

Cervical cancer screening among immigrants in Norway

Challenges, possibilities and the effect of an intervention



Kathy Ainul Møen

Thesis for the degree of Philosophiae Doctor (PhD)
University of Bergen, Norway
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I dedicate this thesis to my mother.

Died so young, but had great impact on many lives, for the most beautiful flowers in the garden are picked first.

"A mother holds her children's hands for a while, but their hearts forever."

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Scientific environment

This research has taken place at the Department of Global Public Health and Primary Care, Faculty of Medicine at the University of Bergen and the Unit for Migration Health at the Norwegian Institute of Public Health. The project was funded with grants from the Norwegian Cancer Society, a 50% PhD candidate position from August 2015 to July 2019, which was funded through the Unit for Migration Health at the Norwegian Institute of Public Health. I have also received funds from Norwegian GPs' Research Committee (Allmenntmedisinsk Forskningsutvalg) and Norwegian GPs' Research Fund (Allmenntmedisinsk forskningsfond, the Norwegian Medical Association).

The main supervisor has been Dr Esperanza Diaz, associate professor at the Department of Global Public Health and Primary Care, Faculty of Medicine at the University of Bergen, and the co-supervisor Dr Bernadette Nirmal Kumar, professor at Empower School of India.

The research team consisted of researchers with different professions and experiences. There were physicians, nurses, sociologist and research assistants with education including in the field of economy. The team who conducted the focus groups and interviews consisted of researchers and assistants from Pakistan, Sri Lanka, Somalia, India, Poland and Spain. Thus, the women from Pakistan and Somalia could communicate in their own language with the researchers.

The reference group included researchers, policy makers and users in the field of Migrant Health and had three meetings between 2015 and 2018. There were three international members; two from Denmark and one from Great Britain. The other members were from the Norwegian Institute of Public Health, Norwegian Cancer Registry, Norwegian Directorate of Health, representatives from the Pakistani and Somali community and representative from immigrant user associations. Representatives from the Norwegian

General Practitioner Medical Association, Norwegian Association of Midwives and representatives from Oslo municipalities were also invited, but unfortunately, they couldn't attend the meetings.

Acknowledgements

The interrogatives “why” and “how” have been the two main words in this thesis and in my career-life as a General Practitioner (GP). This thesis started with “why immigrants don’t participate in the cervical cancer screening program” and “how can we make them participate”, and as a general practitioner, “why immigrants don’t come to me as often as non-immigrants” and “how can I make them realize that general practitioners can help them”. With these questions, I contacted my main supervisor in 2014. It has been a long and wonderful journey with lots of learning, dedication, respect and admiration since then.

I have been so lucky to have the best supervisor-duo, Dr Esperanza Diaz and Dr Bernadette Kumar, who are dedicated to the health of immigrants and work for their better health, both on the national and international level.

I thank Dr Diaz for her infinite enthusiasm, engagement and dedication. She has, both encouraged me and stimulated my reflections. A PhD student’s life is mostly a roller coaster, times of despair and triumph. I thank her very much for always being there for me. She has been encouraging me in times of disappointment and celebrated the triumphs. Her drivecraft has helped me to achieve even greater goals.

My co-supervisor Dr Kumar has offered me great support, making me realize that I could reach new heights, not just be satisfied with where I am. I very much appreciate her comments on the papers and thesis. I am most thankful for her ability to make time for discussions even in-between busy schedules. She always let me feel like I am one of the members of the “big family” at the Norwegian Centre for Minority Health Research (NAKMI), which is now a unit under the Norwegian Institute of Public Health.

The Section for General Practice at University of Bergen is always a good place to be. I thank all the colleagues for taking me into their academic environment with enthusiasm, their valuable comments on the way and their support and encouragement, especially Professor Anders Bærheim for giving valuable comments on this thesis. Professor Kirsti Malterud has given me helpful ideas on the qualitative part of the thesis. Dr Jannicke Igland has helped me with the statistics analysis. I thank her for always being there to answer me and explain.

I thank all the colleagues at the Unit for Migration Health, Norwegian Institute of Public Health, for their support and collaboration. It has been a wonderful journey with valuable discussions, meetings and celebrations.

The national research school in general medicine (NAFALM) has been a good place to learn, discuss and develop as a researcher. I thank all the lecturers, especially professor Linn Gertz and associate professor Stefan Hjörleifsson, and my fellow students there for educational gatherings and valuable discussions.

Without the Norwegian Cancer Society's grant and the Norwegian Medical Association's research grants for general practitioners, I could not have completed this project. Many thanks to AFU and AMFF, and the Norwegian Cancer Society.

I also extend a big thanks to the participants in the focus groups; the general practitioners, gynaecologists and midwives, for taking their time and sharing valuable knowledge.

I am most grateful for the coordinators for PhD students at the Institute for Global Health and Primary Care, Daniel Gundersen and Kirsti Nordstrand, who have always been helpful with the practical things, arranging research school gatherings and sending reminders.

I also would like to thank the university librarians Christine Tarlebø Mjøs and Hilde Wedvich for effective and knowledgeable help with literature search.

I thank all my friends for their encouragement and support in times of stagnation, especially my good friend Denise Hagen for taking her time proof-reading the document.

I thank my family for their encouragement and infinitive support, especially my children for their cooperation, interest and patience, my nephew for his help with the graphs. Last but not least, my utmost thanks go to my husband for proof readings, help with comments and layout, and for his patience. I would have never achieved this without his support all the way, from *medicinae studiosum* to *philosophiae doctor*.

Abbreviations

CIN: Cervical Intraepithelial Neoplasm

CCS: Cervical Cancer Screening

EEA: European Economic Area

GP: General Practitioner

HCPs: Health Care Provider

HELFO: Norwegian health economics administration database

HIC: High Income Countries

HPV: Human Papilloma Virus

LMIC: Low-and-Middle Income Countries

MBR: Medical birth registry

NCCSP: Norwegian cervical cancer screening program

NCR: Norwegian Cancer Registry

NIPH: Norwegian Institute of Public Health

NPR: National Population Registry

RCT: Randomized Controlled Trial

SSB: Statistics Norway (Statistisk Sentral Byrå)

WHO: World Health Organization

Summary

The aims of this thesis were: (i) to determine immigrants' participation rate to CCS compared to non-immigrants and predictors to take the CCS-test, (ii) to obtain knowledge of HCPs perceptions regarding CCS test among immigrants and how they overcome barriers, strategies being used, if any, and (iii) to measure the effect of the intervention conducted at general practices as a cluster randomised controlled trial.

Being a mixed method study, data from different sources, both quantitative and qualitative, were collected and analysed for this thesis. Norway has well established national registers which we took advantage of. The first paper was a cross sectional register-based study using the National Population Registry (NPR), the Norwegian Health Economics Administration Database (HELFO), the GP database ("Fastlegedatabasen"), and the Medical Birth Registry (MBR). We grouped the immigrants by world's geographic region, carried out descriptive analyses and constructed several logistic regression models. The main outcome variable was whether the woman was registered with a CCS-test or not. This study was part of a bigger registry study "Immigrant health in Norway" and thus data already available from 2008.

The second paper presents a qualitative study conducted in 2016, where we used thematic analysis to study three focus groups among general practitioners, and four semi-structured personal interviews; two among gynaecologists and two among midwives. Based on the results of these interviews, a literature review and findings from focus groups conducted among Somali and Pakistani women (focus groups among immigrant women were conducted parallelly by other members of our research group, and are not a part of this thesis), we developed an intervention to increase the participation of immigrants to CCS that was tested using a cluster-randomised study design. The intervention targeted general practices in the clusters and immigrant women were the units of analysis.

The intervention consisted of (i) an educational session for GPs; about immigrants' lower attendance to CCS, some groups having higher prevalence of cervical cancer, and urging GPs to ask about CCS when immigrant women came for consultations for other reasons, (ii) distribution of a mouse pad for GPs in order to remind them of the intervention in their everyday work, and (iii) a poster with a message in four languages (Somali, Polish, Urdu and English) to be placed in the waiting rooms. The intervention was implemented from January 2017 to June 2017, and its effect is presented in the third paper. The main outcome variable was status of screening of the women by January 2018 measured by means of data linked from NPR, GP-database and Norwegian Cancer Registry.

Our study confirms that there is lower participation to CCS program in Norway among immigrants compared to non-immigrants. Higher income, residence in rural areas, and having a female GP were associated positively with CCS-test for both immigrants and non-immigrants. The focus groups and interviews among HCPs revealed several challenges related to CCS. While some barriers were common for both immigrants and non-immigrants such as GPs' understanding of routines and responsibilities for prevention, others were aspects specific for immigrants related to organization of appointments, language, health literacy levels, culture and gender. Some HCPs described several strategies that they already tried to implement to address the existing barriers, such as having longer consultations (organization), using interpreters (language), using anatomy models to explain (health literacy) or dealing differently with the expression of pain (culture).

The intervention had a statistically significant effect, both measured as relative effect (OR (95% CI)) 1.24 (1.11-1.38), and as absolute effect (RD (95%CI)) 2.6 (1.1-4.0) adjusted for baseline screening. In addition, in subgroup analyses, the intervention particularly increased participation among women who were not screened at baseline of the intervention and among some specific immigrant groups.

Our study presents a feasible intervention in general practice that can increase the participation of immigrants to CCS. However, the effect is clinically small, and we do not know how long it might last or its cost-effectiveness. Thus, we suggest further research including: piloting of measures that facilitate other primary care providers outside general practices, for example midwives, to perform the task, long-term evaluations and studying cost-effectiveness.

Migrant health is public health. Public health studies targeting ethnic diversity are necessary to make effective and good policies for achieving health equity. Our randomised controlled study may also be used as a model to increase CCS among immigrants in other HIC. This could also be piloted among primary care providers in HIC to target other health issues where the gap between the majority population and immigrants should be bridged.

Norwegian Summary

Formålet med denne avhandlingen er (i) å sammenligne innvandrerkvinnens deltakelse i livmorhalscreeningprogram med kvinner som ikke er innvandrere og å undersøke hvilke kjennetegn som predikerer at innvandrerkvinner tar livmorhalsprøve, (ii) å undersøke hvilke perspektiver helsepersonell har på det at innvandrerkvinner tar livmorhalsprøve og deres tanker om hvordan man kan overvinne eventuelle barrierer under konsultasjonen, samt hvilke strategier som eventuelt kan brukes, og (iii) å måle effekten av en intervensjon utført på fastlegekontorer for å øke innvandrerkvinnens deltakelse i livmorhalscreeningprogrammer ved hjelp av en klusterrandomisert, kontrollert studie.

Avhandlingen tar i bruk både kvantitative og kvalitative metoder, og er dermed en såkalt «mixed method»-studie. Data ble samlet fra forskjellige kilder. Norge har gode nasjonale registre som vi benyttet oss av i første studie som er en tverrsnitts-, registerbasert analyse. Norsk pasientregister, Helseøkonomiforvaltningen (HELFO), Fastlegedatabasen og Medisinsk fødselsregister ble tatt i bruk. Innvandrerkvinner ble gruppert ifølge SSB sin gruppering av verdensdeler. Deskriptive analyser og flere logistiske regresjonsmodeller ble gjennomført. Den viktigste utfallsvariabelen var om kvinnene hadde tatt livmorhalsprøve eller ikke i 2008.

Neste studie var en kvalitativ studie hvor vi brukte en tematisk analyse for å analysere resultater fra tre fokusgrupper som vi hadde blant fastleger og to semistrukturert intervjuer gjort med gynekologer og jordmødre. Basert på funnene, litteraturgjennomgang og en annen kvalitativ studie med fokusgrupper blant innvandrerkvinner fra Somalia og Pakistan, utviklet vi en intervensjon som vi implementerte på fastlegekontorer i Bergen (fokusgruppene med innvandrerkvinner ble satt opp og analysert av vår forskningsgruppe i Oslo og er ikke en del av denne avhandlingen.) Intervensjonen hadde tre komponenter: (i) et kort innlegg i lunsjen på legekontorer om innvandrerkvinnens lavere oppmøte til

livmorhalscreening og som oppfordret fastlegene til å spørre om livmorhalsprøve når kvinner kommer med andre problemstillinger, (ii) en musematte som takk for innsatsen som skulle fungere som en påminnelse til legene, og (iii) en plakat med beskjeden «du kan forhindre livmorhalskreft ved å ta en enkel prøve. Bestill time hos din fastlege i dag!» på Somalisk, Polsk, Urdu og Engelsk. Den skulle plasseres på venterommene på legekantorene. Intervensjonen ble evaluert i 2019 med en kluster-randomisert kontrollstudie for å se om den hadde gitt effekt. Denne analysen er den tredje studien i avhandlingen.

Resultatene fra den første studien viste lavere oppmøte blant innvandrerkvinner sammenliknet med norske kvinner. Høyere inntekt, bosted i landlige områder og kvinnelig fastlege var forbundet med å ta livmorhalsprøven for både innvandrere og norske kvinner. Fokusgrupper og intervjuer med helsepersonell viste oss at det er mange barrierer for livmorhalsprøver. Fastlegenes forståelse for rutiner og ansvar når det gjelder forebyggende arbeid var felles både for innvandrerkvinner og norske kvinner. Noen av aspektene ved fastlegene var spesifikke barrierer for innvandrerkvinner f.eks. det å organisere time for livmorhalsprøve, språk, helsekunnskap, kultur og kjønn. Helsepersonell hadde allerede noen strategier for å overvinne disse barrierene; å ha lengre konsultasjoner med innvandrerkvinner (organisatorisk), bruke tolk (språk), bruke anatomimodeller for å forklare om kroppen (helsekunnskap) og å handle annerledes når innvandrerkvinner uttrykker smerte under prosedyren (kultur).

Intervensjonen ble evaluert gjennom en kluster-randomisert kontrollert studie og analysen viste en statistisk signifikant effekt i den totale studiepopulasjonen. I tillegg viste subgruppeanalyser at intervensjonen hadde effekt blant kvinner som ikke hadde tatt livmorhalsprøve tidligere og kvinner fra Somalia, Pakistan and Poland.

Studien vår presenterer en gjennomførbar intervensjon i fastlegekontorene som kan øke innvandrernes deltagelse til livmorhalscreening. Effekten er imidlertid klinisk liten, og vi

vet ikke hvor lenge effekten varer. Det er også vanskelig å si noe sikkert om kostnadseffektiviteten. Derfor foreslår vi videre studier og pilotering av tiltak som tilrettelegger for at annet helsepersonell i primærhelsetjenesten utenfor fastlegekontorene, for eksempel jordmødre, også skal kunne ta livmorhalsscreeningsprøve og vi foreslår ytterligere langsiktig evaluering og analyse av kostnadseffektiviteten av intervensjonen.

Innvandrerhelse er folkehelse. Gode studier som er rettet mot et mangfoldig samfunn er nødvendige for å skape effektive og gode politiske retningslinjer som fører til helsefremmende tiltak. Vår randomiserte, kontrollerte studie kan også brukes som modell i primærhelsetjenesten i andre høyinntektsland som har helseutfordringer i områder hvor gapet mellom den generelle befolkningen og innvandrerne er stort.

List of Publications

Artikkel I-III

I. Møen, K., Kumar, B., Qureshi, S., & Diaz, E. (2017). Differences in cervical cancer screening between immigrants and non-immigrants in Norway: A primary healthcare register-based study. *European Journal of Cancer Prevention: The Official Journal of the European Cancer Prevention Organisation (ECP)*, 26(6), 521-527.

II. Møen, K., Terragni, L., Kumar, B., & Diaz, E. (2018). Cervical cancer screening among immigrant women in Norway- The healthcare providers' perspectives. *Scandinavian Journal of Primary Health Care*, 36(4), 415-422.

III. Effect of an intervention to increase the participation of immigrants to cervical cancer screening - A cluster randomised controlled trial in General Practice

Submitted for publication

Kathy Ainul Møen, Bernadette Kumar, Jannicke Igland, Esperanza Diaz

Note: I will refer the articles as Paper I, II and III.

Concepts and definitions

Migration is a highly political theme and migration and health as a research area is relatively new. Therefore, terms and use of words are still evolving. The following definitions were taken from the glossary of International Organization for Migration (IOM) (1), First World Congress on Migration, Ethnicity, Race and Health (MERH 2018) (2) and the book “Migrant Health- A Primary Care Perspective” (3), The World Bank (4), The Norwegian Directorate of Immigration (5) and The Norwegian Health Economics Administration (6).

Asylum seeker: A person who seeks safety from persecution or serious harm in a country other than his or her own and awaits a decision on the application for refugee status under relevant international and national instruments. In case of a negative decision, the person must leave the country and may be expelled, as may any non-national in an irregular or unlawful situation, unless permission to stay is provided on humanitarian or other related grounds.

Country/region of origin: The country that is a source of a migrant or migratory flow (regular or irregular).

D-number: A D-number is a temporary identification number that one receives in if one has applied for protection (asylum) in Norway, or if one has a residence permit and will be staying in Norway for less than six months.

Ethnicity/ethnic group: The social group a person belongs to, and that the person either identifies with or is identified with by others, as a result of a mix of cultural and other factors including language, diet, religion, ancestry, and physical features traditionally associated with race. All people have an ethnicity – not only minorities.

Equity: The absence of avoidable or remediable differences among groups of people, whether those groups are defined socially, economically, demographically, or geographically.

Exemption card: One is entitled to a healthcare exemption card (Frikort) once he/she has paid a certain amount in user fees when receiving healthcare services. When one presents his/her exemption card, he/she does not have to pay user fees for the remainder of the calendar year. There are two exemption card schemes for health care services (6).

Exhausted migrant theory: The health advantage of a “healthy migrant” deteriorates rapidly as the length of stay in host countries increases, leading to worse health outcomes as compared to the situation at arrival.

General population: Everyone in the population being studied, but sometimes used to indicate the population other than ethnic or social minorities.

Health care providers: By health care providers (HCP) in this study, we mean general practitioners, gynaecologists and midwives. These are the personnel who are involved in cervical cancer screening test, although general practitioners have the main responsibility.

