=0.004). Half (50 %) of the respondents reported enhanced motivation when healthcare was provided in concordant language. The motivational effect of concordant language increased among less Finnish proficient and less educated patients, and was significant among patients, unable to relate their health problems in Finnish. Poor Finnish proficient patients also reported decreased confidence in the healthcare providers and weakened healthcare quality. Approximately three quarters (73.7 %) of the respondents regarded concordant language communication very or relatively important. However, only 37 % of the participants reported that the healthcare providers preferred to communicate with them in Swedish. In the case of discordant language communication, 47 % of the patients chose to make a return-visit, consulted another healthcare specialist, or ceased to seek

medical advice. Most (78.5 %) of the respondents had not been referred to a language concordant healthcare practitioner. (Table 2)

Table 2. Respondent-reported (n=221) own Finnish language proficiency, the healthcare professionals' Swedish language proficiency and occurrence of misunderstandings and effect on self-care motivation

	Percentual (%) distribution on a Likert scale		χ^2 -test
The respondent's fluency in describing health problems in Finnish (question 4)	26.8 30.9 22.3 13.6 6.4	Very good Good Satisfactory good Poor Very poor	Correlation with the healthcare providers' helpfulness p=0.004
The healthcare personnel's comprehension of the Swedish speaker's native language (question 13)	8.8 11.5 34.1 28.6 17.0	Very good Good Pretty fair Poor Very poor	
The respondent asked for service in Swedish (question 7)	13.2 11.9 20.6 13.7 40.6	Always Relatively often Sometimes Rarely Never	
The importance for the patient to communicate about health problems in native language (question 5)	50.7 23.0 16.0 8.0 6.6	Very important Relatively important No matter Unimportant Of no relevance	
Was the respondent's native language asked in connection with the registration? (question 6)	6.0 7.4 12.5 12.5 61.6	Always Relatively often Sometimes Rarely Never	
The healthcare personnel's willingness to communicate in Swedish (question 11)	21.2 15.8 21.7 24.1 17.2	Very willing Relatively willing Somewhat Reluctant Refused to speak Swedish	
Have misunderstandings occurred due to communication in Finnish? (question 16)	1.6 8.5 9.0 16.0 64.4	Always Relatively often Sometimes Rarely Never	Correlation with respondents' Finnish proficiency p=0.001
Native language communication influences the motivation to adhere to professional advice (question 15)	26.0 16.5 10.5 8.5 38.9	Very much Relatively much Somewhat Relatively little Not at all	Correlation with the importance to communicate in Swedish p=0.001

Table 3. Respondents' choices due to discordant language communication

Alternative activity	Total number of activities (n=190)	Number and the kind of alternative activities related to the respondents' Finnish proficiency		
		Poor proficiency	Satisfactory proficiency	High proficiency
Revisit to the healthcare center	32	15	7	10
Talk to another expert	40	14	15	11
Ceased to seek medical advice	10	2	5	3
Undertook other activities	9	2	2	5
No activity	99	9	20	70

Language discordance complicating description of pain and healthcare utilization

The results of Study II showed that bilingual Swedish speaking emergency patients (n=139) visiting a GP reported more hypertension, diabetes and dyslipidemia compared with Finnish speaking patients (n=736). (Supplementary table) However, after adjustment for covariates (age, income, educational level and gender) no significant differences between the language groups in prevalence of self-reported chronic diseases were observed. There were no differences in smoking history and leisure time physical activity. The Finnish speaking participants reported significantly less daily alcohol intake ($p=0.05$) and considerably better perceived health compared to the Swedish speakers ($p<0.001$). (Table 4)

Table 4. The respondents' self-reported health conditions

	<i>Finnish speakers</i>	<i>Swedish speakers</i>	<i>Odds ratio Unadjusted</i>	<i>Odds ratio* adjusted</i>	<i>p value*</i>
High blood pressure % (n)	14.8 (109)	21.6 (30)	1.58 (1.007-2.49)	0.88 (0.49-1.6)	0.7
Diabetes % (n)	4.8 (35)	10.1 (14)	2.24 (1.17-4.29)	0.90 (0.38-2.1)	0.8
High cholesterol % (n)	11.0 (81)	11.5 (16)	1.05 (0.59-1.86)	0.52 (0.25-1.08)	0.08
Depression % (n)	16.0 (118)	15.8 (22)	0.98 (0.6-1.62)	1.31 (0.76-2.26)	0.3
Asthma % (n)	11.5 (82)	6.5 (9)	0.53 (0.26-1.08)	0.52 (0.22-1.24)	0.1
Smoking history % (n)	65.2 (480)	68.3 (95)	0.5 (0.59-1.29)	0.73 (0.45-1.17)	0.2
Exercise % (n)					
	0-1/week	28.3 (208)			
	2-3/week	46.1 (339)			
	4 or >/week	25.7 (189)			
Alcohol use % (n)					
	Once / month or less often	86.1 (630)			
	1-3 times weekly	12.8 (94)			
	Daily	1.1 (8)			
Perceived health % (n)					
	Below moderate	8.1 (59)			
	Moderate	22.0 (159)			
	Better than moderate	69.9 (506)			
			<i>Beta unadjusted</i>	<i>Beta* adjusted</i>	<i>P* adjusted</i>
			-0.1	-0.03	0.4
			0.1	0.07	0.05
			<0.001		
			-0.1	-0.06	0.1

* Analyses are adjusted for age, gender, income and educational level

The Finnish speakers seemed to visit a GP annually more frequently than Swedish speakers. A quarter (24.1 %) of the Finnish speakers made over 5 visits annually and Swedish speakers 10.7 % ($p < 0.001$). The access to a language concordant assigned GP was considerably better among Finnish speakers (98.4 %) than Swedish speakers (67.6 %) ($p = 0.001$). Swedish speakers had visited a GP previously for the same health problem prior to the present emergency visit ($p = 0.05$) in significantly more cases than the Finnish speakers. Swedish speakers also reported a greater need to revisit their assigned GP ($p = 0.001$). Concordant language communication significantly influenced the confidence in the GP's medical skills ($p = 0.001$) for all respondents but it was, however, less relevant for the Swedish speakers.