Healthy migrant theory: Often migrant populations tend to comprise individuals in a particularly good state of physical and mental health, reflecting a selected sub-population. The similarity with the “healthy worker effect”, due to the exclusion of unhealthy workers from employment, has given rise to the term “healthy migrant effect”.

HIC/LMIC: The World Bank has classified countries according to their gross national income per capita. In 2019 high-income countries are those with a gross national income per capita of \$ 12 056 or more, low-income countries have \$ 995 or less and lower middle-income countries between \$ 996 and \$ 3 895.

Irregular migrant: A person who (for example) owing to unauthorized entry, breach of a condition of entry, failure to gain asylum, or the expiry of his or her visa, lacks legal authorization to reside in the country where he or she is living. Synonyms in use include clandestine/ undocumented migrant or migrant in an irregular situation.

Majority population: The population, excluding ethnic minority groups. When used in race/ ethnicity studies this phrase is usually used as a synonym for white or European.

International migrant/Immigrant: While there is no formal legal definition of an international migrant, most experts agree that an international migrant is someone who changes his or her country of usual residence, irrespective of the reason for migration or legal status. Generally, a distinction is made between short-term, or temporary, migration, covering movements with a duration between 3 and 12 months, and long-term, or permanent, migration, referring to a change of country of residence for a duration of 1 year or more. The term is sometimes wrongly applied to the offspring of migrants born in the country of settlement. An error of the opposite kind is made when people born abroad, but with ancestry in the country of settlement, are not referred to as migrants (e.g. the Aussiedler in Germany, descendants of colonists, or possibly expelled from other countries).

The use of the words migrant and immigrant has different political connotations in different countries. In this thesis, I will use the term “immigrants” when I refer to women in Norway. I will use the term “migrants” when I refer to studies from other countries where the term “migrants” was used.

Migration: The movement of a person or a group of persons, either across an international border, or within a State. It is a population movement, encompassing any kind of movement of people, whatever its length, composition and causes; it includes migration

of refugees, displaced persons, economic migrants, and persons moving for other purposes, including family reunification.

Refugee: A person who, "owing to a well-founded fear of persecution for reasons of race, religion, nationality, membership of a particular social group or political opinions, is outside the country of his nationality and is unable or, owing to such fear, is unwilling to avail himself of the protection of that country. (Art. 1(A)(2), Convention relating to the Status of Refugees, Art. 1A(2), 1951 as modified by the 1967 Protocol). In addition to the refugee definition in the 1951 Refugee Convention, Art. 1(2), 1969 Organization of African Unity (OAU) Convention defines a refugee as any person compelled to leave his or her country "owing to external aggression, occupation, foreign domination or events seriously disturbing public order in either part or the whole of his country or origin or nationality." Similarly, the 1984 Cartagena Declaration states that refugees also include persons who flee their country "because their lives, security or freedom have been threatened by generalised violence, foreign aggression, internal conflicts, massive violations of human rights or other circumstances which have seriously disturbed public order".

The usage of “immigrants” and “migrants” in this thesis

In Norway, the term “immigrants” is used widely instead of “migrants”, and mean individuals who were born outside Norway. Offspring of immigrants are sometimes mentioned as “second generation immigrants” in some literature, but this is not recommended in migrant health glossaries, which is understandable because this group cannot be referred as “immigrants”. However, in paper III, we include offsprings of immigrants as “immigrants” because the numbers in each group will be very small without them.

Preconception

In qualitative studies, proximity to the field is an important prerequisite, and the researcher should possess a reflexive attitude in order to give the empirical data an analytical interpretation. Reflectivity means that the researcher is able to see the importance of his or her own role in interaction with the participants, the empirical data, the theoretical perspectives, and the understanding (previous knowledge) that the researcher brings with him in the project (7).

Already as a teenager in Sri Lanka, I experienced that public health is the core in medical science. I was privileged to study medicine in Norway after experiencing several years of civil war in Sri Lanka. At the end of my studies at the University of Bergen, I wanted to become a general practitioner. As I saw it, nothing could compare to a general practitioner's close relationship with a patient, privileged to follow him/her over so many years, and giving medical help, and sometimes just being a fellow human being for that patient. I experienced this during the four weeks as an intern in a general practice when I was a final year medical student.

While I practiced as a general practitioner, I noticed that even though I had many patients with immigrant background, I rarely met them. The questions "why don't they come?", "what could be done?" and "how can it be done?" were raised. At the same time, I came across an article in the local newspaper about a research project on immigrants' use of the emergency room by Dr Esperanza Diaz. I contacted her and asked her whether I could be her research assistant. We began to work on an application about cervical cancer screening among immigrants in Norway right after.

My experience with cervical cancer screening was minimal when I came to Norway as a 23- year-old woman. I didn't hear about it in Sri Lanka as there wasn't any regular screening program. However, I heard stories about women from my (Tamils in Norway)

community died of cervical cancer because many of them did not take the symptoms seriously, and many of them did not participate in screening programs. Furthermore, I myself was not aware of cervical cancer screening before I had my first child in Norway at the age of 29. Neither did I get the invitation letter from the Norwegian Cancer Registry, nor did my general practitioner recommend the CCS test. It was clear to me that knowledge about cervical screening among immigrant women in Norway was too low. Therefore, when my supervisor asked me whether I was interested in starting a research project on this subject I didn't hesitate to say yes.

Over these four years as a PhD candidate, I have been privileged to learn a lot, not only about cervical cancer among immigrants, but also about behaviour change among individuals. There are many factors that change the behaviour of individuals; both women and health care providers. To achieve long term behaviour change is the aim of every researcher in this field.

Furthermore, being a general practitioner and as an immigrant myself had given me this unique opportunity to get to know many patients with immigrant background and to motivate me to contribute to this research topic where there is a vast gap.

1. Introduction

Migration is not always a simple journey from one place to another; it could be haphazardous, perilous and even life threatening. For example, the much talked about “boat-refugees” where approximately 27 000 lives were lost last two decades in an attempt to cross the ocean to Europe (8). At the same time, it could also be a desired and productive journey that lets you experience a new culture for some years. Global migration is complex, but reports such as World Migration Report 2018, help us understand some aspects of this complexity (3). This report states that international migration makes an important contribution to population growth in some areas where there is population decrease. Migrants consist of large proportions of working-age people and thus lower the dependency ratio (number of children and older persons vs people in work-age). Women play an increasingly significant role in all regions and comprise nearly half of all migrants in 2017 (9).

Migrants in Europe are a heterogeneous population of people who originate from different countries, belong to different cultures, and speak different languages. They are refugees, asylum seekers, labour migrants, educational migrants and migrants who move for family reunification. In addition, people with no legal permit to stay in a given country are defined as undocumented or irregular migrants. Migrant categories as mentioned above, may reflect particular beliefs, goals and interests of the parties who assign these labels (10).

Both the WHO Europe (11) and UCL Lancet commission (10) have declared that migrant health is public health, and emphasized the need for the highest attainable health services for migrants in their reports in 2018. They further emphasize that without a sustainable and equitable health system for migrants, there will not be a well-developed public health care system. Legislating and implementing appropriate policies regarding migrant health issues has been challenging for several high-income-countries (HIC). A solid foundation

is necessary to build the right architecture for global public health, and for that, migration should be understood as a health determinant within which health care services operate (3).

1.1 Migration to Norway

Migration to Norway increased about four decades ago when oil was discovered, and Norway needed more workers (12). The Pakistanis, followed by the Turkish, were the two main immigrant groups in the 1970's. After the introduction of the Immigration ban in 1981, the immigration profile changed from economic migrants to refugees and asylum seekers. The main immigrant groups in this period came from Sri Lanka, Iran, and Iraq. After the Schengen agreement, signed in 1985, labour migrants, many of them from Eastern Europe, became the biggest groups moving to Norway. Even though labour migrants from Poland constitute one of the biggest migrant groups in Norway, they arrived much later, when Poland became a member of EU in 2005. Thus, immigrants in Norway today are quite heterogeneous in terms of social, cultural, religious, and migration background.

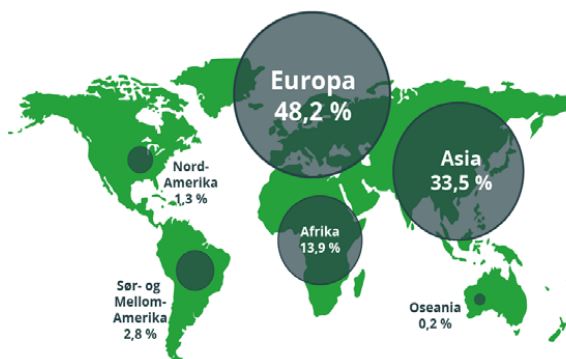


Figure 1: Where do immigrants come from? Source: Statistics Norway, report on immigration 2019. Mind that SSB has taken immigrants' offspring as "immigrants".

Immigrants constitute 14,4% of the total population in Norway as per January 2019 (SSB), whereas 3,4% are Norwegians born to immigrant parents. Most of the immigrants today moved from Poland and Lithuania as labour migrants. The main reason people immigrate to Norway is thus labour, followed by family reunion and thereafter refugees and asylum seekers. Figure 1 shows where immigrants come from, by continent, to Norway.

Women comprised 48,2% of all immigrants in January 2019, most of them from Asia (13). The proportion of immigrant women who take higher education and are employed has been steadily increasing the last few years despite differences between groups (13). In 2018, the total fertility rate for immigrant women was 1.87 per woman - the lowest ever. The fertility rate for all women in Norway was 1.56, but there are variations among groups. For example, newly arrived women from Syria and Eritrea give birth to an average of 3,51 and 3,27 respectively (14).

1.2 Migration and health

Migration and health are dynamic. Different events at the different phases in the migration cycle (figure 2) such as the following can interact with the health status of a person: the loss of family members before migration; violence under flight; exploitation, unfriendly migration policies and social exclusion after arrival in the host country. Furthermore, during the return phase, factors such as family ties in both countries, duration of absence and health services at the country of origin will influence the health of a migrant.

According to the “healthy migrant theory” (15), migrants are healthier than the general population upon arrival in the host country. People who migrate are often younger and healthier than people who stay behind, as they often need to tackle the dangerous long journey and hurdles and begin a life from scratch. This theory is, however, not evident

among all recent immigrants and might not always apply for refugees (16). Poor living conditions in the refugee camps can lead to poor health and need for special care.

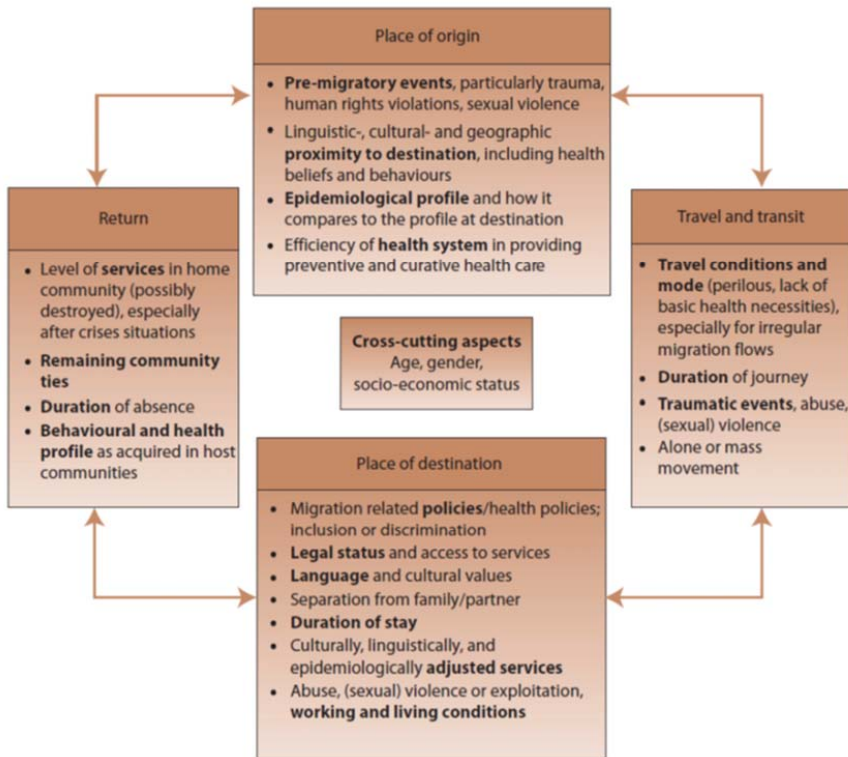


Figure 2: The migration cycle: source: *Migrant Health: A Primary Care Perspective* (reference 3)

Long term residence in a new country might lead to health deterioration among some immigrants, and this is called the “exhausted migrant theory” (17). The “allostatic load” refers to the price the organism has to pay for its efforts to maintain stability through change and it has been used to explain part of the mechanisms by which chronic stress can lead to poor health for immigrants trying to cope with difficulties and adjusting to a new environment. On the other side, well-functioning coping strategies, support from society, physical activity and adequate nutrition are factors which can ease this process (17), and build up “resilience”, or the capacity to adapt in the face of adversity, trauma, tragedy, threats or other type of stressors.

For many years, the influence of migration in health was explained through the social determinants of health. However, migration is now considered an independent determinant of health (18). Factors associated to migration and other social determinants of health along the pathway (pre-, during and post-migration), however, can interact and multiply their effect as mechanisms to undermine immigrants’ health.

Migration influences the health of a migrant by sociodemographic changes, and changing place-specific rates of illness and mortality. As soon as they become immigrants, both men and women undergo a process of physical and psychosocial change, with consequences for somatic and mental health. More often than the majority population, immigrants face inequality in access to health care and consequently unmet health needs, especially when it comes to non-communicable diseases like diabetes and coronary heart diseases (19). This inequality is further justified by socio-economic differences, racism and discrimination, lower paid jobs, less education and living in crowded areas (20).

Yet, beyond these common problems, female immigrants often face new challenges in sexuality, fertility and reproductive health care. Structural barriers and navigating health care system (21), financial and cultural barriers to host country’s health services, in

addition to self-neglect, can lead to multiple health problems among immigrant women (22).

1.3 The Norwegian health care system

The health care system in Norway (figure 3) is tax-based and publicly funded. Health care is semi-decentralised; municipalities are responsible for primary care and the state for secondary care (23).

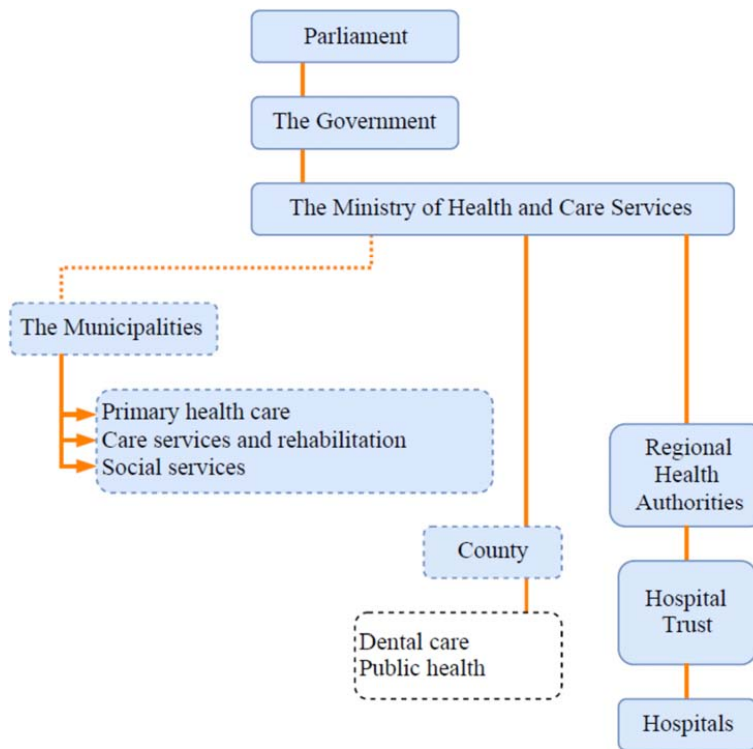


Figure 3: Overview of the Norwegian Health Care system, slightly modified, source: A.K. Lindahl, Norwegian Knowledge centre for health services, 2015

Primary health care includes GPs and emergency rooms in addition to nursing homes, home care, midwives, nurses working with healthy-child care (health centres) and physiotherapy services. Secondary care services include both specialists and hospitals.

In Norway, all residents staying a minimum of 6 months, and registered asylum seekers are members of the National Insurance Scheme, which entitles them access to a GP and Emergency Primary Care services. Everyone who is registered in the National Registry as resident in a Norwegian municipality is entitled to have a GP. Asylum seekers with a D-number are also entitled to a GP. All residents can choose their own GP as long as the GP is available. One can also change the GP twice a year (24). Undocumented immigrants are not entitled to regular health care, but only acute help defined as help that can't wait, contagious diseases, some psychiatric help, pregnancy and childcare.

Patients, except children and pregnant women, pay a subsidised consultation fee when visiting their GP. Patients get a health care exemption card ("frikort"), covered by the national insurance scheme, for public health services once they have paid more than a certain amount (\approx NOK 2 400 in 2019, \approx 10 consultations) in user fees. When they obtain the exemption card, they do not have to pay user fees for the remainder of the calendar year. Hospital services are free for the patients, however there is a co-payment of approximately 400 NOK for out-patient services.

Preventive care is provided at health centres, health clinics and general practices. Nurses and midwives typically work at the health centres ("helsestasjon"), while GPs work in general practices ("fastlegekontorer"). Public health nurses at the child health centres provide vaccination and health check-ups of infants and school children up to the age of 16 years, while midwives at health clinics and GPs take care of antenatal and perinatal care. Service at the health clinics is free of charge and most providers are women.

1.4 Immigrants' use and perception of preventive care

Immigrants' use of primary care services has been studied in Norway by means of the available personally identifiable national registers, including data from consultations with GPs. There is significantly lower use of primary health care services among immigrants in Norway, especially among elderly immigrants (25-28). However, those who contact their GPs, have a 2-15% higher consultation rate as compared to the host population (29). Immigrant's lower use of primary health care could be explained by either the "healthy migrant theory" or barriers to access.

To identify immigrants' use of preventive care by means of Norwegian registers is a difficult task because the researcher depends on the diagnostic codes from the GPs and because consultations at the health clinics and health centres are not registered in the same way as general practices. Studies from other countries show lower use of preventive care by immigrants (30-32), due to both the economic and other factors like lack of knowledge about the health system (31).

Immigrants' perception of preventive care may differ among the different immigrant groups and from the perception of host population; a Swedish study (33) reported that immigrants in general were offered health screening without necessary information. The study found that immigrants were disappointed because the screening service mainly focused on identifying infectious diseases and overlooked their actual needs. This disappointment occurred even though they acknowledged that there are benefits in regards to health screening. In addition, immigrants expressed concern that all the information letters were only in Swedish. Moreover, in another study, immigrant women expressed that they did not see their GPs if they didn't have any symptoms, thinking that it would be a waste of resources (34).

1.5 Cervical cancer and screening

Immigrants in Norway have a generally lower incidence of cancer compared to non-immigrants, with two exceptions; men from Eastern European have more lung cancer than the general population, and for some groups of immigrants from low-income countries, the incidence of liver cancer and stomach cancer is particularly high (35).

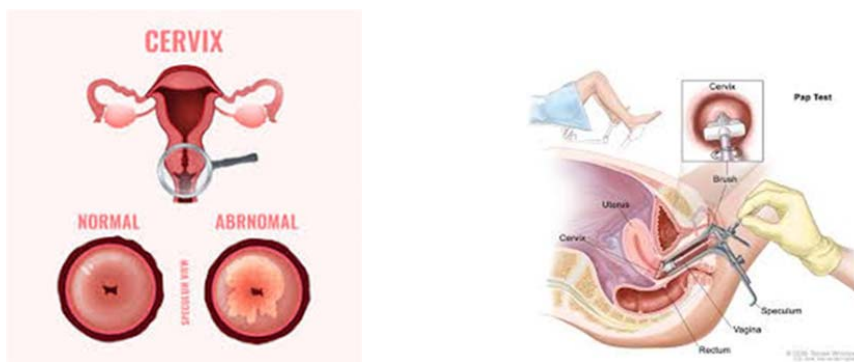


Figure 4: Anatomy of cervix and how the CCS test is taken: National Cancer Institute, USA.

Cervical cancer is cancer of the cervix (figure 4), the entrance to the uterus from the vagina. The primary cause of this cancer is Human Papilloma Virus (HPV). One becomes infected with this virus under sexual intercourse. There are many types of HPV, but the two high-risk types are type 16 and 18, which cause the majority of cervical cancers. These types stop the normal activity of cells, causing them to reproduce uncontrollably which leads to cancerous tumour.

Pre-cancerous cervical cells are called Cervical intraepithelial neoplasia (CIN). These pre-cancerous stages are not dangerous, but if left untreated, they can develop into cancer. If cervical cancer is diagnosed at an early stage, it's usually possible to treat.

There have been many methods to detect pre-cancerous stages over the years in HIC. The Papanicalou test, often called the "Pap-test", was the first test used to detect abnormal cells in a smear from the cervix (figure 4). This test has good specificity, but relatively poor sensitivity. Many LMIC still use this test or Thin Prep or liquid based cytology (variation of Pap-test). Many HIC have changed from the Pap test to HPV DNA testing. This test is more effective at early detection than traditional Pap test. However, this test would probably not be affordable for population-based screening in LIC.

The HPV vaccine has been introduced in many HIC in their National Immunisation Programme. This vaccine covers 70% of cervical cancer cases (36), and is most effective for women who have not had sexual contact. The duration of the effectiveness of vaccine is still not known and the opportunistic rise in prevalence of previously low incident oncogenic HPV types cannot be predicted. Thus, women should continue to undergo CCS despite HPV vaccine.

The Norwegian Cervical Cancer Screening Programme (NCCSP) aims to reduce the incidence and mortality of cervical cancer through identifying and treating early cancer stages, which if left untreated have a high likelihood of progressing to invasive cancer. It is based on triennial screening with cytology smears among women aged 25-69. Women with no registered screening test during the last three years receive a reminder letter from the Norwegian Cancer Register with a recommendation to make an appointment with their General Practitioner (GP) to take a CCS test. Overall, 76% of the women have taken a smear after two reminders (37) and more than half of the women diagnosed with cervical cancer have rarely or never taken a CCS test.

1.6 Cancer screening among immigrants

International studies showed immigrants have lower attendance to preventive screening like breast/cervical and colorectal cancer screening (38-40). In addition, women without regular primary care providers had the lowest cancer awareness and minimal screening activity. Some of them, even though they knew about the important information regarding cancer and early detection, do not participate in screening (38). Preoccupation with resettlement problems, low self-confidence, language issues, and other cultural barriers to health care services were mentioned as possible explanations.

The general barriers which prevented immigrant women from participation in cervical, breast and colorectal screening in the literature were inability to pay, lack of transportation to doctor's office, fear or embarrassment, dislike of having a male physician perform the examination, language problem and process is too uncomfortable or risky (41).

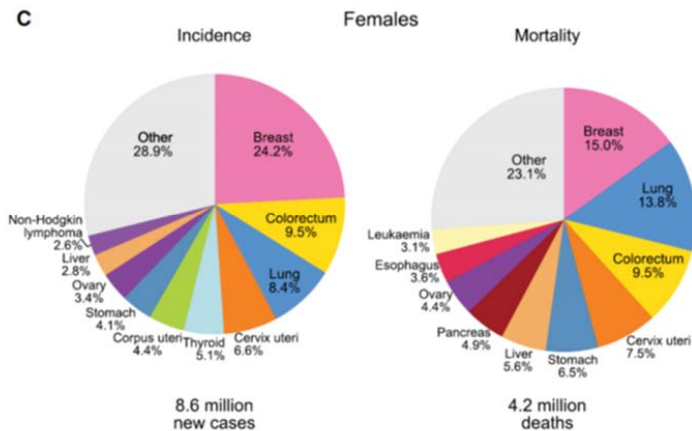


Figure 5: Pie Charts Present the Distribution of Cases and Deaths for the 10 Most Common Cancers in 2018 for females. Source: GLOBCAN 2018

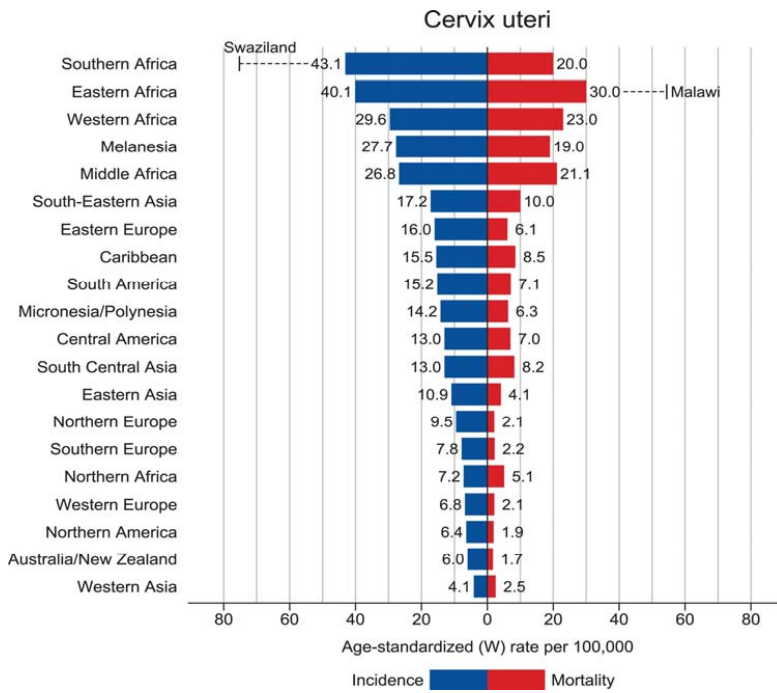


Figure 6: Bar Chart of Region-Specific Incidence and Mortality Age-Standardized Rates for Cancers of the Cervix in 2018. Rates are shown in descending order of the world (W) age-standardized rate, and the highest national age-standardized rates for incidence and mortality are superimposed. Source: GLOBOCAN 2018

Cervical cancer is the fourth most frequently diagnosed cancer and the fourth leading cause of cancer death in women worldwide (42) (see figure 5), especially in Sub Saharan Africa and South East Asia (42). Figures 5 and 6 show cervical cancer in an international perspective while figure 7 shows age standardized incidence rates of cervical cancer in Norway. We should note that according to figure 7, women from Sub-Saharan Africa and South Asia have lower incidence in Norway, which is contradictory to GLOBCAN report

as in figure 6. This could be because of “healthy migrant effect”, failure to register, do not take the CCS test or the way categorize countries in migrant health research.

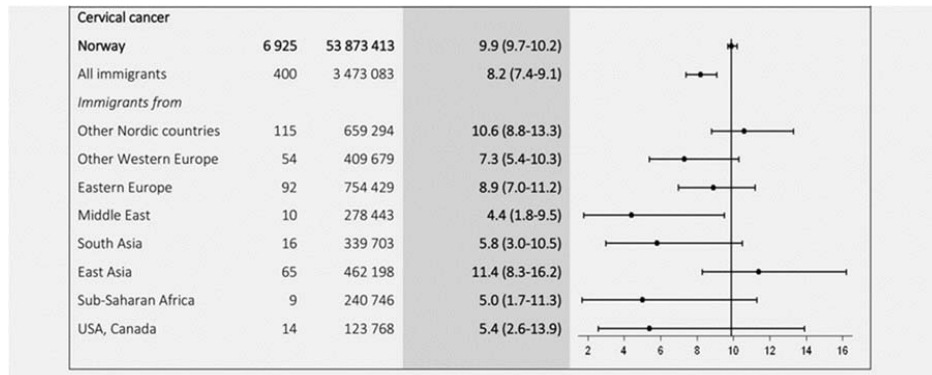


Figure 7: Age-standardized incidence rates (ASRs) with 95% confidence intervals (CIs) for cervical cancer by birth region. Source: Ethnic differences in the incidence of cancer in Norway. *Int. J. Cancer*, 140: 1770-1780. doi:10.1002/ijc.30598, permission given from authors.

Barriers and facilitators for cervical cancer screening among immigrants

Before our study, there was little knowledge about cervical cancer screening among immigrants in Norway. Even though the Norwegian Cancer Registry sends invitations and reminders to all the women between 25 and 69 years old, and the letters and reminders raise the attendance for the general population, their efficiency among immigrants was unknown. The screening programme in Norway does not explicitly target immigrant women. Reminders are sent in Norwegian, which might dissuade immigrant women from participating in screening or health intervention programmes.

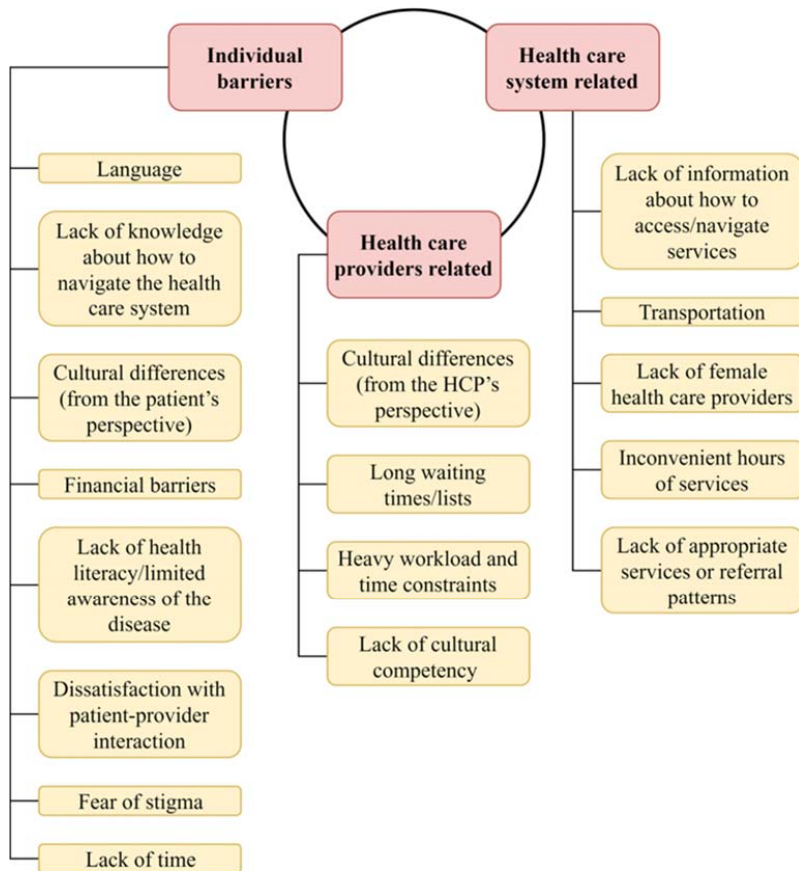


Figure 8: Barriers to cervical cancer screening in three levels which are integrated with each other

Following a recent scoping review (43), results from a qualitative study among immigrant women from Somalia and Pakistan in Norway conducted by our research group (44), a recently published Norwegian Study (45), and other international studies

(46-51) including a scoping review from Canada (34), barriers to cervical cancer can be classified in three categories: individual, related to health care providers and health system-related, as illustrated in figure 8. Some of these barriers are common to the majority population, while others are specific to one or several immigrant groups. These three levels of barriers; individual, health care system-related and health care providers-related, interrelated with each other, but nevertheless, I have grouped them for the sake of systematization (figure 8).

Barriers related to the individual patient

Sociodemographic barriers

Low educational level (52), low income, being in extreme age groups (older/younger), being single, distance to the screening facility or transport difficulties, cost and time, having family and work responsibilities are described as barriers to take CCS test. More specifically for immigrants, low health literacy (44, 52) including preventive health concept, language barriers (53), lack of awareness of cervical cancer screening, low levels of acculturation, and patriarchy (partner's preferences such as husbands not allowing them to take the test and women needing partner's approval, limited support and encouragement), difficulty getting child care and prioritising children, partner and other family members and procrastination have been described.

Beliefs and attitudes

Beliefs including not being at risk for cervical cancer (44), being healthy and having no gynaecological symptoms to warrant screening, not perceiving CCS test as beneficial, screening not viewed as important or necessary, fear of pain and discomfort from the procedure (34, 44), embarrassment and modesty (44), fear of the possibility of receiving

positive results, fear of stigma among mostly unmarried women (might be viewed by others as sexually active, circumcision) and fear of losing their virginity have been mentioned as barriers.

Cultural and religious barriers

Screening viewed as against an individual's cultural and religious beliefs (44), believing that God will protect oneself from cancer and not wanting to expose private body parts to other men than one's husband (34), preference for traditional or alternative care, physician-patient hierarchy (ie immigrants regarding physicians as authoritarian) and cultural differences between patient and provider in non-concordant consultations have also been described as barriers.

Barriers related to health care providers

Provider related barriers include providers not providing health education, not advising, recommending or encouraging women to screen for cervical cancer. In some situations, physicians' heavy workload (34) leads to suboptimal explanations about CCS test or failing to recommend the test. For some groups of immigrants this is especially important, as they respect physicians as authoritative personnel and don't think a test is necessary if the physician does not actively recommend it. Physician's unawareness of screening guidelines (54) has also been stated as a barrier. The lack of cultural competency among HCPs can lead to misunderstandings and non-compliance (34). Challenges with interpreters during consultations, especially regarding male interpreters during gynaecological examinations can be a barrier. Last, negative attitudes of providers towards some groups of patients have also been reported.

Barriers related to the health care system

The cost of the CCS test was mentioned as a barrier for women who come from lower socio-economic groups. Lack of a regular physician and a female provider (44), long waiting times (55) to get an appointment for the test were mentioned as barriers. In addition, lack of appropriate reminder system and of interpretation services, lack of access or having difficult access to facilities where the test is done (34), or unavailability of services were also reported as barriers. Finally, lack of trust in the health care system have also been reported as a critical barrier.

Facilitators for cervical cancer screening

A recent literature review from the United States (56) looked in to different facilitators which I have tried to group in the same three categories: individual level, health care provider level and health care system level.

Factors such as linguistic skills (language in the host country), health literacy (what cancer is and understanding the prevention methods), having the financial means to pay for screening tests, having higher education, longer stay in the host country and support from family members and the community were mentioned as facilitators for screening at the individual level. Regarding HCPs; having a regular HCP and visiting her/him regularly, having a HCP who is fluent in the same language as the patient and obtaining recommendations or referrals from the HCP were mentioned as facilitators.

Having access to source of information about cancer and screening, educational interventions and programs and facilitations for access such as transportation, appointments and home-screening have proven to be effective. The most effective facilitator was mentioned as educational interventions and programs where immigrant women were educated in cancer risk, prevention and screening, which also changed their

perception of pain and risks when it came to screening. In addition, using lay health workers in culturally and linguistically appropriate interventions and educating women in home tests were also methods which were mentioned as successful at the system level.

1.7 Cultural competency and interventions targeting HCPs

Norway has become a multi-cultural society where immigrants from different countries, ethnicities and religions live side by side in addition to the host population, which is also culturally diverse. Health care providers, especially primary care providers play a key role in immigrant health, not only at the arrival of an immigrant to a new country, but also as they continue to follow him/her up. It is therefore important that the HCPs become culturally aware in their consultations, acquire knowledge of migration as a health determinant and skills in cross-cultural communication.

There are many definitions of cultural competence developed by different researchers. Words “culture” and “competence” are complex and dynamic. We choose a simple definition here. Cultural competence is the ability to understand, communicate and effectively interact with people across cultures. It consists of cultural awareness, knowledge, attitude and skills (57).

As society in Norway becomes increasingly diverse, health care services should also be diversity sensitive so that the needs of several groups of populations can be met. However, the health needs of different groups of immigrants may differ from the general population, also at different phases of migration and depending on the situation. Therefore, what might work for the majority, might not necessarily work for all immigrant groups at all stages.