(Table 5)

Table 5. The respondents' healthcare visits and communication language

		Finnish speakers % (n)	Swedish speakers % (n)	t	p value for difference between language groups*
Annual GP visits	0	1.9 (14)	4.6 (6)	-3.45	0.001
	1-2	35.4 (257)	47.3 (62)		
	3-5	38.5 (279)	37.4 (49)		
	>5	24.1 (175)	10.7 (14)		
Concordant language communication with an assigned GP	Never	0.3 (2)	11.7 (13)	-13.8	< 0.001
	Sometimes	1.3 (9)	20.7 (23)		
	Always	98.4 (662)	67.6 (75)		
Preferred language with GP	Finnish	99.2 % (724)	3.7 % (5)	46.3	<0.001
	Swedish	0	75.6 % (102)		
	Does not matter	0.8 % (6)	20.7 % (28)		
Proficiency in the non- native language (second language)	None	6.4 % (43)	2.3 (3)	9.3	<0.001
	Some	13.3 % (89)	4.5 % (6)		
	Satisfactory	34.6 % (232)	20.3 % (27)		
	Well	35.2 % (236)	29.3 % (39)		
	Fluent	10.6 % (71)	43.6 % (58)		
Importance of language concordant communication	Very important	80.0 % (581)	51.9 % (69)	7.33	<0.001
	Quite important	15.7 % (114)	27.1 % (36)		
	No difference	3.6% (26)	19.5% (26)		
	Somewhat unimportant	0.3% (2)	0.8% (1)		
	Not important at all	0.4% (3)	0.8% (1)		
Confidence in the GP when concordant language	Very much	39.9% (285)	30.8% (41)		
	Quite much	36.1% (258)	23.3% (31)		
	Language irrelevant	20.8% (149)	44.4% (59)		
	Not much	2.9% (21)	0.8% (1)		

	None	0.3% (2)	0.8% (1)		
Earlier visit to the assigned GP for same health problem	No	59.6 (434)	51.5 (68)	1.98	0.05
	Yes	40.4 (294)	48.5 (64)		
Planned revisit to the assigned GP	No	816.1% (115)	52.7% (6)	6.13	<0.001
	Yes	3.9% (600)	47.3% (61)		

* Analyses are adjusted for age, gender, income and educational level using linear regression

The patient-reported reasons for the emergency visit were similar in both language groups despite small and non-significant differences in reported prevalence of respiratory infections, obstetrical, gynaecological and urological causes.

The better Swedish and Finnish proficiency, the better was all patients' experience of the emergency visit assessed by confidence in the physicians' professional skills. The motivation to adhere to the physicians' medical instructions after the visit was significantly weaker among the Swedish compared to the Finnish speakers ($p < 0.005$). (Table 6)

Table 6. Association between the patients' native language and their experience during the emergency visit (1-5 graded scale*)

	Swedish speakers Mean \pm SD (n) **	Finish speakers Mean \pm SD (n)**	<i>p</i> value
Sense of security/insecurity	4.23 \pm 0.9 (77)	4.0 \pm 0.9 (379)	0.99
Trust/fear	1.5 \pm 1.0 (71)	1.7 \pm 1.0 (372)	0.7
Confidence in / uncertainty of the GP's professional skills	3.8 \pm 1.0 (76)	3.8 \pm 1.0 (381)	0.1
Motivated / unmotivated to adhere to the GP's instructions	4.2 \pm 1.0 (76)	4.5 \pm 0.9 (381)	0.005
Satisfied /dissatisfied with the service	3.9 \pm 1.4 (77)	3.8 \pm 1.2 (382)	0.27

*1-5 graded scale: 1= the most negative experience, 5= the most positive experience

**Adjusted for age, gender, income and educational level

Most patients (68.8 %) reported GPs being highly proficient in Finnish and 60.3 % in Swedish. GPs were estimated to be proficient in both national languages by 67.6 % of the respondents. (Table 7)

The Finnish speakers reported significantly less unspecific pain when the GP's language proficiency in the patients' native language was perceived as good. The GP's poor language proficiency in the patients' native language, Finnish or Swedish, was associated with pain in all other reasons for the emergency visit except) musculoskeletal diseases. (Table 8) All patients completed the VAS pain scale, which demonstrated that Swedish speakers' poor language proficiency in Finnish significantly predisposed them to increasing pain experiences ($p=0.02$). (Table 9)

Table 7. Association between the GP's patient-reported proficiency in Swedish and Finnish* and the patients' experience of pain**

	Poor	Average	Good	
The GP's language proficiency in				
Swedish % (n)	20.6 (13) ***	19.0 (12)	60.3 (38)	
Finnish % (n)	5.1 (19)	26.1 (98)	68.8 (258)	
Both Swedish and Finnish	7.3 (32)	24.8(109)	67.6 (296)	
				<i>p</i> value
The patients' pain experience mean \pm SD (n)				
GP's proficiency in Swedish	3.7 \pm 2.43 (12)	2.7 \pm 2.0 (11)	2.8 \pm 1.9 (33)	Ns
GP's proficiency in Finnish	4.4 \pm 1.7 (18)	3.7 \pm 1.9 (91)	3.3 \pm 2.1 (252)	0.005
Proficiency in Swedish and Finnish	4.1 \pm 2.0 (30)	3.7 \pm 1.9 (103)	3.3 \pm 2.1 (285)	0.007

*Language proficiency scale 1=poor, 2=average, 3=good

** Adjusted for age, gender, income, educational level and native language

*** Errata notified in the published article, The association between patient-reported pain and doctors' language proficiency in clinical practise, table 3.

Table 8. Association between the GP's patient-reported proficiency in Swedish and Finnish* and pain experience (pain scale VAS 0-10) related to reason for emergency visit**

Pain experience, mean \pm SD (n) when the GP's language was as follows:				
value	Poor	Average	Good	<i>p</i>
Reason for visit				
Musculoskeletal problems	5.1 \pm 1.5 (6)	4.7 \pm 1.0 (27)	4.3 \pm 1.8 (77)	0.2
Other health problems	3.8 \pm 2.0 (23)	3.3 \pm 2.0 (75)	2.9 \pm 2.1 (202)	0.01
All problems	4.1 \pm 2.0 (30)	3.6 \pm 1.9 (102)	3.3 \pm 2.1 (285)	0.007

*Language proficiency scale 1=poor, 2=average, 3=good

** Adjusted for age, gender, income, educational level and native language

Table 9. Association between the patients' pain experience and their language proficiency in a non-native language*

VAS pain scale 0-10		Mean \pm SD (n)	<i>p</i> value
The patients' non-native language proficiency on 1-4 graded scale (1=none/poor, 4= fluent)	None or very poor	3.6 \pm 1.9 (78)	
	Satisfactory good	3.5 \pm 2.0 (132)	
	Good	3.2 \pm 2.1 (121)	
	Fluent	3.0 \pm 2.0 (66)	
	Total	3.4 \pm 2.0 (396)	0.02

*Adjusted for age, gender, income, educational level and native language

In conclusion, physicians' proficiency in both native and non-native language tended to improve the pain communication among bilingual Swedish speakers compared to monolingual Finnish speaking patients. GPs' poor language proficiency indicated increasing dissatisfaction with the emergency visit among all patients.

Pain assessment in native and non-native language

The congruity between answers in verbal pain questionnaires in Finnish and Swedish was tested among bilingual Swedish speaking participants with diabetes (n=51). Monolingual

Finnish speaking controls (n=10) were tested twice in Finnish in order to reveal intrinsic repetition variations. The Swedish and Finnish speaking participants were all predominantly females and they did not differ regarding occupational status, age, duration of diabetes and BMI. The educational level varied somewhat among the Swedish speakers while all Finnish speakers had a vocational qualification. One third of the bilingual Swedish speaking participants with diabetes reported proficiency in their second language, Finnish, as close to their native language. Nine respondents (17.6 %) reported poor (hardly any or some) Finnish proficiency. These patients had also the lowest educational level. (Table 10). Both the Swedish speakers' and the Finnish speaking controls' self-assessed BMI was on average equal.

There was no difference in pain intensity within the Swedish speaking group, differentiated in the four Finnish proficiency categories. The Finnish speaking controls (n=10) reported similar pain intensity compared with the Swedish speakers. Five (50 %) Finnish speaking respondents scored on PainDETECT, pain likely to be of neuropathic origin and eleven (22 %) Swedish speaking participants. The sensory qualities of pain measured by sfMPQ did not differ between the language groups.

Poor Finnish proficient Swedish speakers scored significantly more differences between Test I and Re-test II than Finnish speaking respondents (ANOVA $p < 0.001$). The differences increased in line with declining Finnish proficiency. Swedish speakers with moderate or good proficiency in Finnish did not differ from monolingual Finnish speakers in any other studied aspect. Swedish speaking patients scored the meaning of pain, the affective quality of pain, differently in Swedish and Finnish. No differences were shown in scoring sensory descriptions of pain, i.e. intensity and location of pain.

Table 10. The Swedish speaking respondents' (n= 51) educational level and Finnish proficiency in Study IV.

Basic education		Finnish as good as Swedish	good Finnish proficiency	moderate Finnish proficiency	poor Finnish proficiency
elementary school	13	2	2	3	6
student	3	0	2	1	0
academic degree	8	1	4	2	1
vocational qualification	27	11	9	5	2

*Errata notified in the published article, Pain assessment in native and non-native language: difficulties in reporting the affective dimensions of pain, table 1.

Discussion

Language discordance main outcomes

The current studies showed that healthcare delivered in Finnish caused primarily poor Finnish proficient Swedish speakers, difficulties in describing health problems, including pain.

Discordant language communication decreased their motivation to adhere to medical instructions and they frequently experienced distrust, misunderstanding and the need for a revisit. Asymmetric language decreased care satisfaction and the assessment of care quality in primary healthcare. Less educated and elderly patients with chronic disease experienced particularly serious communication difficulties in their second language. Despite equally reported chronic diseases in both language groups, the Swedish speakers in the emergency department visited a physician less frequently than the Finnish speakers.

Visiting a language concordant physician had several favourable effects on primarily poor Finnish proficient Swedish speakers. Communication in native language coincided with a decrease in all emergency patients' self-reported unspecified pain but the effect was particularly apparent among the Finnish speakers. By contrast, the GP's poor Finnish proficiency coincided with a significantly increased degree of Finnish speakers' self-reported pain. Poor Finnish proficient Swedish speakers had considerable difficulties in describing the affective quality of pain and the difficulties increased in line with declining Finnish proficiency.

The results from the current studies agree with prior findings showing several disadvantages due to discordant language communication with bilingual patients.

Comprehension problems are common

Comprehension problems due to discordant language communication were reported by 20% of bilingual Swedish speaking patients visiting healthcare centers. Especially poor Finnish proficient elderly patients had difficulties to describe their health problems in a second language. They reported inability to relate their symptoms, pain and illness, parts of the body as well as to explain gynecological problems in their non-native language. One out of ten Swedish speaking patients reported misconceptions occurring often or always due to absence of, or poor proficiency in, a common native language with healthcare providers. The relationship between healthcare providers' low language proficiency in the patient-preferred language and miscommunication has also been confirmed previously (Stolk, 1998). Moreover, the findings revealed that poor Finnish proficient bilingual patients showed decreased adherence to medication and medical instructions, as had likewise previously been demonstrated (Diamond et al., 2019).

The possibility of bilingual patients' over-optimistic impression of their own language proficiency in the second language might explain comprehension difficulties, demonstrated in other studies (Dagsvold et al., 2016; Hut, 2018). Language barriers could also reduce patients' understanding of the complex health care system (Inagaki et al., 2017; Parker et al., 2017).

The first impression of healthcare quality is influenced by the physicians' choice of language and is fundamental for building the patient-physician relationship (Rimondini et al., 2018). As the emergency patients in the present studies met an unfamiliar physician in the emergency unit, the first impression probably influenced the language communication. The findings show that bilingual Swedish speakers with advanced Finnish skills were able to

develop a satisfactory communication style even if they did not share the same native language with the physician. No data about the first impression of the physicians in emergency care, nor about possible unfair treatment by the physicians were gathered in the current studies. The first impression of the physician, and consequently also the patient-physician interaction, might however, change along with continuity in care increasing trust and mutual understanding (Raivio, 2017). Thus, long term healthcare relationships established by family doctors could grow in mutual comprehension and trust even without complete native language proficiency. However, chronically ill Swedish speaking patients with limited skills in a second language benefit most from visiting an empathic, preferably Swedish speaking physician. This finding agrees with prior studies in other countries (van Wieringen et al., 2002; van Osch et al., 2017).