Health interventions that target the whole population can have a positive effect on immigrants, but we can't be sure of it. Interventions actively designed to be sensitive to

diversity must be equally effective for all citizens regardless of their cultural, religious or other background. Razum and Spallek (58) recommend a migrant-sensitive approach where the different needs and expectations within a group are met. In this model, several aspects of a population such as gender, education, religion, sexual orientation and migration status have to be discussed.

The alternative approach is to design culturally adapted interventions to immigrants' specific characteristics for some health outcomes or at specific time points (59). One can find many definitions for "culture", and one of them is "distinct group of people sharing a collective system of values, beliefs, expectations, and norms, including traditions and customs" (60). As culture is complex, developing a culturally adapted intervention provides many challenges. One of the challenges involves the approach to culture in the design of an adapted evidence-based intervention that is tailored to the needs of a particular group.

Conducting interventions among GPs as we did in this thesis is challenging because of the time constraints and heavy workload that they perceive in every-day life (54). Despite this fact, interventions targeting GPs or primary health providers seem to give significant results in previous studies (61-63) including ours, and the advantage is reaching many people at once.

Furthermore, when developing interventions targeting HCPs, considering the factors which influence the health behavior of individuals (in this thesis immigrant women), would help us achieve better effect. Many models for individual's health behavior have been described. One of them was the ecological model. In this model, McLeroy et al (64) mention several factors which could influence the health behavior of women which we discuss under discussion.

2. Objectives

The main objectives of this PhD thesis are i) to study immigrants' participation to CCS program in Norway; ii) to explore barriers and facilitators to CCS among immigrants perceived by HCPs, strategies they already use and types of tools they may need to gain better knowledge, and iii) to develop and evaluate an appropriate intervention to be implemented among GPs to increase the attendance to CCS among immigrants.

Research question 1: How is the participation of CCS among immigrants in Norway compared to the host population?

Our hypothesis in this research question was that immigrants in Norway had lower participation rates than non-immigrants to CCS. In addition, we hypothesised that not only the individual barriers of the women but also barriers at the HCP level, could influence women's participation to CCS. Thus, our aim was to (i) compare the proportion of different groups of immigrants with non-immigrant women attending the national CCS program and (ii) to find out the predictors for attendance to the CCS program for the different immigrant groups and their GPs.

Research question 2: What are the barriers regarding gynaecological examinations and CCS among immigrants according to HCP's perceptions?

In this second research question, we aimed to (i) understand the HCP's experiences related to gynaecological examinations and CCS among immigrant women, (ii) learn what kind of strategies HCPs already used to overcome any barriers encountered in these consultations, and (iii) learn their need for additional information or assessment tools and how would they like to get that information or knowledge.

Research question 3: Will an intervention among GPs give an increase in immigrant women's participation to CCS?

Our aim here was to measure the effect of the intervention held in General Practice by using a cluster randomised controlled trial where subdistricts in Bergen were used as clusters.

3. Design, material and methods

This thesis has a mixed-method approach; the first paper is a quantitative study using national registers, the second paper is a qualitative study using focus groups and semi-structured interviews, and the third paper is a cluster randomised controlled trial.

Mixed method is a research approach that combines different methods, such as quantitative design and qualitative design. We chose this method for our study because while quantitative designs can give us answers on research questions like causality, validity and measures of effect, qualitative research methods give us valuable information on why or how a phenomenon occurs, and are better suit to develop theory, or to describe the nature of an individual's experience. Thus, both methods can be complementary for each other and strengthen the answer of the research question.

In this thesis, we used quantitative design to describe CCS status among immigrants in Norway using register data. When we found out that the participation was lower than for non-immigrants, we wanted to know why, and what could be done. We used focus groups and interviews for this purpose, as these qualitative methods give in-depth information on individual's behaviour and perceptions. From the knowledge we gathered from focus groups and interviews among immigrant women (not a part of my thesis) and health care providers; GPs, gynaecologists and midwives (part of my thesis), we developed two interventions; one among immigrant women (not a part of my thesis), and the other one among HCP (part of my thesis). We measured the effect of the intervention among HCPs by a cluster randomized controlled study. Figure 9 gives an overview of the whole project and what is part of my thesis (in orange) and table 1 shows the summary of the method part of the three studies comprising the thesis.

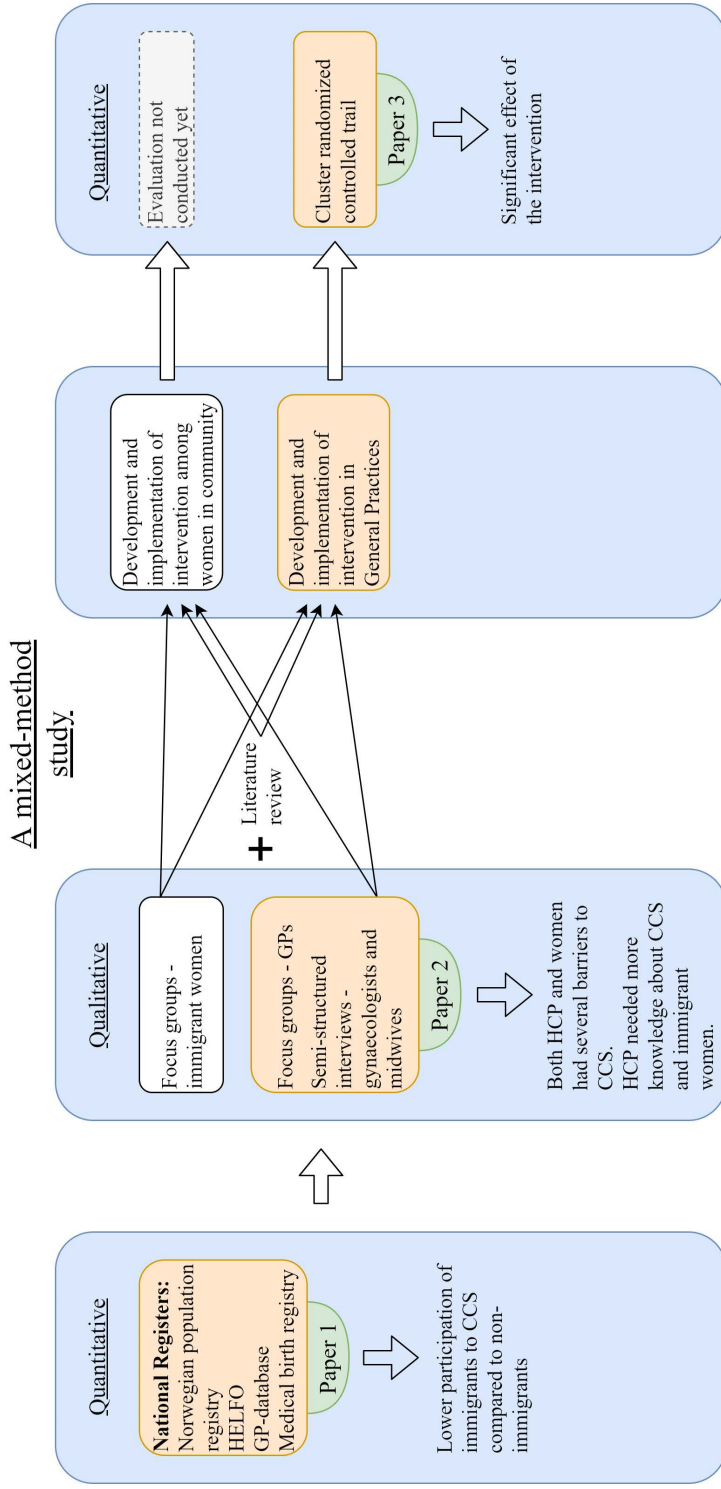


Figure 9: Overview of the thesis, the boxes in white are not part of the thesis, but a parallel project by our research team in Oslo.

Table 1: Summary of the three studies comprising the thesis

Specific objectives	Design	Participants	Data collection	Analysis
I. To find out immigrants' attendance to CCS program compared to non-immigrants	Cross sectional quantitative design Four registries (Norwegian Population Register, HELFO, GP-database and Norwegian Cancer Registry)	Women registered in Norway, aged 25-69 yrs old, n=152 800, non-immigrants n=1 168 832	2008	Descriptive statistics, binary logistic regression
II. To explore and understand how HCPs perceive CCS among immigrant women, existing barriers and strategies to overcome these barriers	Qualitative design 3 focus groups among GPs, 2 semi-structured interviews among gynecologists and 2 semi-structured interviews among midwives	GPs, gynecologists and midwives in Oslo area	November 2015 to March 2016	Thematic analysis: Themes were developed using a hybrid approach combining deductive and inductive coding. Codes for the analysis were developed and codes were aggregated in overarching themes
III. To evaluate the effect of an intervention in general practice	Matched pair, cluster randomised controlled trial	Subdistricts with general practices in Bergen as randomisation units and immigrant women who belong to their GPs as units of analysis	Intervention conducted between Jan 2017 and June 2017 Three registries that were linked; Norwegian Cancer Registry, GP-database and Norwegian Population Registry	Descriptive statistics, linear regression, logistic regression and multinomial regression. Mixed effect logistic regression with random intercept

3.1 Paper I

This study has a cross sectional, quantitative design, linking four national registries; The National Population Registry (NPR), the Norwegian Health Economics Administration Database (HELFO), the Medical Birth Registry (MBR) and the GP database. All Norwegian citizens and legal immigrants staying in Norway for more than six months, are given a unique personal identification number by the Norwegian government. This personal identification number is necessary to get access to primary health care services and other welfare systems in Norway and was used to link the four registries. Data was obtained for the year 2008 because this study was a part of another bigger study called “immigrant health in Norway”.

Data collection

Data was collected from these four registries for the year 2008.

National Population Registry (NPR)

The NPR includes information about all the residents in Norway. We obtained information on age, gender, civil status, length of stay in Norway, municipality of residence, region of origin, income and education level of women from this registry.

Norwegian Health Economics Administration Database (HELFO)

HELFO is an external agency under the Norwegian Directorate of Health, which administers refunds and coverage of health services. HELFO is responsible for settling out of hospitals, providers outside of hospitals and reimbursing health expenses to

individuals, including exemption cards which was explained earlier. HELFO manages the regular GP scheme, including regular GP exchange. GPs send their administration claims, based on diagnoses, to HELFO and obtain reimbursements.

From HELFO, we obtained information on diagnoses referring to cervical cancer screening test as it was mentioned under the method section of Paper I.

GP database

The database is mainly an administrative register provided by the Directorate of Health now, but previously administered by Norwegian Centre for Research Data. The IT system used to administer the regular GP scheme constitutes the main part of the database, and contains GP's name, practice, patient and municipal data.

The Medical Birth Registry (MBR)

MBR is a nationwide health register of all births in Norway. The register is part of the National Institute of Public Health and is affiliated with the University of Bergen. MBR conducts research and monitoring of health conditions in connection with pregnancy and childbirth.

Definition of variables

All Norwegian born women (with both parents from Norway) and immigrant women (defined as born abroad with both parents from abroad) in screening age for cervical cancer (25-69 years) registered in Norway in 2008 were included in this study. Women's age, immigration background, length of stay, municipal centrality, civil status, educational level, income, country of origin were the variables we gained from NPR.

Immigrant background consisted information on whether the woman or GP was immigrant or not. By “immigrant”, we mean an individual born outside Norway with both parents born outside Norway (2009/1747).

From HELFO, we obtained all the diagnoses which could indicate that a CCS test was taken in primary care (GP or emergency rooms). Diagnoses (ICPC-2) included X85 disease in cervix IKA, X86 abnormal cervical cytology, A981 cytology cervical screening, and X-37 histological/cytological test and other gynecological illnesses.

We obtained GP’s gender, age from this register. GPs’ immigrant background (Norwegian or not) was obtained by linking to National Population Registry.

From the MBR, we obtained data on whether the women had given birth in 2008 or 2009.

Statistical methods

Descriptive analyses were conducted for immigrants and non-immigrants. Chi Square and ANOVA were used to compare continuous and categorical variables respectively. Binary logistic regression analyses were conducted for the dependent outcome variable which is being registered as taken the CCS test in 2008. Our hypothesised explanatory variable was the region of origin of the participants, using Norway as reference.

Ethical considerations

Being a register-based study, we did not need to obtain consent from the immigrant women. The study (2009/1747) was approved by the Regional Committee for Medical and Health Research Ethics and the Norwegian Data Inspectorate.

3.2 Paper II

Study design

This study had an exploratory qualitative research design and data were gathered through focus groups and personal semi-structured interviews. Since the intervention was to be conducted in Bergen in the Western part of Norway, we conducted the focus groups and interviews in Oslo, the Eastern part of Norway, to avoid contamination as much as possible (figure 10).

Research setting



Figure 10: Map of Norway: The focus groups and interviews among HCP were held in Oslo while the intervention at general practices was conducted in Bergen.

Participant selection and recruitment

Performing CCS tests is one of the GPs' tasks. However, GPs refer women to gynaecologists in case of complexity. Midwives don't perform CCS routinely, however, recently as part of an experimental project, a few of them have begun to do so. Therefore, we have included some gynaecologists and midwives also as participants.

GPs participate in courses as part of their continuing education. Two supervisors of two such groups were contacted by e-mail using the authors network to recruit GPs for focus groups. The participants were relatively young, most of them worked in Oslo and suburbs and not known to us previously. In addition, we contacted the supervisor of one thematic course, comprising participants from different age groups and working in different places in Norway. All supervisors and GPs in the three groups gave their consent to participate in the study.

Gynaecologists and midwives were invited to the project by leaders of the midwives' association and gynaecologists' association. Although we intended to conduct focus groups for all the professions, the numbers of those willing to participate were few among private gynaecologists and midwives. Therefore, in addition to the three focus groups (FG) among GPs, we conducted two personal semi-structured interviews with gynaecologists (one interview was with 2 participants) and two personal semi-structured interviews with midwives (one interview with 2 participants). The first and the last author of the paper interviewed a total of 26 GPs, 3 gynaecologists and 3 midwives from November 2015 to March 2016 in different areas in Oslo.

Data collection

The interview guide (supplementary material 1) covered three main topics; (i) HCPs' experiences regarding gynaecological examinations and CCS with immigrant women, (ii) their strategies (if any) to make these consultations work well and (iii) their need for more information or other materials in order to improve uptake to CCS among immigrant women.

The interviews were conducted in Norwegian, recorded and transcribed verbatim and anonymized. Interviews were analysed using thematic analysis. Themes were developed using a hybrid approach combining deductive and inductive coding (65). Codes for the analysis were developed after an initial reading of all the transcripts and were based on the main interview questions, prior research, and emergent concepts from the current data. To develop the codes, three of the authors independently reviewed two focus group transcripts. These initial codes were discussed, and a codebook was developed. The codes were further refined during coding of subsequent transcripts. Codes were successively aggregated in overarching themes. Quotes were selected to illustrate the results.

Ethical considerations

The project (2015/1156) was approved by the Norwegian Regional Committees for Medical and Health Research Ethics. Written informed consent was obtained from every participant (GPs, gynaecologists and midwives) before the focus group or interview started.

Paper III

Study design

The study is a community based, matched pair cluster randomised controlled trial, with sub districts of the municipality Bergen in Norway (figure 12) as the units of randomization and patients with immigrant background at GP centers in the sub districts as the units of analysis. The intervention targeted GPs in GP centers within the sub districts in the intervention arm, i.e. at a level in-between the unit of randomization and the unit of analysis (Figure 13).

Method of this study is described in detail under CONSORT check list of this trial (supplementary material 2).

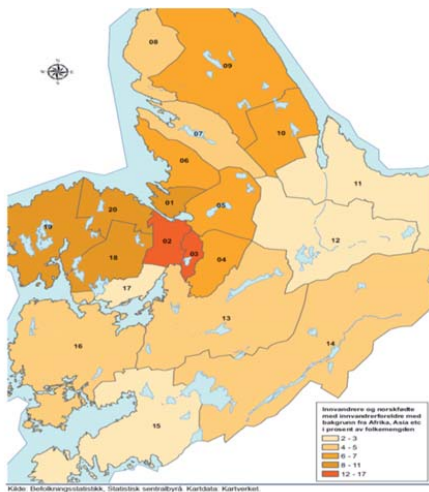


Figure 12: Immigrants from LMIC and their offsprings in percentage of total population in the 20 subdistricts. Intervention areas were 1, 2, 5, 6, 7, 10, 11, 12, 16, 19 and control areas were 3, 4, 8, 9, 13, 14, 15, 17, 18. Source: Statistics Norway, Report on immigrants and their offsprings in Bergen, report 2014/23

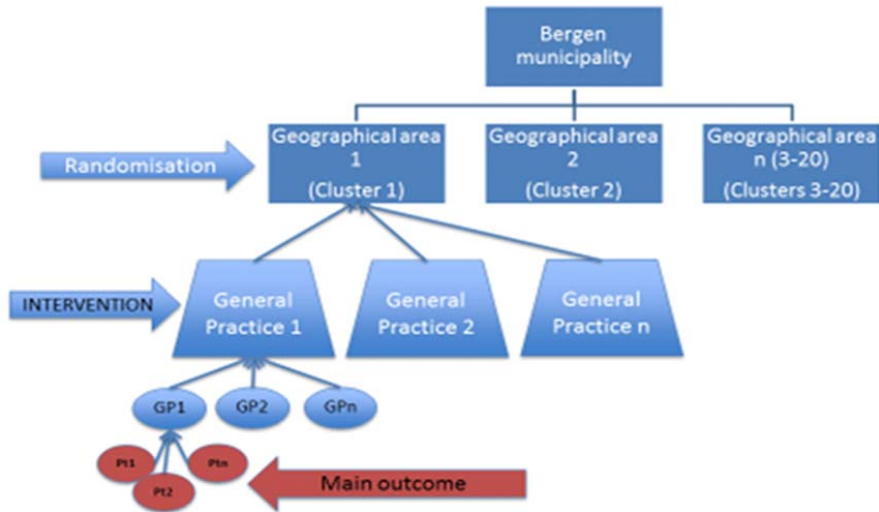


Figure 13: Overview of the interview

The intervention

The study intervention was developed based on (i) focus groups and semi-structured interviews conducted among HCPs, (ii) focus groups conducted among immigrant women by our research team (not part of this thesis), and (iii) a review of the literature. The intervention targeted general practices and consisted of: (i) a short educational session at general practices during lunch (15 minutes) (supplementary material 3), informing them about the generally lower participation of immigrants to CCS, requesting them to inform immigrant women about cervical cancer and invite them to take the CCS test when they otherwise consulted for non-gynaecological problems, ii. a mouse pad to remind the GPs

about this message in their everyday-work, and iii. a poster delivered to the practices to be placed in the waiting rooms. The posters and the mouse pad had the same message “You can prevent cervical cancer with a simple test. Make an appointment with your doctor today”. This message was delivered in four languages in the poster; Somali, Polish, Urdu and English and only in English in the mouse pad. Posters were placed at the waiting room so that immigrant women could read the message and ask their GPs about the test or make an appointment with the secretaries directly to take the test. In addition, the posters were meant to facilitate and initiate a discussion which both immigrant women and HCPs considered as difficult.