The present studies did not explore the physicians' attitudes to Swedish speaking patients' native language preferences. However, criticizing bilingual patients for their language preferences has a markedly negative impact on the patient-physician relationship (Hanefeld et al., 2017). Bilingual Swedish speakers appeared to resolve unsatisfying language communication conditions in several ways. Arranging a revisit and visiting another healthcare specialist were the most frequently reported consequences of unsatisfying language communication. Ceasing to seek medical advice due to the absence of concordant language healthcare was revealed among Swedish speaking patients irrespective of their Finnish proficiency level. This somewhat alarming finding may emanate from coincidental elements, such as healthcare practitioners' unkind or critical behaviour. However, complex health problems, impossible or stressful to describe in a non-native language, have been revealed in prior studies and could also explain the Swedish speakers' healthcare behavior (Ali and Watson, 2018).

In general, bilingual Swedish speakers seem to have high expectations of getting service in their native language. The current studies showed that 61.6% of the Swedish speaking patients visiting a healthcare center had never been asked about their native language and a further 12.5% had been asked only rarely. Consequently, Swedish speaking patients were not referred to a language concordant healthcare provider. Fear of causing monolingual healthcare providers linguistic troubles is a frequently reported reason for less Finnish proficient Swedish speakers to communicate in Swedish. Because bilingual Swedish speakers are routinely considered to manage in their second language, Finnish, the language communication is mainly delivered on the monolingual healthcare providers' terms. Previous studies show that this praxis is related to healthcare providers' strong belief in bilingual patients' entire proficiency in two languages (Dagsvold et al., 2016). Current findings show, on the contrary, that bilingualism has various proficiency levels, apart from perfect, a fact which is also verified in recent research (Hut, 2018). The regularly performed language barometer 2004-2016 in bilingual (Finnish and Swedish) regions along the south and west coast and in Ostrobothnia also confirms current findings. Swedish speakers scored the language communication in their native language in healthcare a whole number lower (on average 7.8) on the Finnish numerical school grade (4-10 best) compared with the Finnish respondents (on average 8.7) (Lindell, 2016). The results from the language barometer also show that Finnish speakers receive superior service in healthcare regarding communication in their native language compared to Swedish speakers. Monolingual healthcare providers' optimism about the language proficiency of bilingual Swedish speakers often leads to ignorance of language preferences (Dagsvold et al., 2016).

The current studies showed that primarily poor second language proficient Swedish patients were disappointed when the healthcare practitioners were reluctant to communicate in Swedish. As these patients could not relate their health problems, they were consequently not

able to entirely utilize disease-related information. The result of unsatisfying communication conditions also caused more frequently reported low care quality.

Well educated patients were substantially proficient in the second language and had less need for native language communication. Despite this, not all high Finnish proficient Swedish speaking patients were able to communicate efficiently in their second language. This probably derives from problems with recalling and producing Finnish words, as shown in previous studies (Lehtonen et al., 2012; Hut, 2018). Neither does considerable bilingualism necessarily ensure knowledge of specific health-related words, a fact which has also been revealed in recent studies (Itzak et al., 2017). Discordant language communication is an additional healthcare obstacle for poor health literate patients, but due to the high quality of education in Finland, health illiteracy could not explain Swedish speakers' communication problems (Fleary et al., 2018).

Concordant language communication with Swedish speakers cannot, however, always be achieved in healthcare centers where the healthcare providers are mainly Finnish speaking monolinguals. Although concordant language communication significantly increased all patients' confidence in the GP's medical skills, this seemed less important for the Swedish speakers. These somewhat conflicting findings presumably demonstrate that most Swedish speakers have got used to the monolingual healthcare reality. The present studies did not clarify whether Swedish speakers' uncomfortable experiences of discordant language communication caused treatment interruptions or delayed healthcare.

These findings confirmed that bilingual Swedish speakers should not be considered as one homogenous linguistic group but as individuals with various language abilities. By investing in bilingually qualified healthcare providers, considerable improvements in language communication have been achieved (Sloots et al., 2010; Steinberg et al., 2016).

Risk of weak adherence

Without the patients' contribution in adhering to medical instructions, favourable healthcare outcomes are less likely to be achieved. Health coaching has been demonstrated to be an effective method in the management of chronic diseases, resulting in enhanced weight management, increased physical activity and improved physical and mental health (Kivelä et al., 2014). An important part of the improvement in health rests on the patients' motivation to utilize the prescribed instructions. Prior studies show that patients with language concordant physicians are twice as likely to receive counselling about diet and exercise as patients with language discordant physicians (Parker et al., 2017). The positive effects of counselling in patients' native language have been verified previously with objective measures (Diamond et al., 2019). One-fourth of the Swedish speaking individuals in Study I reported that a concordant language relationship considerably enhanced their motivation to adhere to medical advice. Almost 40 % of the patients did not express any effect of discordant language on their adherence. Whereas bilingual patients' language preferences seem impossible to anticipate before the visit, there is a definitive need for routinely exploring the patient-preferred language. It has been strongly suggested that this practice should be implemented in healthcare settings visited by bilingual patients (Fernandez et al., 2004; Detz et al., 2014; Dagsvold et. al., 2016).

The results from the present studies indicated that some of the foreign physicians were less proficient in Finnish and Swedish. Although not entirely irrelevant, this had, however, no major effect on the results since most of the physicians working in the Finnish healthcare are native Finns.

The association between discordant language communication and healthcare utilization has been verified in various healthcare settings elsewhere, but not among Finnish patients (John-

Babtiste et al, 2004; Jacobs et al., 2006; Diamond et al., 2019). The results from Study III revealed different healthcare utilization patterns among Swedish speaking emergency patients, compared with Finnish speakers. Significantly more Finnish speaking emergency patients visited a physician more than 5 times annually, compared with Swedish speakers ($p < 0.001$), despite a similar self-reported frequency of non-communicable diseases. Although our study did not target reasons for visit preferences, the discordant language communication frequently reported by Swedish speakers may be a reason for less health care utilization. The need for out-of- hour visits has been noted to decrease when the patients have the possibility of access to an assigned GP facilitating long-term patient–doctor relationships. This has positive effects on health outcomes in general (Vehviläinen et al., 2005). The Swedish speakers' visit preferences could indicate that language barriers generally cause less healthcare utilization.

Current findings from Study III regarding emergency outpatients self-reported chronic diseases and perceived health demonstrated small differences in health conditions between Swedish and Finnish speakers in contrast to observations in epidemiological surveys and studies utilizing registry data (Suominen, 2014). The national statistics from 2017 verify these results, also showing slightly more outpatient visits in healthcare centers among the Finnish speaking population, compared with Swedish speakers. The perceived symptoms and poor health status, lower quality of life and frequent visits to a primary healthcare provider are associated with increasing rates of GP visits (Karlsson et al., 1995; Kivelä et al., 2018). The complexity of these various problems has been suggested as underlying frequent emergency department attendees' healthcare needs, but such conclusions cannot be drawn from present study.