Implementation of the intervention

Knowing that GPs have a tight schedule, and that they are invited to many research projects and interventions, we tried to develop a strategy that would give them the necessary flexibility, would not take much of their time and could be easily remembered in everyday work. For this last purpose we decided to have a coherent presentation of all the elements of the intervention; post cards, mouse pads and posters, so that seeing one of them would recall of the intervention. In order to invite the GPs to the study, postcards with a special design (figure 14) were sent individually to each physician in the intervention areas to invite them to participate in the intervention. The postcards were also sent to all the general practices, and not only GPs, in the intervention areas, so that secretaries and any non-identified GPs (substitutes) would be aware of the study.

Two weeks after the post cards were sent, the PhD candidate telephoned the practices and made appointments to visit each of them. The candidate visited all the offices from January to June 2017 and delivered the short educational session, mousepads (figure 15) and the posters (figure 16). Those GPs who were not present for lunch received the same lecture as handovers. Among the 41 general practices invited, 9 were not interested in

visit, but accepted anyhow to get the posters and mousepads delivered, and the secretaries were asked to place the posters in the waiting room after a short explanation of the study.

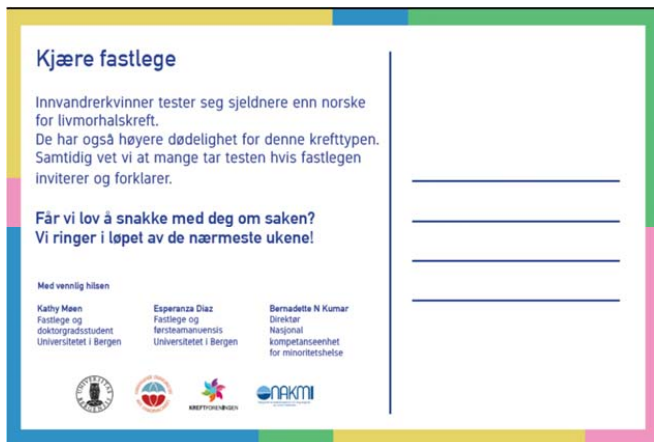


Figure 14: Postcard (front and back)

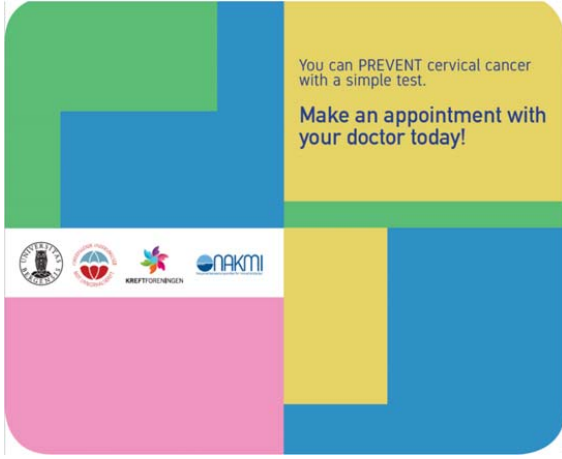


Figure 15: Mousepad as a reminder



Figure 16: Poster: The message in Somali, Polish, English and Urdu

In order to further ensure that the GPs and the secretaries remembered the intervention, and to assess the implementation, eight to twelve weeks after the visits, the PhD candidate called all the practices she had visited and reminded the secretaries to place the posters in the waiting rooms. Notes were taken on whether the posters were placed, and if they were placed, where and how many. In total, 35 out of 41 practices had placed the posters in the waiting rooms or other places (laboratories, consultation rooms) in the offices.

Data collection

Register data for the evaluation of the intervention was collected in autumn 2018. In addition to data from Norwegian Population Registry and the GP database, we also gained data from the Norwegian Cancer Registry (NCR) for the period 2012-2018.

NCR is the institute that collects data and conducts the national statistics on cancer occurrence. The register receives data from all hospitals that treat cancer patients, and screening tests in primary and specialized care, and processes them for statistical use.

Variables

We obtained the variables women's age, civil status, educational level, income in 2016 and region of origin from NPR. Region of origin was grouped into EU/EEA, Europe excluding EU/EEA, Africa, Asia including Turkey and other countries. This categorization was already set by Statistics Norway (SSB) who delivers data from the NPR. In addition, we received information on country of origin for women from Norway, Sweden, Poland, Somalia and Pakistan.

Information on GP's age and gender was obtained from the GP-database, and their region of origin (Norway, EU/EEA, Europe excluding EU/EEA, Africa, Asia including Turkey and other countries) was obtained by linking to NPR.

From the NCR, information on screening status for a period of 2012-2018 was obtained. A woman was defined as screened according to Norwegian recommendations at follow-up if she had taken a CCS test within three years before January 1st, 2018 (January 1st, 2014 – December 31st, 2017).

Table 2: Overview of the variables used in this thesis

	Registries	Variables
Paper I	National Population Registry	Women's age, immigration category, reason for immigration, length of stay, municipal centrality, civil status, educational level, income, country of origin
	Norwegian Health Economics Administration Database (HELFO)	Diagnoses regarding CCS test
	GP database	GP's age, gender, immigrant background
	Medical Birth Registry	Women's number of births given
Paper II	Qualitative data	Focus groups and semi-structured interviews
Paper III	Norwegian Population Registry	Women's age, civil status, educational level, immigration background, income in 2016 and region of origin for both women and GP's
	GP database	GP's age, sex
	Norwegian Cancer Registry	Data of screening status from 2012-2018

Statistical methods

Baseline characteristics of the study population at the individual level (n=10360) were reported separately for the intervention group and the control group as means and standard deviations (SD) for continuous variables and counts and percentages for categorical variables. We also performed descriptive analyses at the cluster level (n=17) (supplementary material 4), separately for the intervention group and the control group. We tested for differences between intervention and control groups at baseline using linear regression, logistic regression and multinomial regression depending on type of variable to be tested, and with robust standard errors to account for clustering for the women.

The effect of the intervention on screening status by January 1st 2018 was tested using mixed effects logistic regression with random intercept to account for clustering and reported as odds ratios (OR) with 95% confidence intervals with the control group as the reference group. We estimated ORs for the intervention effect with three levels of adjustment (3 models) as it shown in table 2 in paper III. In addition, we estimated the intervention effect as the absolute difference in screening proportion using generalized linear models with identity link function, binomial distribution and clustered robust standard errors.

The effect of the intervention was analysed for the total sample of women and for two subgroups. We constructed three different models where model 1 was random intercept logistic regression adjusted for baseline CCS-status (January 2017) for the total sample and in analyses stratified by country of origin. No adjustment in analyses stratified by screening status at baseline. Model 2 consisted of rrandom intercept logistic regression adjusted for woman's age, marital status, income level and region of origin in analyses stratified by screening status at baseline and additional adjustment for baseline CCS-status in analyses stratified by country of origin. Model 3 included rrandom intercept

logistic regression adjusted for all covariates in model 2 in addition to adjustment for GP's gender, age and region of origin.

In order to test if the effect of the intervention varied in different subgroups of the study population, we stratified on screening status at baseline and country of origin (women from Somalia, Poland, Pakistan versus all other countries). Differences in the intervention effect between strata was tested by including an interaction term between intervention group and stratification variable in a mixed effects logistic regression variable with random intercept for cluster.

In additional analyses, we also tested for an intervention effect in Norwegian women who were initially excluded from the study population.

A 5% significance level was applied in all analyses and data were analyzed according to the initial group allocation (intention-to-treat). We used STATA SE version 15.1 for the analysis.

Ethics

This study used three national registries. In the GP database, information regarding GPs' addresses and practices that we used to contact the practices is publicly available, and the study was approved by the Norwegian Regional Committees for Medical and Health Research Ethics, which approved that we would not need consent from the GPs in the intervention areas, since our intervention's main part was to make practitioners aware of the theme. Immigrant women were not contacted, and the intervention was about the participation in an already established national CCS program, thus informed consent from immigrant women was not necessary.

4. Results

The main findings of this thesis are as follows:

The study showed lower participation of immigrants to CCS in Norway compared to non-immigrants, and HCPs reported several challenges in consultations regarding gynaecological and CCS among immigrants. Targeted interventions are necessary to bridge the gap in CCS between immigrants and non-immigrants. The intervention we implemented in General Practice to increase the participation of immigrants to the national CCS program was feasible and showed significant effect, with an absolute effect of (RD (CI)) 2,6 (1.1-4.0) adjusted for CCS at baseline.

4.1 Paper I

We showed that immigrants from all world regions had significantly lower probability of having a CCS test registered as compared with nonimmigrants. Higher personal income, living in rural areas, and having a female GP were factors significantly associated with higher attendance to CCS for both immigrants and non-immigrants. Although the associations between screening and socioeconomic variables were in the same direction for immigrants and non immigrants as a whole in terms of income and living in rural areas, they differed slightly for the various immigrant groups for other characteristics; Younger age was significantly associated with CCS for women from Eastern Europe and for the non-immigrant population, but the age pattern seemed to be different for women from Asia, where women aged 41–55 years took the test significantly more often. The association between length of stay in Norway and screening varied also with the immigrant group, being positively associated for women from Eastern Europe, whereas most other groups had significantly lower attendance after 2 years. In terms of GP's characteristics, having a female GP significantly increased the probability of taking a

CCS test for all groups, whereas having a GP born outside Norway was associated with significantly lower rates of CCS test for Europeans and Asians, but not for women from Africa and South America. Thus, from Paper I we concluded that the attendance to CCS was lower among all groups of immigrants, and that participation was related to characteristics of both the patient and the provider, but with effect modifications for the different immigrant groups.

4.2 Paper II

In paper 2, the focus groups and interviews showed that although most of the providers had contact with immigrant patients on a regular basis, very few had had consultations with immigrant women regarding CCS. However, a minority of health providers had reflected upon specific challenges linked to CCS among immigrants before they met us. Through the analyses of the data, HCPs' experiences were classified into two broad groups: i) general perspectives related to all women and ii) perspectives specific for immigrant women.

A few GPs considered that providing CCS test was not their sole responsibility. They took into consideration the written information from the NCR and the women's personal responsibility to her own health. Furthermore, they emphasized that CCS test is not a compulsory test, that women can decide on their own whether they wish to take the test or not. These perceptions of the GPs applied to all women.

The specific barriers for immigrant women that emerged during the interviews can be grouped into theme related to (i) organization, (ii) language and health literacy, and (iii) culture and gender.

Regarding organisational themes, according to the providers, immigrant women neither made specific appointments for CCS, nor raised the issue themselves upon receipt of the

Cancer Registry's invitation letter. The HCPs meant that immigrants raised more often than non-immigrants several issues in one consultation, and that time constraint of GPs was a big obstacle for their meetings with immigrant women. The possibility of taking the CCS test within primary care, but out of the GP office (referring to midwives taking the test) was mentioned by some GPs.

Low health literacy among some groups of immigrants and the difficulty to communicate in Norwegian were also mentioned by HCPs. This also resulted in time-consuming consultations.

Cultural and gender aspects regarding both the women and the providers came up, such as male HCPs' higher threshold to ask immigrant women about CCS test and lower threshold to refer them to female colleagues or gynaecologists.

On the other side, HCPs already tried to implement several strategies to overcome the barriers, and investing enough time was key for facilitating these consultations. Some providers systematically appointed more time when they performed CCS test or gynaecological examinations. This helped also when they explained the findings to the women. In addition, HCPs used interpreters, used simple words and sentences, and sometimes used body-language when meeting some groups of immigrants. They more often than with non-immigrants used anatomy models and drawings to communicate.

After sharing their experiences and strategies, all participants identified the need for more information about this subject both for themselves and for other colleagues, but also stated that it was important that the women obtained understandable information in their own language. We discussed the possibilities to provide information for providers in the future, such as courses, visits to GP offices or written information such as e-mails, brochures, letters and posters. Given a choice, most of them preferred short visits by experts in this field during lunch or morning meetings at the GP offices, and posters to be

placed in the waiting rooms. In addition, giving information to the women directly through other channels was mentioned by all. According to this information, we developed an intervention with a short educational session for the GPs, mousepads as reminders and posters to be placed in the waiting rooms.

4.3 Paper III

In paper 3, the RCT included 41 general practices in the intervention group and 34 general practices in the control group. All characteristics were similar between the two groups, except for a slightly higher number of women per cluster and number of GPs and practices per cluster in the intervention group. This was mainly caused by one single cluster in the intervention area (the city centre) which was larger both in terms of general practices, GPs and number of women.

The intervention and control clusters covered a population of women with a mean age of 44 years. There were no significant differences between the women in the two groups regarding education, income levels or screening status at baseline. The only statistically significant difference was the distribution of women according to region of origin. The intervention group had more women from Africa (13,2% vs 10,3%) and other regions (12,3 vs 8,7%), and less women from Asia including Turkey (33,4% vs 35%), EU/EEA (32,8% vs 35,9%) and Europe excluding EU/EEA (8,3% vs 10%) as compared to the control group.

In the total study population, the proportion screened according to recommendations increased from 53.0% to 55.6% in the intervention group and from 50.7% to 51.3% in the control group. After adjustment for screening status at baseline, the OR (95% CI) for being screened at follow-up was 1.24 (1.11-1.38) in the intervention group. The effect was almost the same after further adjustment for characteristics of women (1.25 (1.12-

1.39)) and remained significant in a model also including adjustment for characteristics of the GPs (1.19 (1.06-1.34)).

Subgroup analysis by screening status at baseline, this is to say separately for those who were considered screened as baseline (having taken a test from 2014 to 2016) and those who were not, showed statistically significant effect in all three models for women not screened at baseline. The ORs (95% CI) were 1.35 (1.16-1.56), 1.37 (1.18-1.59) and 1.30 (1.11-1.53) respectively. Women screened at baseline followed the same pattern, but these results were not statistically significant. The tests for interactions between subgroup and intervention group were not significant in any of the models.

The odd ratios for subgroup analysis by country of origin (women from Somalia, Poland and Pakistan versus other countries) were statistically significant in model 1 and 2 but not in model 3 (OR were 1.74 (1.17-2.61), 1.70 (1.12-2.56) and 1.54 (0.99-2.40) in the three models respectively. Women from all other countries together followed the same pattern with OR 1.15 (1.02-1.30), 1.16 (1.04-1.31) and 1.12 (0.99-1.26). Interaction between subgroup and intervention group were significant in all models. The number of women from each country in this subgroup analysis, number screened before and after the intervention, showed in supplementary material 4.

4.4 Other results

Post-intervention interviews with eleven GPs

During the educational session of the intervention, the GPs hadn't the opportunity to express their meanings because of their tight schedule. Therefore, six months after the intervention, from January to March 2018, eleven GPs were chosen to give us in-depth information about how they experienced the implementation of the intervention. The following factors were considered while we recruited the GPs; representation of both men

and women, immigrants and non-immigrants, and from different part of intervention areas so that some GPs came from areas with many immigrants and some didn't.

Generally, the GPs told us that the campaign was a good initiative, and they supported the intervention. They had the intention to implement the message they got from us; to ask the immigrant women about CCS when immigrant women came to them, but they still perceived several barriers such as time constraints, heavy workload, challenges with interpreters, gender barriers such as male GPs not asking some group of women about CCS, stereotypes and prejudices. Even though the results of these post intervention interviews mostly confirmed the findings of focus groups and interviews held one year earlier, stereotypes and prejudices were clearly expressed in this context as the GPs were interviewed one by one and not in groups. Stereotypes such as women from certain region of origin "complain" much and mostly discontent/had distrust with the help they got from GPs, women taking up several issues at once and accompanied by children and spouses, were mentioned during the interviews.

5. Discussion

5.1 Methodological considerations

5.1.1 Method 1: Cross sectional register-based study

A cross sectional register-based study was chosen to answer the first research question, **“how is the participation of CCS among immigrants in Norway compared to the host population”**. Norway is privileged with her well-kept national registries which we made use of. Due to the use of unique personal identification numbers in Norway, data are linkable, thus individuals can be traced over long time periods. However, public registers have already defined variables on limited numbers of outcomes and confounders. Nor are data without errors, especially for registers like GP database which is not specifically designed for research, although most data are of high quality (66).

By using these registers, bias of self-reporting (recall bias) and selection was avoided. Furthermore, instead of having all immigrant women as a single group, grouping by major world regions, disentangled some of the differences between immigrant groups.

Being a cross-sectional study, data was obtained only for 2008 calendar year, at which time at that time the CCS test was recommended every three years. In addition, we used data only from HELFO, administrative claims registered in primary care; GPs and emergency rooms, and not from the NCR. These factors were limitations and should be mentioned because they could undermine the actual participation to CCS.

Over 200 countries and areas are represented in the immigrant population in Norway. We grouped the immigrant women in region of origins even though immigrants are heterogenous. A more granular approach, like country of origin, would have provided a

more relevant research information to the various immigrant groups, but the number of immigrant women from each country were too small for such categorization.

5.1.2 Method 2: Qualitative study: Thematic analysis

We chose a qualitative approach to answer the second question, **what are the perspectives of HCPs regarding gynaecological examinations and CCS among immigrants**, we conducted focus groups and semi-structured interviews to find out the answer. In this study, the thematic analysis method was used as it was the most appropriate method of analysis in this research context. This is because of its flexibility, and more accessible form for analysis for researchers who are relatively unfamiliar with qualitative methods (67) like myself.

Co-creation has become increasingly important in health research. This is defined as the collaborative generation of knowledge by academics working alongside stakeholders from other sectors (68). In this study, physicians, nurses, researchers, research assistant with other background than health, including economy, and sociologists worked together with immigrant women. Co-creation in health research will help to increase the impact of the research result.

By taking into consideration the different perspectives of all the types of HCPs who are involved in taking CCS; GPs, gynaecologists and midwives, we obtained insight on the varying views of HCP and possible future implementations that could make CCS more efficient. In addition, by recruiting GPs as groups following continuing education, we avoided selection bias that could have arisen by recruiting only those who were interested in immigrant health. Saturation of information was reached through the three focus groups among GPs. The four personal interviews gave us in-depth information that can sometimes be difficult to achieve in groups when it comes to sensitive issues.

Almost all the HCPs in this study were from urban areas (Oslo and suburbs). Our first study showed that living in rural areas was related to higher participation to CCS. Thus, we should have also recruited HCPs from the rural areas to participate in the focus groups and interviews.

One of the limitations of focus groups would be that participants are in a particular social context and their views might be influenced by the direction of the discussion or the context, the moderator and what is “politically correct” to say (69). From the personal interviews with gynaecologists and midwives, we got more in-depth information, and HCPs’ negative perspectives of some aspects of immigrant women emerged. In addition, the interviewer being an immigrant woman herself, could also have hindered HCPs of giving negative information of immigrants which they considered would “offend” the interviewer.

5.1.3 Method 3: Cluster randomized controlled trial

To answer the research question “**will an intervention among GPs give an increase in immigrant women’s participation to CCS**”, we conducted a cluster randomized controlled trial which is considered as the gold standard in medical research. Randomized controlled trials minimize allocation and selection biases, and blinding minimizes performance bias. Furthermore, randomization minimizes confounding due to unequal distribution of prognostic factors. In our study, the matched pair clusters had similar characteristics and the intervention trial was implemented without major errors. Even though we did not have blinding in our study, the GPs in the control clusters did not know about the study and the women in both groups did not know about the study.

A cluster randomized design was chosen to avoid contamination between general practitioners. However, we can never exclude possibilities for contamination. GPs meet

each other through continuing education, emergency rooms or other meetings. However, by taking subdistricts with general practices as clusters rather than inviting GPs to the study and then randomize, we avoided contamination and selection bias (signing up of GPs who are interested in immigrant health).

Usually, in a RCT, both intervention and control groups are informed about the study. In our study, the GPs in the control areas were not informed. This is justified by the fact that information about the awareness regarding CCS among immigrants was a component of the intervention, and therefore GPs in the control areas were not informed.

We adjusted for different covariates in the three regression models (table 2 in paper III); baseline CCS in model 1, women's characteristics in model 2 and GP's characteristics in model 3. In the subgroup analyses (table 3 in paper III), model 1 and 2 showed a statistically significant effect while model 3 was not statistically significant. Adjusting for more variables in regression models reduces the degrees of freedom and may lead to less significant results if the added variables have little explanatory power. In addition, the relatively small numbers of women in the group (Pakistan, Somalia and Poland) also makes it difficult to obtain statistical significance.

We have done several subgroup analyses even though we presented two of them; by CCS status at baseline and by country of origin. The country of origin (Somalia, Pakistan and Polen) was decided by the languages in the poster; Somali, Polish and Urdu. We assumed that women who spoke these languages read the message in the waiting rooms and thus had an impact on the effect of the intervention. In this way we could partially disentangle the effect of this complex intervention.

The measurements in our intervention were objective behavioural change, instead of change in knowledge or self-reported behaviour, as it commonly seen in most other CCS studies. However, we measured the effect of the intervention already after six months,

which may be a too short period to see if the effect of the intervention persists. It would be interesting to repeat the measurement after one or two years to see whether we would achieve the same results as now.

During the intervention, because of a logistic error, two practices that should have been allocated to the control group were allocated to the intervention group, and one practice that should have been in the intervention group was allocated to the control group. Since it is not possible to identify general practices in the anonymised dataset, it was not possible to do as-treated analyses to investigate the size of this possible bias. The intention-to-treat analyses that were conducted could, because of this error, have underestimated the intervention effect.

The three clusters with no general practices should have been eliminated before matching and randomization but were eliminated after, and thus excluded from analyses. Because of this, we could not take matching into account when analysing the data. However, the impact of this on the results was unlikely, since we adjusted for characteristics which could potentially differ between clusters.

5.1.4 Heterogeneity and granularity

The issue of heterogeneity arises when we categorise immigrant women by world regions. As mentioned earlier, immigrants are not homogeneous, and a researcher should strive to report results as granular as possible to reveal the challenges in health status among different groups. A report from UK showed in 2014 that in health inequalities research, socioeconomic inequality is the core focus and other dimensions of disadvantage, including ethnicity, are neglected (70). This paper further mentioned that without explicit consideration of ethnicity within health inequalities, there is a risk of partial understanding of the social processes producing poor health outcomes and ineffective, or

even harmful, intervention. In this thesis, it would have been desirable to present disaggregated data for different immigrant groups, but this was not possible because of low numbers in each group.

Subgroup analyses of women from Poland, Somalia and Pakistan showed significant effects of the intervention in model 1 and 2. Women from other countries also showed statistically significant increase in CCS test in model 1 and 2. In addition, the p-interaction was significant in both groups. Despite the statistically significant effect in these two groups in models 1 and 2, we acknowledge that we should have taken into account the granularity of these three different groups and should have conducted the analyses separately for each group. Unfortunately, it was not impossible to do so because of the small number of women residing in Bergen in each of these groups.

5.1.5 Internal and external validity

To reflect on a study's trustworthiness and value, concepts such as internal and external validity are used. While internal validity means whether a study is well-conducted or not, external validity relates to how generalizable the findings are in the real world (71). One of the strengths of a randomized trial is that the diversity of the study population is distributed between the two groups and thus helps maintain internal validity and to achieve this, confounding factors and bias must be reduced to a minimum (72).

The two main threats to internal validity are bias and random error (73). Errors in data collection, statistical analysis, or interpretation of study data are elements which can create bias. In this trial, we attribute the difference observed in screening status per January 2018 to our intervention and no other causes. However, a national campaign called #Sjekkdeg (#Checkyourself) has been going on in the background during our study. Thea Steen, a Norwegian woman who died of cervical cancer at the age of 26

started this campaign in collaboration with the Norwegian Cancer Society in 2015. It has been held annually since 2015, but this campaign was in Norwegian and targeted all women generally, and not immigrants in particular. This was supported by the analyses of our material which showed even though there was a slight increase in both the intervention and control group in CCS attendance among non-immigrants, it was not statistically significant as we mentioned in paper III. In addition, we adjusted for screening at baseline in both the intervention and control groups to adjust for any differences in baseline. Thus, we believe therefore that this trial's internal validity is relatively strong.

The clinical relevance of the RCT is reduced when the external validity is insufficient (74). Study samples can be specifically selected by setting inclusion and exclusion criteria, but it can affect the generalisability (73). Association of CCS and residence in rural areas was fairly new for our study. This finding can be explained by better integration with the community when you live in rural areas, and the GP might spend more time to explain and recommend CCS for patients in rural areas.

Despite the fact that the intervention was conducted in an urban setting in a HIC, we suggest that the same intervention can be conducted in rural parts of Norway and other primary care settings similarly organised in other HIC. However, whether this trial is reproducible in other settings, like secondary care, needs further research.

5.2 Discussion of the results

5.2.1 Cervical cancer screening and health care providers

There were only few other studies (75-79) that explored HCPs' perspectives regarding CCS among immigrants, most of them published at the same time as ours. The overarching themes in these studies were the perception of the providers regarding the women's lack of knowledge about screening, cultural barriers, male physicians feeling

uncomfortable talking about CCS test with immigrant women, limited time for consultations, challenges with interpreters and physicians not recommending the test. These findings are concordant with ours. However, our study can, in addition, provide some reasons to partially explain why these barriers arise in the first place.

Focus groups that have been done by our research group among immigrant women and other studies (34, 44) show that physician's recommendation plays a major role for immigrant women in taking the CCS test because they value their physician as an authoritative person. Thus, GPs are in a key position to influence women by recommending them to take the test as the results of our trial also showed.

Focus groups and personal interviews with HCPs revealed that HCPs' heavy workload, time constraints, lack of cultural competency and cultural awareness can lead to HCPs not being able to invest time to build a solid patient-provider relationship and reflect upon these barriers.

Our study showed that male GPs had higher threshold to ask an immigrant about CCS, and they referred women often to another female colleague, often without asking the immigrant women if they would take the test with them (male GPs). Other studies mentioned lower CCS and mammography screening numbers among patients of male GPs (45). Immigrant women mentioned their GPs did not talk about CCS with them (44), however some of them were willing to take the test if their male GP explained about the test and recommended it. While male GPs "assumed" that it was too intimate and might be culturally inappropriate to ask the women about CCS test, the women expressed that it was too difficult for them to take up the topic with their GP when the GP did not bring up the issue. However, having a female GP was definitively a facilitator for taking the test, both according to our study, and also other studies, but the reason might be that female GPs often take on the responsibility to ask their patients about breast and cervical cancer screening than their counterparts (80). In contradiction, one study from Australia (81)

found that Thai women who had male GPs were more likely to have regular CCS test than women who had female GPs. However, the study did not explore feelings of trust, and ongoing relationship between women and their GPs and the GPs' recommendation of CCS test.

One gynaecologist who treated many immigrant patients mentioned something interesting and unusual; he mentioned that some immigrant women were skeptical to be examined by him, but when he took his time to explain about CCS test and gave them time to get to know him and when language was not a barrier, the women preferred to let him take the test regularly. This shows that establishing a trustworthy patient-provider relationship is important, perhaps more than gender issues as one study among Hispanic women showed (82). The same male gynaecologist also mentioned that even though the women hesitated to be examined by him, the husbands who accompanied the women encouraged them to take the test with the male gynaecologist instead of being on a long waiting list for a female gynaecologist. Some male GPs also mentioned that for offspring of immigrants, taking CCS test with a male GP was not a problem. It is important to mention that not only immigrant women, but also some women from the general population, prefer a female GP for CCS test (83), thus this phenomenon might not be specific for immigrant women.

Real or perceived lack of time is one of the reasons given by HCPs for not implementing cancer screening (54). Patient's present complaints often take priority, thus screening is often procrastinated. However, HCPs gaining knowledge that their recommendation is a strong predictor, will increase their awareness and participation of women.

5.2.2 The “ethnic pain”

Some HCPs stated that immigrant women expressed much pain during the procedure, and this was assumed as “cultural” by HCPs. Culture could be used as a “black box” when the reaction of an immigrant patient is not understood fully by HCPs. The expression of pain, pain behaviors and communication regarding one’s pain are tightly bound to sociocultural origins. Many other important factors shape the pain experience and contribute to disparities between groups, such as locus of control, cultural mistrust, religion, pain models and feelings regarding the meaning of pain (84). In addition, HCPs’ inadequate knowledge of pain management, negative attitudes towards racial and ethnic minorities, stereotypes and lack of cultural competency lead to inequality in pain care (85).

5.2.3 Cultural competency among health care providers

As a country becomes more culturally diverse, HCPs of different backgrounds are dealing with a greater proportion of patients whose perspectives are different from those taught in the mainstream health care system (86). One of the findings from our first study was that having an immigrant GP was negatively associated with taking a CCS test which also supported by a Canadian study (49). Research has shown that provider-patient communication is directly linked to patient satisfaction, adherence, and subsequently, health outcomes (87). Thus, when cultural and linguistic barriers in the clinical encounter negatively affect communication and trust, this leads to patient dissatisfaction, poor adherence (to both medications and health promotion/disease prevention interventions), and poorer health outcomes (88). Therefore, educating HCPs in cultural competency is vital for multi-ethnic population in Norway.

One of the many models describing cultural competency in health care is called cultural congruent care (89), which includes; provider level (cultural diversity, cultural awareness, cultural sensitivity and cultural competence behaviours) and patient level (patient, family and community attitudes, beliefs and behavior that represent areas of greatest similarity

and difference both between and within cultural groups, subgroups and individuals) that fit in a dynamic interaction, and where patient's, family's and provider's attitudes, perceptions and behavior influence health outcomes.

In addition to behaviour change among HCPs, educating cultural competency to HCPs and students in health care service is vital. The qualitative part of this study also brings up the theme cultural awareness among HCPs. Cultural competence in consultations is important for a good patient-provider relationship and compliance. Betancourt et al (60) identified barriers that occur when sociocultural differences between patient and provider are not fully accepted, appreciated, explored, or understood. Patients may have very different sociocultural based health beliefs; medical practices, including use of home remedies; attitudes toward medical care; and levels of trust in doctors and the health care system.

5.2.4 Lower participation: what could be done at different levels?

To understand the lower participation of immigrants to CCS, we should have a broader perspective; Combining McLeroy's ecological model and model for Cultural Congruent Care which we mentioned above, gives us a chance to understand factors that influence one's health behaviour. McLeroy and colleagues' described (90) five levels of influence for health-related behaviours and conditions. These levels include: (1) intrapersonal or individual factors; (2) interpersonal factors; (3) institutional or organizational factors; (4) community factors; and (5) public policy factors.

Intrapersonal factors are characteristics that influence women's behavior, such as knowledge of preventive care and cervical cancer, attitudes and beliefs towards one's own health and trust in health care system. These are factors which we could influence by providing information to women.

Interpersonal factors include support from family members such as parents, partners and friends influence one's health behaviour. By including family members like partners or parents in providing necessary health information, HCPs could increase compliance among immigrant women taking CCS test.

Institutional or organizational factors like availability of female primary health care providers who take the time to explain about CCS and recommend the test, for example female GPs or midwives, easy access to make appointments for CCS and transport facilities, making CCS test as free of charge, will lead to an increase in participation.

Rules, regulations, policies, and informal structures may constrain or promote recommended behaviours. In addition to social norms, laws that regulate or support healthy actions and practices for disease prevention, early detection, control and management will also promote women's attendance to CCS program.

By combining these factors and interacting them dynamic with the women's, their families' and providers' values, attitudes and beliefs, we could get better participation of immigrants to CCS.

5.2.5 Statistically significant effect versus clinically significant effect

The intervention has showed a statistically significant effect in the total sample of all three models, and in model 1 and 2 in subgroup analyses. However, statistically significant results are not always clinically significant and vice versa. Despite the small statistical effect, the clinical significance of this RCT is meaningful. This is justified by the fact that the intervention has reached a group who usually have lower participation and the group of women (Somalia and Pakistan) who are otherwise hard to reach. Therefore, each woman who takes the test has greater value clinically. However, there is much work to be done to further increase the participation and the analyses of cost effectiveness.

5.2.6 Ethical considerations

Broad groupings of immigrants (South Asian, Chinese, Black, White, etc) masks heterogeneity. Every category, including “the host population”, is actually comprised by individuals with various backgrounds, religions and cultures. Many studies which investigate migrant’s health use the majority population as reference, as we also did in our study. When comparing immigrants with the host population, results obtained might put immigrants in bad light, especially issues such as preventive care, for example screening. LMIC from where most of the immigrants come from, might not have a well-developed preventive care health services and immigrants who emigrate from such countries may not have heard about screening. As such, the participation to screening among these immigrant groups will always be lower than the host population. On the other hand, research which look into issues where groups of immigrants do better than host population, are rare. Therefore, researchers have an ethical responsibility to present balanced research. In addition, researchers should identify innovative methods in migrant health research, for example, will it be more appropriate to have the population that immigrants left behind in their home countries as reference?

As in every screening program, there will always be false positive and false negative results of a test. In addition, CCS cannot exclude invasive cancer despite normal test. A significant number of precancerous stages disappear by itself. Many of the women who undergo colonisation following a positive test, would never have developed invasive cancer. Furthermore, we should take in to account the life quality of the women who undergo colonisation and would have never developed invasive cancer, but unfortunately, such factors are difficult to measure. Advantages of CCS program should be measured against the cost and disadvantages the program leads to. Some of the GPs who we interviewed about the intervention mentioned that they “would not prioritise screening” in consultations and “would not go looking for disease in healthy people”. On the contrary, they would use the consultation time to ask about other things which are more important

to an immigrant patient, such as how are they were coping in the new country, work situation and mental health. However, we suggest that it is important that GPs give information on CCS to immigrant woman so that they can make their informed choice; to take the test or not, as it is not compulsory.

5.2.7 Future perspectives

One of the future possibilities to increase CCS among immigrants is to engage other primary care providers in taking the CCS test, for example midwives as we mentioned earlier.

The entire NCCSP is undergoing a change from cell samples to HPV testing. Since 2015, HPV screening had been introduced in some counties in Norway (Rogaland, Hordaland and Trøndelag) for all women between the ages of 34 and 69 born on even numbers. Younger women are still being investigated for cell changes, since HPV infection is more common in this age. From the summer of 2018, the HPV screening was expanded to apply to all women between 34 and 69 years in these counties.

In addition, a randomized controlled study using home test kits were introduced in March this year by NCR. This study was launched mainly to investigate whether home test kit would help underscreened women taking the CCS test. Home test kits might help some groups of immigrants where modesty and privacy are barriers, but at the same time, knowledge about screening and cervical cancer is a prerequisite for compliance also here, like in traditional methods.

To achieve even greater participation, we suggest regular reminders to GPs in addition to one-point interventions and evaluating the feasibility and effectiveness of including CCS as the midwives' tasks as an additional option to the GPs.

NCCSP has a universal reminder system as mentioned earlier. In addition, the focus groups among immigrant women and semi-structured interviews with gynaecologists

showed that immigrant women preferred letters from their GPs with specific appointment for CCS test. Thus, our suggestion to policymakers includes; a strategy of targeted reminders where GPs send an appointment to immigrant women who don't participate regularly. Thus, other aspects well worth exploring in the future would be; (i) information given to immigrant women about screening programs and preventive care in Norway on arrival, (ii) letters from GPs or NCR with specific appointments to CCS test sent to immigrant women who did not take the test as recommended by NCR.