The use of private medical services alongside public healthcare has been comprehensively analysed in Finland. The results show that income and living in urban areas are strongly

related to increased private service use among Finns (Kallio, 2008). In 2012, nearly 40 % of the Finnish population visited a physician and of these, nearly 30 % had also visited a private physician. Differences between social groups have been suggested as primarily relating to patients' health condition and available services. (Manderbacka et al., 2017) Studies II and III did not show significant differences in the frequency of visits to private physicians between Swedish and Finnish speakers.

About 15 % of the Finnish population used several service providers during 2012. These data show that private healthcare increasingly focused on occupational health services, excluding retired and unemployed. (Kajantie, 2014) Irrespective of income, persons over 65 years old generally visited physicians in public healthcare centers but high-income elderly persons also use private medical service considerably more often (Hannikainen, 2018). The Swedish and Finnish speaking respondents in the present study were from the same region, having equal access to private services. No differences in socioeconomic factors and education that would explain different healthcare use were found between the language groups.

Study III findings showed that Swedish and Finnish speaking emergency patients used private medical services instead of public healthcare equally frequently. Probably the Finnish respondents used occupational healthcare more due to their younger age. This was not explored in the present study. However, this does not explain Finnish speakers' more frequent use of public healthcare compared with the Swedish speaking participants.

Swedish speaking emergency patients' language preferences differed significantly from those of the Finnish speaking patients ($p < 0.001$). Our findings confirmed that Finnish speakers generally have no doubt about access to language concordant healthcare providers, but Swedish speakers generally prepare for discordant language communication. Many Swedish speakers (43.6 %) reported fluent proficiency in Finnish but one quarter (24.8 %) reported

only some or satisfactory skills. The substantial difference in Swedish speakers' language preference when communicating with a GP - 75.6 % preferred Swedish and 3.7 % Finnish - and in their proficiency in Finnish - 67.6% of the Swedish speakers reported concordant language communication with their assigned GPs but the difference compared with Finnish speakers (98.4 %) is significant ($p < 0.001$). Concordant language with their GP was of less relevance for Swedish speakers' confidence significantly more often than for Finnish speakers, possibly revealing more about Swedish speakers' acceptance of the reality than describing the actual experience ($p < 0.001$). An unknown number of the Swedish speakers probably managed with partially concordant language communication, which has been shown to be functional in the case of many bilinguals (Diamond et al., 2012). Discordant language complicates accomplishing patient-centered communication, which facilitates treatment adherence, achieving targeted health outcomes and patient satisfaction, as demonstrated earlier (Johnson et al, 2004). Moreover, the present findings about Swedish speakers' healthcare use might derive from a failure to establish this beneficial approach in language discordant patient-physician relationships.

Anyhow, language problems generally cause patients concern, in addition to the intrinsically stressful emergency visit (Tate, 2105). The present findings do not exclude Swedish speakers' decreased use of healthcare resources due to discordant language patient-physician interaction. The association between insufficient language proficiency and underutilization of healthcare services has also previously been verified (Yeo, 2004; Ohtani et al., 2015).

Language communication and healthcare utilization

Finnish speaking emergency patients reported more annual visits to a physician than Swedish speakers although they reported equal numbers of chronic diseases ($p < 0.001$) in Study II. Swedish speaking emergency patients seem to visit physicians differently compared with

Finnish speakers. The Swedish speakers' visit preferences may indicate that language barriers cause less healthcare utilization which possibly contribute to insufficient health outcomes, as verified in prior studies from other countries (John-Babstiste et al, 2004; Jacobs et al., 2006).

Current findings regarding emergency outpatients self-reported health conditions and perceived health demonstrated small differences between Swedish and Finnish speakers. These results differ from observations in epidemiological surveys (Suominen, 2014). The national statistics from 2017 verify these findings showing slightly more outpatient visits in healthcare centers among the Finnish speaking population, compared with Swedish speakers. Perceived symptoms and poor health status, lower quality of life and frequent visits to a primary healthcare provider are associated with increasing rates of GP visits (Karlsson et al., 1995; Kivelä et al., 2018). The complexity of these various problems has been suggested reflecting frequent attenders' healthcare needs, but such conclusions cannot be drawn from the current study findings.

Swedish speaking emergency patients' language preferences differed significantly from those of the Finnish speaking participants. An unknown number of the Swedish speakers probably communicated partially in Swedish and partially in Finnish which has been shown to be functional in the case of bilinguals (Diamond et al., 2012). Discordant language complicates accomplishing patient-centered communication, which is likely to enhance treatment adherence, health outcomes and patient satisfaction, as demonstrated earlier (Johnson et al, 2004). The present findings might derive from a failure to establish this beneficial approach in language discordant patient-physician relationships.

Discordant language may lead to nurse- and physician-related safety risks in healthcare. Such cases are difficult to detect because standardized and explicit practices for assuring language concordant communication are lacking. Previous studies support the necessity of developing

guidelines for detecting and reporting as well as bridging language barriers in every healthcare setting aimed at avoiding severe mistakes (van Rosse et al. 2016).

Description of pain

Estimation of pain intensity is demanding and if not adequately accomplished exposes patients to poor analgesic therapy. The findings in Study I indicated that pain might be difficult to describe in a second language. Findings from Study III showed that Swedish speaking emergency patients tended to report less pain when communicating with a language concordant physician. Finnish speakers reported significantly less unspecified pain when visiting a language concordant physician. The results verify that while many bilingual Swedish speakers are used to trying, or had to try, to manage in Finnish in the absence of native Swedish speaking healthcare providers, monolingual Finnish speaking patients expect to have healthcare delivered in their native language. Finnish speaking patients have not generally experienced language barriers regarding pain but the growing number of foreign physicians in the Finnish healthcare system might increase Finnish speakers' experiences of such problems. Language discordant communication has predominantly been studied among immigrant patients treated by physicians representing the majority population. However, the impact of language communication between patients representing the majority population and less language proficient foreign physicians also needs further exploration.