In this randomised controlled trial, we did not conduct cost effectiveness analyses as it was beyond the scope. However, this intervention was inexpensive as it was conducted by the PhD candidate who visited and phoned practices in Bergen after conducting the focus groups in Oslo. Postcards, posters and mousepads were specially designed for the intervention, and the information from the registries used for the evaluation had to be funded as well. However, calculating the number of CCS tests resulted by the intervention and more specifically including all expenses to know the real cost-effectiveness of our intervention would have been desirable.

Finally, in conclusion, this study has several strengths including using national registries to avoid selection and recall biases, grouping immigrant women in world regions and country of origins to disentangle some of the differences between groups, our intervention targeting HCPs and thereby reaching many groups of immigrants at once, as well as solid theoretical grounds for developing the intervention and using randomized controlled design. However, there are also limitations such as inability to provide more granular grouping of immigrants and lack of cost effectiveness analyses.

6. Conclusion

The gap in uptake for CCS test between immigrants and non-immigrants is present in Norway and it seems to be related not only to the immigrant women's preferences and choices, but also to barriers at the provider level. Some of these barriers can be overcome by a complex, but easy to implement intervention. Our trial shows that raising the GP's awareness and drawing attention to the importance of inviting immigrant women to CCS is a feasible and effective strategy to increase the participation in the program, especially among immigrant women who have never been screened before.

In concordance with the recommendation from UCL Lancet commission and WHO, this study sheds light on interventions targeting HCP that could be effective in acquiring better participation of immigrants to screening programs. Moreover, there is a need for more research in the field of migrant health to achieve better health standards for migrants.

In a culturally diverse society where GPs are the frontrunners in giving primary care and in many cases the first HCP whom a resident turn to, knowledge about migrant health and cultural competence are two areas GPs should prioritize in order to promote public health, for migrant health is public health. Furthermore, besides practicing patient-centered communication, the HCP, regardless of gender, should be aware of his or her own cultural beliefs, perceptions and values.

7. Implications for clinical practice

Migration is dynamic and more diverse for each passing day, and this can challenge health systems at the national level. Therefore, we need policies that target this diversity to achieve better health results. Implementing policies is not easy, but we can contribute to better evidence of what works through research that takes into account this diversity. Immigrants in Norway are heterogeneous, and measures targeting one group may not be effective in other groups. Therefore, to embrace diversity in health care, it is important that in addition to provide general health care both for the majority and immigrants, there should be measures and facilitations which specially target some immigrant groups.

Our findings indicate the need for more knowledge about CCS among immigrants, both for women and HCPs, and to propose a way to implement measures targeting the prevention of cervical cancer among immigrants. We recommend the following; (i) campaigns targeting both HCPs and immigrants to increase awareness of CCS, including reminders to GPs and immigrant women (in their own language) (ii) educating HCPs in cultural competency by compulsory courses affiliated to continuing education, in addition to implement cultural awareness and cultural competency in the syllabus for students of health care.

There are good reasons to suggest that midwives could perform CCS test in the future. However, adequate education and logistics should be put into place followed by a pilot intervention as pre-requisite to an eventual implementation of the midwives taking the CCS test. Such an intervention, as other methods have now been suggested like sending the test kit by post, should be carefully planned and evaluated.

Identifying ethnic inequalities in health requires data with sufficient ‘granularity’ classifying immigrants to capture sub-group variation in healthcare use, risk factors and health behaviors (91). We need, therefore, change in policies so that the immigrant

background such as country of origin can be systematically registered such that clinicians and researchers are able to monitor and evaluate interventions for a particular group of immigrants when needed.

Migration health is a growing research field. Even though the aim of many HIC is to give equitable health care to immigrants, there is much to be done in practice and we are far from reaching that aim. We need more solid research in migration health to develop liable and good policies, and thereafter finding ways to implement them.

8. Future research

As mentioned earlier in this thesis, multifaceted interventions that help to identify new practice norms and associate them with peer and reference group behaviors are more likely to lead to behavior change. During the post intervention interviews of our study, the GPs also proposed that they would like to receive short regular reminders about CCS. A future study to measure the long-term effect of this intervention after a couple of years would be appropriate as the next step.

In this thesis we were unable to conduct an analysis of cost effectiveness. A future study that includes analysis of cost-effectiveness could provide us broader perspectives of the effect of the intervention.

In addition, an intervention where midwives perform CCS test and an evaluation of such intervention could also be the aim of future research.

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Supplementary materials

1. Interview guide for semi-structured interviews

I. Tell about your own experiences in gynecological examinations and cervical cancer screening among patients with an immigrant background?

II. What do you do to make these meetings easier? Measures you can initiate yourself to increase the proportion of immigrants taking screening tests?

III. What information or other type of facilitation do you need to further increase the participation of immigrant women to cervical cancer screening program?

The circle represents how the HCPs would like to get more knowledge: short visit at general practices, letters or e-mails, courses and other methods.

Hvordan ville du best få informasjon eller øke ferdighetene dine?



2. CONSORT extension guidelines for cluster randomised trials-checklist

1. Title and abstract

Effect of an intervention to increase the participation of immigrants to cervical cancer screening - A cluster randomised controlled trial in General Practice

Background

Immigrant women have lower participation in cervical cancer screening (CCS) programs. Targeted interventions among health care providers (HCPs) and immigrant women are therefore necessary. In this trial, we conducted an intervention in General Practice with the intention of increasing immigrants' participation to the Norwegian CCS program.

Methods

The 20 subdistricts of Bergen municipality served as clusters and were matched according to the number of immigrant women living there and randomised thereafter. The intervention consisted of a short seminar about CCS among immigrant women, held at general practices between January and June 2017. Mixed effects logistic regression analyses were conducted for the main outcome measure, screening status in January 2018. We conducted subgroup analyses to assess whether screening status at baseline or women's region of origin affected the outcome. Analyses were by intention to treat. The trial was registered in ClinicalTrials.gov with identifier NCT03155581.

Findings

Post intervention, the proportion of immigrant women screened had increased by 4,9% in the intervention group, and by 1,1% in the control group. After adjustment for screening status at baseline, the Odds Ratio (OR) (95% CI) for being screened at follow-up in the intervention group was 1.24 (1.11-1.38). This statistically significant effect remained unchanged after adjustment for women's characteristics (1.25 (1.12-1.39)), and further adjustment for general practitioners' characteristics (1.19 (1.06-1.34)). In subgroup analyses, the intervention particularly increased

participation among women who were not previously screened and those from Somalia, Pakistan and Poland.

Interpretation

Our intervention targeting general practice significantly increased CCS participation among immigrants. Engaging other professionals such as midwives to perform CCS could further contribute to increase the participation.

Role of funding sources

The Norwegian Cancer Society who funded the first author's PhD, had no role in the study design, data collection, data analysis, data interpretation, or in writing of the article.

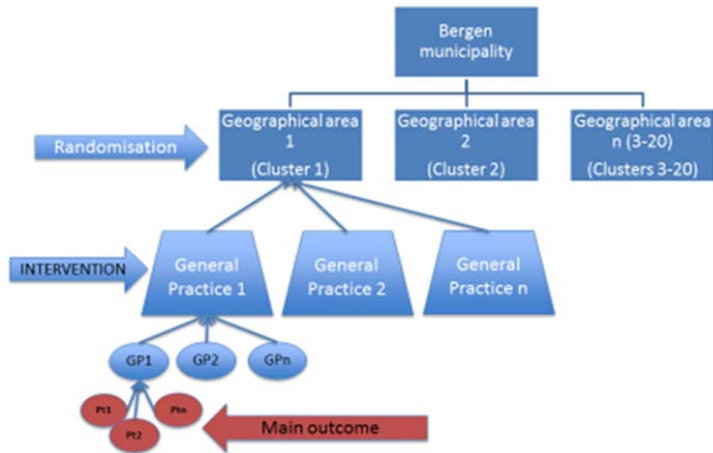
2a. Scientific background and explanation of rationale for using a cluster design

A cluster randomised control trial is a randomised trial where group of individuals are randomised (1) rather than individuals like in typical randomised control trial. Cluster randomised trials are used when the intervention is implemented at a cluster level. In this study, we chose GP-practices in a given geographical areas as clusters (see figure 1). This was chosen because it is difficult to randomise GPs individually or by GP-practices because of the possibility of contamination and for ethical reasons such as the GP choose some patients for CCS test and the others not to.

2b. Specific objectives or hypothesis with explanation on whether objectives pertain to the cluster level, the individual participant level or both

Our aim was to measure the effect of an intervention implemented among GPs in the intervention areas. Thus, the objectives pertain to the individual level. The objective was to influence each GP in a GP-centre individually. We did not expect that it was possible to influence all the GPs at one GP-centre or at geographical areas (cluster) level. Figure 1 explains these different levels.

Figure 1: Overview of the intervention



3. Methods

Trial design

3a. Description of trial design including allocation ratio, definition of cluster and description of how the design features apply to the clusters

See figure 1. A cluster was defined as all general practices in a given subdistrict. Bergen consisted of 20 subdistricts. This is a parallel, two arms, matched pair design (intervention and control arms). In a matched pair design, clusters are constructed so that within each pair, clusters are as similar as possible in relation to factors that might affect the trial outcomes (2).

4. Participants

4a. Eligibility criteria for clusters

All 20 subdistricts of Bergen were included as clusters. There were no specific criteria for selecting the GP-centres. All GP-centres in each of the 20 clusters were included and all GPs in the randomly assigned intervention areas were invited to participate. The rest of the geographic areas in Bergen were assigned as control areas. Within each general practice, the target population were all immigrant women aged 25-69 per 1st of January 2017 and were registered as living in Norway between 2014 and 2018.

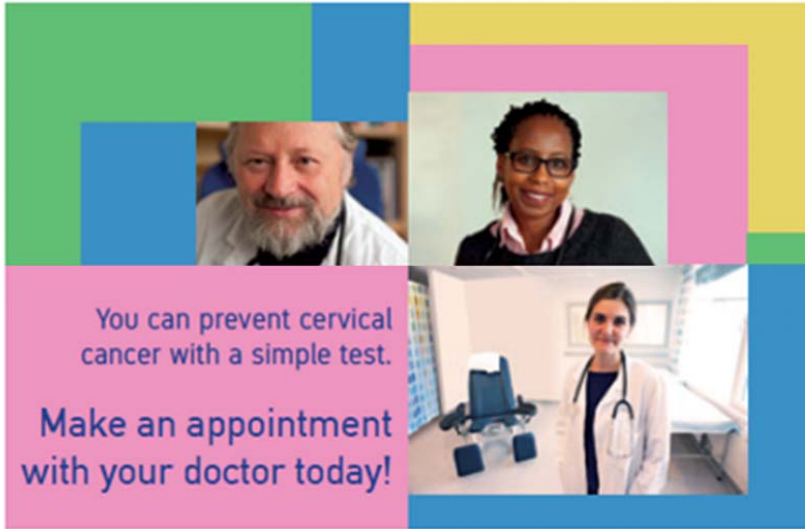
5. The interventions for each group with sufficient details to allow replication, including how and when they were actually administered

Intervention pertain to the cluster level (general practices) and was implemented from January 2017 to June 2017. The first author sent invitations to all the GPs working at GP centres in the intervention areas prior to visiting each centre. Intervention consisted of three components: (i) a short educational session about CCS among immigrants, (ii) a mousepad as a reminder for GPs, and (iii) a poster with a message in Somali, Polish, English and Urdu. The postcards, mouse pad and poster included the same message; “you can prevent cervical cancer with a simple test. Make an appointment with your doctor today!”.

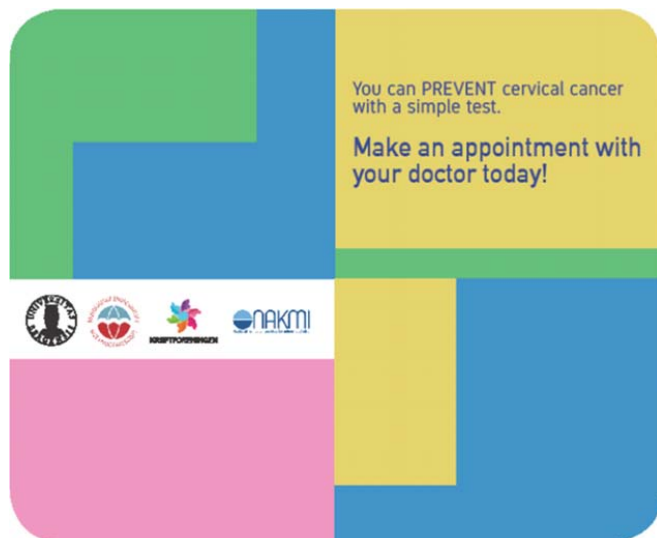
The GPs were encouraged to ask the immigrant women about CCS when they visited them for other reasons, including matters excluding gynaecology. Posters were meant to be placed in the waiting room mainly, but some offices wanted to have one or two additional posters to be placed in the laboratory or inside the consulting rooms.

Two months after the initial round, the first author made telephone calls to the general practices in the intervention areas and talked to the secretaries to find out whether the posters that have been delivered were placed in the waiting rooms or not.

Post card sent to GPs as invitation-front and back



Mouse pad delivered to every GP in the intervention area as a reminder



Poster delivered to general practices in the intervention areas, the message was in Somali, Polish, English and Urdu.

Somali: Waxaad kaga hortagi kartaa kansarka ku dhaca afka-hore ee ilmo galeenka, adiga oo sameeya baadhitaan fudud.
Ka samayso ballan dhakhtarkaaga maanta.

Polish: Możesz zapobiec rakowi szyjki macicy wykonując proste badanie.
Już dzisiaj umów się ze swoim lekarzem!

English: You can prevent cervical cancer with a simple test.
Make an appointment with your doctor today!

Urdu: آپ ایک آسان ٹیسٹ کے ذریعے بچہ دانی کے دہانے کے کینسر سے بچ سکتی ہیں۔
آج ہی اپنے ڈاکٹر سے رابطہ کریں!



6. Outcomes

6a. Outcome measure was whether the immigrant woman had taken the CCS-test according to recommendations as per 1st of January 2018. A woman was defined as screened according to recommendations if she had taken at least one CCS-test within three years before January 1st, 2018 (January 1st, 2014 – December 31st, 2017). The outcome thus pertains to the individual (patient) level.

7 & 8. Sample size and randomisation

We used a matched-pairs cluster-randomised design with 20 clusters according to the 20 geographical subareas in Bergen municipality defined by Statistics Norway (ref Immigration report about Bergen from Statistics Norway). Power calculations were done based on the number of non-western female immigrants in each cluster as reported by Statistics Norway. The mean (m) number of non-western female immigrants aged 20-66 was 430 with a standard deviation (SD) of 291.8 and a coefficient of variation for cluster sizes (cv) of 0.66.

By specifying 5% significance level and assuming 45% screening participation (P1) in the control-clusters, we calculated the following minimum detectable differences with varying values for intraclass correlation (ICC):

ICC	Number of clusters in each arm	M (average cluster size)	sd	cv	P1	Minimum detectable difference
0.005	10	430	291.8	0.66	0.45	0.06
0.01	10	430	291.8	0.66	0.45	0.08
0.015	10	430	291.8	0.66	0.45	0.10
0.02	10	430	291.8	0.66	0.45	0.12

As long as ICC does not exceed 0.015 there is enough power to detect and increase in screening participation from 45% to 55%.

Assuming an ICC of maximum 0.015 and 10 clusters in each arm, the given cluster sizes would give 80% power to detect a difference in screening participation between intervention and control of 10% point (45% versus 55%). Because of variation in population size and proportion of non-western immigrants between clusters, the 20 clusters were matched in 10 pairs according to cluster size (below or above median population size) and percent non-western female immigrants aged 20-66 (+/- 1% was defined as match) before randomization. A random member of each pair was randomly assigned to intervention or control and the remaining member of the pair was allocated to the opposite group (matched pair randomization).

9. Allocation and allocation concealment mechanism

Allocation was based on clusters, not individuals. There was no allocation concealment mechanism.

10. Implementation

The random allocation sequence was generated by statistician J. Iglund. She enrolled clusters by assuming an ICC of maximum 0.015 and 10 clusters in each arm. This was explained in detail under sample size and randomisation. A random member of each pair was randomly assigned to intervention or control and the remaining member of the pair was allocated to the opposite group (matched pair randomization).

10b. All GP-centres in a given geographical area were included as a cluster (complete enumeration).

10c. The Health professional intervention does not pose major ethical challenges, as it mainly consists of information given to professionals already dealing with screening tests for the entire population. The study is based on data from the Norwegian Cancer Registry and other public registries in Norway without any direct contact between the included women and the researchers. A written consent from the women was thus not required. All women between 25 and 69 years

old get an invitation letter for CCS-test by the Norwegian Cancer Registry. Those who do not want to be registered in the database could chose not to give informed consent.

11. Blinding

There was no blinding done in this cluster randomisation trial.

12. Statistical methods

Baseline characteristics of the study population at the individual level (n=10360) were reported separately for the intervention group and the control group as means and standard deviations (SD) for continuous variables and counts and percentages for categorical variables. Since cluster randomisation can result in differences at baseline between treatment groups, we tested for potential differences between the two groups using linear regression, logistic regression and multinomial regression depending on type of variable, and with robust standard errors to account for clustering. We also performed descriptive analyses at the cluster level (n=17) separately for the intervention group and the control group.

We tested the effect of the intervention using mixed effects logistic regression with random intercept to account for clustering and reported the intervention effect as odds ratios (OR) with 95% confidence intervals (CI) with the control group as reference. We estimated ORs for the intervention effect with three levels of adjustment including variables that were considered as important prognostic factors for the outcome.

In model 1 we adjusted for screening status at baseline. We compare "status allright" versus "status not allright". With "status allright", we mean screened according to the Norwegian cancer registry's recommendations. Those who have value "1" have an updated test. Those who have the value "0" have either never taken the test or it has been more than 3 years since the previous test.