Many diseases include different types of pain which need to be examined during the emergency visit. Fear of not understanding issues in the medical interview and being unable to adequately describe vital symptoms is stressing also for bilingual patients (Ali and Watson, 2018). Adequate pain communication is of considerable importance when aiming at diagnosing and alleviating the symptoms. For these reasons self-reporting is considered the gold standard. Earlier studies show consistently that insufficient pain communication results

in underestimation of pain and non-optimal pain medication (Cleeland et al., 1997; McCaffery and Pasero, 1999; McNeill et al., 2001; Puntillo et al., 2003; Davoudi et al., 2008; Melotti et al., 2009; Diamond et al., 2019). In discordant language communication physician-patient relationship difficulties might occur when assessing pain with free pain-descriptors, as demonstrated in Study I. By using the verbal pain measure MPQ discrepancies were defined regarding sensory and affective pain description in Swedish and Finnish among Swedish speakers with diabetes. The current findings demonstrated that poor Finnish proficient Swedish speakers' use of Swedish affective pain-descriptive words significantly differ from those in Finnish ($p < 0.01$). Healthcare providers do not consider language barriers as significantly impacting pain treatment, but prior studies confirm that unquoted pain increases the risk of worsening pain symptoms and causing frustration (Ciauzzi et al., 2011; Coran et al., 2013). The present results support the need in Finnish monolingual healthcare settings for identifying patients who are unable to describe emotional pain qualities in their second language. Prior studies show that it is possible to achieve considerable improvement in the interaction when physicians proficient in the patient-preferred language are linked to patients proficient in the corresponding language (Chang et al., 2010).

Strengths and weaknesses of data collection

Data about patients' subjective experiences can only be gathered with questionnaires or interviews but the method has limitations. The researcher-driven collection of data was laborious and required assistance from several persons. Not every patient who met the criteria set up for participation took part in the study. The number of potential Swedish speaking participants remained unknown, but the plausible loss of individuals might have influenced the reliability of the results. Those Swedish respondents who criticized the lack of concordant language healthcare provision might have completed the questionnaires more actively,

causing selection bias. On the other hand, considerably many bilinguals from the so-called Swedish-Finland participated in the studies, thus compensating possible distortion of the sample. The sample size ensured comprehensive coverage, which ensured the reliability of the results (Luoto, 2009).

The study lasted 12 years, starting in 2004 and ending in 2016, due to slow data gathering. During the study period the language ratio between Finnish and Swedish speakers remained unchanged. This confirmed the reliability of the results and eliminated selection bias of the data. The results from the language barometer 2004-2016 supported this assumption (Lindell, 2016). Thus, the studies are assumed to have been performed under similar conditions and their reliability was not compromised. The questionnaires used as measure methods have regularly been used in other pain and language communication studies and therefore were considered reliable.

Assessing language preferences and problem areas caused by discordant language communication has repeatedly been performed in diverse populations and healthcare settings. The validity of the instruments modified for culturally homogenous populations with different native language in Study I, II and III was verified by using repeatedly applied measures in analogous studies. The MPQ instrument has been systematically validated in pain research.

In 2018, the average age among outpatients was 77 years (Finnish Institute for Health and Welfare THL, 2018). More elderly Swedish speaking patients than Finnish speaking participated in the study and this was adjusted in the statistical analyses aimed at increasing the internal validity of the study. Selection bias was avoided by gathering Finnish and Swedish speakers from the same region.

Many populations are bilingual, but similar linguistic structure between the languages possibly facilitates mutual comprehension of the second language. This study demonstrated that two languages with totally different linguistic structures, such as Swedish and Finnish, do not support reciprocal comprehension of words in the non-native language. The Swedish speaking respondents' considerable variations in bilingual proficiency could be generalized to Swedish speaking Finns as a whole. By organizing access to a language concordant physician even more carefully, the healthcare quality could be considerably improved for all patients in Finnish healthcare.

The results from this study could furthermore be generalized to bilingual populations, such as Basque language speakers in Spain or the Irish speaking population in an English speaking environment, examples of two native languages with widely differing linguistic structures, similar to those in Finland.

Conclusions and future considerations

These findings showed that, discordant language communication caused poor Finnish proficient Swedish speaking patients, considerable difficulties, and this was more frequently the case among elderly, less educated and chronically ill patients. Deficient language communication could increase revisits and the risk for giving up adequate healthcare visits. Concordant language enhanced most aspects of high-quality healthcare such as the medical interview, pain communication, adherence to medical instructions and trust. The studies showed that increased language awareness and systematically and routinely performed assessment of bilingual Swedish speaking patients' language-preferences are needed in the Finnish healthcare system. A growing number of immigrants in Finland, originating from foreign cultures, would also benefit from routinely performed language assessment.

Poor Finnish proficient Swedish speakers apparently seem to have problems describing affective pain qualities in Finnish. This implies the necessity of performing pain assessment in patients' native language. The findings suggest that Swedish speakers might exhibit different healthcare visit patterns compared to Finnish speakers. The effects on healthcare outcome are unknown.

Healthcare routinely delivered in Finnish to bilingual Swedish speaking patients is not optimal, hence better awareness of bilingual patients' language preferences is strongly recommended. Standardized language proficiency assessments for the physicians would be helpful for developing satisfactory language communication in multilingual healthcare settings. Developing IT-solutions for helping patients in identifying language concordant physicians in their healthcare center could also be beneficial, especially for poor Finnish proficient patients.

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Supplements

Supplement A (Study I).

Questionnaire about healthcare delivered in Swedish

Cross only one possible answer for each question unless the instructions indicate other forms of answer.

1. Gender and age

- a. male, years b. female,years

2. Education (mention the highest educational level)

- a. primary school/lower secondary school
 b. vocational school/ high school
 c. college
 d. polytechnic/lower academic degree
 e. higher academic degree

3. Do you suffer from

- a. an acute disease b. a chronic disease

4. Are you able to describe your health problems in Finnish?

Very fluently 5 4 3 2 1 Very poorly

5. How important is communication in Swedish about your health problems?

Very important 5 4 3 2 1 Unimportant

6. Was your native language asked when you registered at the healthcare center?

Always 5 4 3 2 1 Never

7. Have you asked for healthcare service in Swedish?

Always 5 4 3 2 1 Never

8. Have you been referred to Swedish-speaking healthcare providers when you contacted the healthcare center?

Always 5 4 3 2 1 Never

9. Can you suggest some specific activities aimed at improving the language service for Swedish speakers in your healthcare center?

Please, classify the alternatives starting from the most important (draw number 1 in the square) to the second alternative (draw number 2 in the square) etc.

- Display: "We speak Swedish with pleasure in this healthcare center, please request it".
 The healthcare providers actively inquire your native language.
 You want to initiate by yourself the communication language
 Another activity, which.....

10. Has the healthcare providers' nametag equipped with a language flag facilitated communication in Swedish?

Very much 5 4 3 2 1 Not at all

11. How willing are the healthcare personnel to communicate in Swedish?

Very readily 5 4 3 2 1 Not at all

12. Are you unable to express certain needs or health problems in Finnish?

Always 5 4 3 2 1 Never

If you identify any problems, please mention some.....

13. Do the healthcare providers understand you when you speak Swedish?

Very well 5 4 3 2 1 Very poorly

14. Are you provided with written documents in Swedish?

- a. Medical instructions Always 5 4 3 2 1 Never
- b. Summary of your case record Always 5 4 3 2 1 Never
- c. Prescriptions Always 5 4 3 2 1 Never
- d. Treatment plan Always 5 4 3 2 1 Never

15. Does communication in Swedish influence your motivation to adhere to the healthcare providers' advice?

Very much 5 4 3 2 1 Not at all

16. Have clear misunderstandings occurred, when the communication takes place only in Finnish?

Always 5 4 3 2 1 Never

If misunderstandings have occurred, describe which kind.....

17. Has deficient Swedish language proficiency among healthcare providers resulted in
(you can circle several alternatives)

- a. a revisit to the healthcare center with the same health problem?
- b. contact ~~to~~ with another healthcare institution, for example a private physician?
- c. communication with another expert among your friends?
- d. no revisit?
- e. taking other forms of action? Which?
- f. no further action?

18. Does communication in Swedish increase your confidence in the healthcare providers' professional skills?

Very much 5 4 3 2 1 Not at all

7. Did you attend
- a Finnish-speaking elementary school?
 - a Swedish-speaking elementary school?
 - both a Finnish- and a Swedish-speaking elementary school?
 - another type of elementary school? Which?
8. Do you have a qualification from the healthcare sector?
- no
 - yes. Which?.....
9. What kind of work do you mainly do?
- farming, cattle-farming, forest work, housekeeping
 - factory work, mining, building or similar
 - desk job, intellectual work, service job
 - studying or schooling
 - householder (housewife/ housefather)
 - retired
 - unemployed
10. Your native language is
- Finnish
 - Swedish
 - Another. Which
11. Are you registered in the population registry with the same native language you declared in question 10?
- Yes
 - No. Mention your registered native language.....
12. If you are living in a couple's relationship mention the native language of your partner?
- Finnish
 - Swedish

Another. Which?

13. Which language(s) do you use at home at present? (You can choose several alternatives)

Finnish

Swedish

Another. Which?

14. Which is/was your mother's native language?

Finnish

Swedish

Another. Which?

15. Which is/was your father's native language?

Finnish

Swedish

Another. Which?

16. Which language(s) did you speak at home during your childhood? You can mark several alternatives.

Finnish

Swedish

Another. Which?

17. Which language do you prefer to use with your physician?

Finnish

Swedish

Another. Which?

18. Mention your second language (your best second language proficiency)

Finnish

Swedish

Another. Which?

I have no proficiency in other languages than my native language.

19. Which is your proficiency level in Finnish language? It is

[4] as good as mother language, Swedish

[3] almost as good as mother language, Swedish

[2] fair ability to speak Finnish

[1] some ability to speak Finnish

[0] nearly none

20. Which healthcare center or hospital do you generally visit?

21. Your present health condition is

very good

quite good

average

quite weak

very weak

22. How tall are you? (the precise length in cm)cm

23. Your precise weight without clothes (or lightly dressed) at present kg

24. Your highest weight during adulthood (women's weight during pregnancy excluded)kg

25. Have you ever smoked during your lifetime?

never

I stopped smoking months/ or years ago

I smoke only occasionally

I smoke 1-5 cigarettes a day

I smoke 6-20 cigarettes a day

I smoke more than 20 cigarettes a day

I smoke other tobacco products than cigarettes. Which and how many/much a day?

I use snuff

26. Your alcoholic beverage consumption at present (for example, beer or something stronger)

daily

two – three times a week

at least once a month

less frequently than once a month

I stopped drinking alcoholic beverages totally months/or years ago

I have never used alcoholic beverages in my whole life.

27. How many times do you generally exercise *weekly* at present so that you slightly lose your breath and get sweaty?

0 1 2 3 4 5 6 >7 times weekly

28. Have you ever had any of the diseases mentioned below confirmed or treated by a physician?
You can mark several alternatives.

Hypertension

Heart insufficiency

Heart attack, heart infarction

Coronary disease, angina pectoris

Intermittent claudication

Diabetes

Osteoporosis

Stroke

High cholesterol

Cancer

Tuberculosis

Depression

Asthma

Chronic obstructive pulmonary disease, chronic bronchitis

Any other disease requiring treatment. Which?

29. How many times do you visit a physician annually?

none

1-2 times

3-5 times

more than 5 times

30. For how long have you visited the same assigned GP (family doctor) in the healthcare center?

I do not have an assigned GP / I do not know who my assigned GP is

I have not visited my assigned GP at all

I have visited my assigned GP for weeks

I have visited my assigned GP formonths

I have visited my assigned GP for.....years

31. Do you use your native language when visiting your assigned GP?

never

sometimes

always

32. The reason for your current emergency visit (describe your symptoms as well as possible)

.....

33. Are you now going to visit your assigned GP in the healthcare center?

Yes

No. Why not?

34. Have you made previous emergency department visits or healthcare center visits for this same reason?

No

Yes. How many times altogether?, mention the date for your last visit
...../... 20.... and why you are making a visit again

35. If you have such information, mention your present diagnosis causing the emergency visit.

.....

36. Was your native language requested when you entered the emergency unit?

No

Yes

37. Do you expect the physician to communicate in your native language?

No

Yes

38. In which language, Swedish or Finnish, do you wish to communicate with the GP?

My native language

I communicate with equal ease in Finnish and Swedish

39. Are you going to communicate in your native language irrespective of the physician's language preference?

Yes

No

I do not know

40. What is the importance to you of native language communication with the physician concerning your health problems?

Very important

Quite important

It makes no difference because I communicate with equal ease in Finnish and Swedish

Not very important

Not important at all

41. Do you have health problems that you are unable to describe in other languages than your native language?

No

Yes. Describe why

I do not know

42. Do you assume that communication with the physician in your non-native language will probably result in misunderstandings and confusion?

No

Yes. Which are the most frightening problems?

43. Would a shared native language between you and the physician affect your confidence in the physician's professional skills?

Very much

Quite much

I have confidence irrespective of the communication language

Not very much

Not at all

Supplement C (Study III).

Post-visit questionnaire (II) for the emergency patient

Cross or mark with a circle only one alternative if there are no other instructions.

1. Diagnosis /or reason for the emergency visit.....

2. Did you perceive the physician's native language?

Swedish

Finnish

Another. Which?

3. Describe your feeling in the emergency unit. (Circle the number which best corresponds to your feeling; the most positive feeling is 5, the most negative is 1)

Very secure	5	4	3	2	1	Very insecure
Very afraid	5	4	3		2	1 Not afraid at all
Great respect for professional skill	5	4	3		2	1 Very uncertain about the physician's professional skill
Very motivated for self-care	5	4	3		2	1 Very unmotivated for self-care
Very satisfied with the care	5	4	3	2	1	Very dissatisfied with the care

4. Was the communication language with the physician your native language during the emergency visit?

Yes (if you crossed this answer, go straight forward to question 6)

No (if you crossed this answer, please answer question 5)

Partly (if you crossed this answer, please answer question 5)

5. The reason for your language choice (You can choose several alternatives)

you were not proficient in the physician's native language

the physician was not proficient in your native language

the physician did not understand you

you did not understand the physician's questions when she/he spoke your native language

you were afraid and distressed when you observed that the physician did not understand your native language

another reason. Which?

6. Did you communicate in your native language even though the physician was untrained in your native language?

Yes. Why?.....

No. Why not?.....

7. Score the physician's proficiency in your native language (4=weak proficiency ---10= perfect proficiency)

Score (4-10):

8. Were blood tests or other laboratory tests collected in order to examine your health problem during the emergency visit?

No

Yes

I do not know

9. Were x-ray/-rays performed in order to examine your health problem during the emergency visit?

No

Yes. Which?.....

I do not know

10. Was any medication prescribed?

No

Yes. Which?.....

11. Were you prescribed sick leave for your health problem?

No

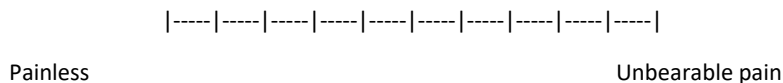
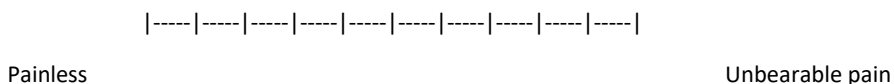
Yes, totally _____ days

12. Was any analgesic drug prescribed?

No

Yes. Which?.....

I do not know

13. If you had pain, how intense was it when you arrived at the emergency unit? (Draw a cross on the scale below)**14. If you still had pain twenty-four hours after the emergency visit, how intense was it? (Draw a cross on the scale below)****15. Did you receive self-care instructions in your native language about self-care? (This does not concern medication prescriptions)****You can mark several alternatives.**

Verbal in Swedish

Written in Swedish

None in my native language

Verbal in another language than my mother tongue. In which language?

Written in another language than my mother tongue. In which language?

Not any instructions

16. Were you able to adhere to the self-care instructions?

Yes

No. Why not?

17. Did you ask any friend how to perform the self-care instructions delivered by the physician?

Yes. Why?

No

18. Did you phone the healthcare center to get more advice about the treatment of your disease?

Yes

No

19. Did you phone anyone else to get more advice about the treatment of your disease?

No

Yes. To whom? _____

20. Did you visit the emergency unit/hospital for the same health problem ~~in~~ within 4 weeks of the initial emergency visit?

No. Why not?

Yes. Why?.....

21. How many times have you visited your assigned nurse or public health nurse or your family doctor (assigned GP) in your healthcare center for the same health problem?

0 Not at all

1 time

2 times

3 or more times

22. How many times have you visited a GP in your healthcare center for the same health problem which caused the emergency visit?

0 Not at all

1 time

2 times

3 or more times

23. Did you visit a private physician for the same health problem which caused the emergency visit?

No. Why not? (if you crossed this alternative do not respond to questions 23, 24, 25 and 26)

Yes. Why?.....and how many times?times

24. Did the private physician prescribe laboratory tests?

†Yes

†No

25. Did the private physician prescribe x-rays?

†Yes

†No

26. Were you prescribed sick leave for your health problem?

†No

†Yes, totally _____ days

27. In which language did the private physician communicate?

Swedish

Finnish

Another. Which language?

28. Do you have access to private physicians for your actual health problem in the region where you are living?

No

Yes

I do not know

Supplementary table (Study II)

Characteristics of the respondents

Total 875 (n)	Finnish speakers (males n=175 females n=561)	Swedish speakers (males n=47 females n=92)	Chisq <i>p</i> value for difference between groups	
Annual income (€)	Males (%)			
	0-20 000	38.6	44.4	
	20 001-30 000	30.0	33.3	
	> 30 001	31.0	22.2	0.5
	Females (%)			
	0-20 000	51.5	53.7	
20 001-30 000	33.9	37.8		
> 30 001	14.6	8.5	0.3	
			Mean difference 95% CI	
Age, yrs (mean)	39.5	47.5	-8.0 (-10.5 to -5.3)	
Males (mean)	39.5	50.1	-10.6 (-15.5 to -5.67)	
Females (mean)	39.5	46.1	-6.7 (-9.8 to -3.5)	
Education				
Years (mean)	13.7	13.0	0.7 (0.2 to 1.4)	
Males	13.4	12.6	0.8 (-0.5 to 2.0)	
Female	13.8	13.2	0.6 (-0.2 to 1.4)	
BMI % (n)	Males			
	≤ 20	3.5 % (6)	2.2 % (1)	0.4 (-5.4 to 6.2)
	20.01-25	35.3 % (61)	26.7 % (12)	
	25.01-30	40.5 % (70)	57.8 % (26)	
	> 30	20.8 % (36)	13.3 % (6)	
	Females			
	≤ 20	13.7 % (75)	2.2 % (2)	-2.6 (-6.2 to 1.1)
	20.01-25	41.0 % (224)	40.7 % (37)	
	25.01-30	24.4 % (133)	37.4 % (34)	
	> 30	20.9 % (114)	19.8 % (18)	

Original publications I-IV