In model 2 we additionally adjusted for characteristics for the women: age, marital status, income level and region of origin. In model 3 we adjusted for characteristics of the GP's gender, age and region of origin.

In order to test if the effect of the intervention varied in different subgroups of the study population, we stratified on screening status at baseline and country of origin (Somalia, Poland and Pakistan versus other countries), including an interaction term between intervention group and stratification variable.

A 5% significance level was applied in all analyses and data were analysed according to the initial group allocation (intention-to-treat). We used STATA SE version 15.1 for the analyses.

13. Results

Figure 2 shows the flow chart of the intervention trial. Two clusters in the intervention group and one cluster from the control group were excluded because there were no general practices in these clusters. The remaining 17 clusters had a total number of 10 360 immigrant women; 5227 (50,4%) in the intervention group and 5133 (49,6%) in the control group. Baseline characteristics of the immigrant women in the study population were mostly similar for the intervention and control groups (Table 1). The mean age of the women was 44 years.

Supplementary Table 1 shows baseline characteristics at the cluster level. There were 41 practices in the intervention group and 34 general practices in the control group. All characteristics were similar between the two groups, except for slightly higher number of women, number of GPs and practices per cluster in the intervention group. This was mainly caused by one single cluster in the intervention area (the city centre) which was larger both in terms of general practices, GPs and number of women.

Table 2 shows the effect of the intervention in the total sample. The three columns show the results of the three random intercept logistic regression models with different adjustments as explained in the methods section. Intra cluster correlation (ICC) was 0,005 for screening status in January 2018. In the total study population, the proportion screened according to recommendations had increased from 53.0% (as shown in Table 1) to 55.6% in the intervention group and from 50.7% to 51.3% in the control group. After adjustment for screening status at baseline, the OR (95% CI) for being screened at follow-up was 1.24 (1.11-1.38). The effect was almost the same in model 2 after adjustment for characteristics of women (1,25 (1,12-1,39)), and

remained significant in model 3 after further adjustment for characteristics of the GPs, (1,19 (1,06-1,34)).

Table 3 shows subgroup analyses by baseline screening status and country of origin. We found that among women from Poland, Somalia and Pakistan, the proportion who were screened at baseline varied between the intervention group and the control group (44.7% versus 35.0%). This was mainly caused by different screening participation of women who belonged to different subdistricts. The majority of the Polish women belonged to two subdistricts in the control group with particularly low screening participation at baseline. One subdistrict in the intervention group had high screening participation at baseline. The odds ratios for subgroup analysis by country of origin with adjustment for screening status at baseline were 1,74 (1,17-2,61) for women for Poland, Somalia and Pakistan and 1,15 (1,02-1,30) for the rest of the women. The results were similar in the three models, although not statistically significant in model 3. P-interactions for subgroup analyses by country of origin were statistically significant for all three models. The absolute effect size among women from Poland, Somalia and Pakistan measured as RD (95% CI) after adjustment for screening status at baseline was 6.5 % (1.8%-11.1%).

14. Recruitment

All GPs working in the intervention clusters were included in the intervention group, while the rest of the GPs in Bergen comprised the control group. Immigrants and their offspring (foreign-born and Norwegian-born with foreign-born parents), who were between 25 and 69 years of age in the period between January 2012 and December 2017, and who belonged to a general practice in Bergen, were included in our analysis.

Recruitment was done from September to December 2016. The first author sent invitations (post cards) to all the GPs in the intervention area individually and to the GP centres situated in the intervention areas.

15. Baseline data for GP centres

	Usual Care	Intervention
<i>Nr of clusters, n</i>	9	8
Number of GP-practices, n	34	39
Number of GP's, n	104	128
Number of GP-practices per cluster, mean (SD)	3.8 (2.6)	4.9 (4.8)
<i>Number of women per cluster, mean (SD)</i>	570 (411)	653 (708)
<i>Mean age in clusters, mean (SD)</i>	45.0 (2.2)	44.9 (1.5)
Proportion married, mean (SD)	0.60 (0.07)	0.55 (0.08)
Proportion with university/college education, mean (SD)	0.53 (0.09)	0.54 (0.09)
Proportion with income < 290 000 NOK (30 000 Eur), mean (SD)	0.23 (0.08)	0.25 (0.07)
Proportion from Africa, Middle-East, South Asia and South-East Asia, mean (SD)	0.37 (0.09)	0.38 (0.06)
Proportion with CCS status screened at baseline. mean (SD)	0.54 (0.07)	0.52 (0.02)

16. Numbers Analysed

This trial is a matched pair randomisation trial. Because of variation in population size and proportion of non-western immigrants between clusters, the 20 clusters were matched in 10 pairs according to cluster size (below or above median population size) and percent non-western female immigrants aged 20-66 (+/- 1% was defined as match) before randomization. A random member of each pair was randomly assigned to intervention or control and the remaining member of the pair was allocated to the opposite group.

17. Outcomes and estimation

Baseline characteristics and follow-up data on the outcome of the study participants were obtained through three national registries; the National population registry, GP Database and Norwegian Cancer Registry. The unique personal identification number available for each Norwegian resident was used to link the three national registries.

The main outcome measure was screening status by January 1st, 2018. Information on screening status at baseline and post-intervention was obtained from the Norwegian Cancer Registry, where women between 25 and 69 years old are registered, with their consent, when they take the CCS test.

The demographic data for immigrant women including age, marital status, highest achieved level of education, income in the calendar year 2016 and region of origin was obtained from the National Population Registry. Income was categorized in four groups according to quartiles of income for all women aged 25 to 69 years living in Bergen in 2016. For the women and GPs, region of origin was grouped into EU (European Union)/EEA (European Economic Area), Europe excluding EU/EEA, Africa, Asia including Turkey and other countries, as categorised by Statistics Norway. In addition, we had access to women's country of origin for the biggest immigrant groups. In sub-group analyses, women from the three countries who used languages on the poster (Somali, Polish and Urdu) were studied separately.

GP's age and gender were obtained from the national GP database and GP's region of origin was obtained from the National Population Registry.

18. Ancillary analyses

In addition, we conducted statistical analysis to study the effect of the intervention among Norwegian women living in Bergen in the intervention areas (n=37 633) and control areas (n=31 636) during the same period. Analyses among the Norwegian women not included in the main study population revealed an increase in the proportion who was screened from 64.1% to 65.5% in the control group and an increase from 64.7 % to 67.1% in the intervention group. OR (95% CI) for the intervention effect was 1.03 (0.96-1.10) after adjustment for screening status at baseline, and thus not statistically significant.

19. Harms

No harms done, or unintended effects caused during the trial.

20. Trial limitations

a. Contamination

Bergen was divided in to 20 geographical areas. Even though we divided these 20 areas in to control and intervention areas, some contamination could have been done between adjacent areas.

b. Two GP-centres which should have been control areas were considered as intervention areas because of a misunderstanding with the address.

c. There were some other campaigns that had been held by others to increase the attendance for CCS, none of them specifically among immigrants though.

21. Generalisability

Our findings suggest by raising GPs' awareness on migrant health issues such as non-communicable diseases and life style factors, we can provide better health for migrants.

However, further research should investigate the long-term effects of such interventions. Our intervention among GPs might also be relevant for other providers in primary care in urban settings of high-income countries with lower participation of immigrants to CCS and eventually for other preventive interventions.

22. Interpretation

Our intervention targeting general practice significantly increased CCS participation among immigrants. Engaging other professionals such as midwives to perform CCS could further contribute to increase the attendance.

23. Registration

The trial is registered in ClinicalTrials.gov with Protocol ID: 2015/1156

24. Protocol

See attachment

25. Funding

The first author's PhD was funded by Norwegian Cancer Society.

References

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2. Eldridge, Sandra, & Kerry, Sally. (2012). Statistics in Practice. Chichester, UK: John Wiley & Sons.

3. Educational session at the general practices

Thank you for giving me the opportunity to talk about cervical cancer among immigrant women. As you know, I am a GP, and take a doctoral thesis on this subject at the University of Bergen.

We know that immigrants are a large group with many different cultures and nationalities, but if you think a bit back: how often do you take cervical cancer tests from immigrants?

What we have found in our research is that the immigrant women, no matter where they come from, have lower attendance to cervical screening than Norwegian-born women. In addition, we know that some immigrant groups, especially those from East Africa and South-East Asia, have a higher incidence of cervical cancer. Therefore, we collaborate on this project with the Norwegian Cancer Registry and the Norwegian Cancer Society, which also believe that immigrant women should be given priority in order to detect cancer as early as possible.

As I said earlier, we know that there are differences between the immigrant groups, but I am generally speaking now because this really concern most immigrant women. Women from Somalia and Pakistan who we interviewed say that they do not receive or do not read the reminder letter from the Cancer Registry.

Those who try to read do not understand the letter. They also say that the doctors did not address the issue with them, but they would really be interested in getting an appointment for the cervical cancer test if they had understood that this was important for them. It is alright that women decide not to take the test if they want, but they must be given relevant information about cervical cancer screening. It is therefore important that we, as GPs, inform immigrant women, briefly and in

simple language, that this is a test to avoid cancer in the genital area and this is recommended for all women between the ages of 25 and 70. Since many believe that the test should first be taken when one has symptoms, it is important to emphasize that the test should be taken before getting symptoms and regardless of how many partners one has. The latter is also a common misconception among some immigrant women, that if you have only one partner, you do not have to take the test. Therefore, today we will invite you to a local campaign to try to increase the attendance to cervical screening among immigrant women in general and especially among non-western immigrants.

The campaign has two parts:

1. We have created nice posters that we hope you can hang in the waiting room, in the laboratory or at the doors of their office. The posters are mostly meant for women, so they themselves are more interested in getting information and ordering time. You may want to inform the medical secretaries about the campaign so that they can help with a brief explanation if immigrant women ask about the posters. Our aim is to not overload you, but to offer the women equal health services and that they are offered own appointments for cervical cancer test if they are interested.
2. The other part of the campaign is inviting you to take this topic up more often with the patients when they come for other reasons. When we talked to GPs in connection with the project, a great number of doctors said that they rarely address the topic of cervical cancer test with women from non-western countries because these patients addressed many issues on one consultation and then it was difficult to make time to take this topic up as well. However, since they rarely take this test and some of them are most susceptible to lethal form of cancer, we suggest that

you consider mentioning this to the women in connection with the consultations. It is probably enough to inform, in brief and in simple language, that this is a test to avoid cervical cancer, it is recommended to all women between 25 and 70 and that it should be taken before getting symptoms regardless of how many partners you have. From our own experience, appointments should be preferably given before they leave the office, instead of asking them to make an appointment when it suits.

Our experience after talking to the GPs is that male doctors have a low threshold to offer referrals to female colleagues / gynaecologists to these patients and it is alright if male GPs think that if this the right way, but giving information to women is the most important thing. So: 1. Place the posters 2. ask the women about cervical cancer test, are our main messages.

Thank you for your attention!

4. Number of women in the subgroup analysis; by country of origin. Screening status at baseline and post intervention

	Number of women included		Screened January 2017, n (%)		Screened January 2018, n (%)	
	Control	Intervention	Control	Intervention	Control	Intervention
Poland	667	266	220 (33.0)	111 (41.7)	224 (33.6)	122 (45.9)
Somalia	106	156	46 (43.4)	76 (48.7)	44 (41.5)	81 (51.9)
Pakistan	51	64	23 (45.1)	30 (46.9)	22 (43.1)	33 (51.6)
All three countries combined	824	486	289 (35.1)	217 (44.7)	290 (35.2)	236 (48.6)

Appendix

Paper I: Differences in cervical cancer screening between immigrants and nonimmigrants in Norway: a primary healthcare register-based study

by Kathy A. Møen, Bernadette Kumar, Samera Qureshib and Esperanza Diaza

Differences in cervical cancer screening between immigrants and nonimmigrants in Norway: a primary healthcare register-based study

Kathy A. Møen^a, Bernadette Kumar^{b,c}, Samera Qureshi^b and Esperanza Diaz^{a,b}

The prevalence of cervical cancer is high among some groups of immigrants. Although there is evidence of low participation in cervical cancer screening programs among immigrants, studies have been subject to selection bias and accounted for few immigrant groups. The aim of this study was to compare the proportion of several groups of immigrants versus nonimmigrants attending the cervical cancer-screening program in Norway. In addition, we aimed to study predictors for attendance to the screening program. Register-based study using merged data from four national registries. All Norwegian-born women (1 168 832) and immigrant women (152 800) of screening age for cervical cancer (25–69 years) registered in Norway in 2008 were included. We grouped the immigrants by world's geographic region and carried out descriptive analyses and constructed several logistic regression models. The main outcome variable was whether the woman was registered with a Pap smear in 2008 or not. Immigrants had lower rates of participation compared with Norwegian-born women; Western Europe [adjusted odds ratio (OR), 95% confidence interval (CI): 0.84, 0.81–0.88], Eastern Europe (OR 0.64, 95% CI: 0.60–0.67), Asia (OR 0.74, 95% CI: 0.71–0.77), Africa (OR

0.61, 95% CI: 0.56–0.67) and South America (OR 0.87, 95% CI: 0.79–0.96). Younger age, higher income, residence in rural areas, and having a female general practitioner (GP) were associated with Pap smear. Longer residential time in Norway and having a nonimmigrant GP were associated with screening for some immigrant groups. Appropriate interventions targeting both immigrants and GPs need to be developed and evaluated. *European Journal of Cancer Prevention* 26:521–527 Copyright © 2017 The Author(s). Published by Wolters Kluwer Health, Inc.

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Keywords: cancer screening, emigrants and immigrants, population register, primary healthcare, uterine cervical neoplasms

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Introduction

Cervical cancer is one of the few preventable cancers if detected early. It is the third most common cancer and the fourth most frequent cause of cancer deaths in women worldwide (Jemal *et al.*, 2011). However, cervical cancer prevalence and mortality are not evenly distributed. More than 85% of the cases and deaths occur in low-income and middle-income countries (Ferlay *et al.*, 2013). Cervix cancer is slightly more common in some immigrant groups living in Western countries than in the general population (Arnold *et al.*, 2010; Azerkan *et al.*, 2012).

The main factor for the development of cervical cancer is persistent infection with high-risk human papilloma virus. Many Western countries use the Papanicolaou stain (Pap smear) for cervical cancer screening (CCS). Several international studies show that immigrants have lower

participation rates in preventive screening (Woltman and Newbold, 2007; Johnson *et al.*, 2008; Lofters *et al.*, 2010; Grandahl *et al.*, 2012; Berens *et al.*, 2014; Campari *et al.*, 2015; Ghebre *et al.*, 2015; Lee *et al.*, 2015) and when they eventually see a doctor, they are often diagnosed with severe forms of cervical cancer (Schleicher, 2007). However, these studies are often subject to selection bias, limited to one immigrant group or ethnic group, and rely on self-reported data.

Nearly 16% of the population in Norway was of migrant origin at the beginning of 2016 (Statistics Norway, 2016). In Norway, today, all women between 25 and 69 years receive a letter in Norwegian at 3-year intervals, inviting them to make an appointment with their general practitioner (GP) to take a Pap smear. Although the general attendance to this program has been 74% after reminders (Skare and Lönnberg, 2015), over half of the women diagnosed with cervical cancer have rarely or never taken a Pap smear (Cancer Registry of Norway, 2016). The proportion of women with immigrant background who attend this program is currently unknown.

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Our hypothesis was that immigrants in Norway had lower but different attendance rates of CCS depending on their region of origin. In addition, we hypothesized that not only the characteristics of the women but also those of their GPs could influence women's attendance to CCS. We took advantage of a nationwide multiregister study including information on all women registered in Norway and their GPs. Our aim was to compare the proportion of different groups of immigrants with nonimmigrant women registered by their GPs as having taken a Pap smear in 2008 and to study predictors for attendance to the CCS program for the different immigrant groups.

Participants and methods

This was a cross-sectional study using merged data from four nationwide registries in Norway: The National Population Registry, the Norwegian Health Economics Administration Database (HELFO), the GPs' database, and the 2008 Medical Birth Registry.

All Norwegian citizens and legal immigrants residing in Norway for over 6 months have a unique personal identification number and this was used to link the four registries. All legally registered immigrants are members of the National Insurance Scheme, which entitles them access to a GP and Emergency Primary Care services. All nonimmigrant women with both parents from Norway (1 168 832) and immigrant women defined as born abroad with both parents from abroad (152 800) in the age group for CCS (25–69 years) registered in Norway in 2008 were included in the study.

From the National Population Registry, we obtained information on study women in terms of age, immigration category (nonimmigrant or immigrant), reason for migration (refugee, work, family reunification, and other), length of stay in Norway (up to 2 years and longer than 2 years), municipal centrality (urban or rural), civil status (married, unmarried, and other – including widowed, divorced, separated, and others), education level (none, low: lower secondary school, middle: upper secondary school, and high: university/college), and personal annual income in Norwegian Kroners (NOK) (low: below 200 000 NOK, medium, and high: over 400 000 NOK). Immigrant's country of origin was categorized by regions as follows: (i) Nordic countries, (ii) North America and Western Europe, (iii) Eastern Europe, (iv) Asia, (v) Africa, and (vi) South and Central America. As preliminary analyses showed similar results for Nordic countries and Western Europe/North America and for comparison with other studies, we regrouped these two regions into one called 'Western Europe'.

HELFO data (HELFO, Tønsberg, Norway) were based on administrative claims registered from all patient contacts within the primary healthcare, including both consultations with GPs and Emergency Primary Care services. Diagnoses were based on the International Classification of Primary Care, version 2 (ICPC-2). For

our study, we selected consultations with diagnoses related to screening for cervical cancer. The diagnoses included were X85 disease in cervix IKA, X86 abnormal cervical cytology, A981 cytology cervical screening, and 37 histological/cytological test and other gynecological illnesses. We created a binary variable as the main outcome variable, being '1' for women with at least one of these diagnoses and '0' for the rest of the women.

We obtained information from the Medical Birth Registry on whether the woman had given birth or not in 2008. From the GPs' database, we obtained information on sex and immigrant background of the women's GP.

This study is part of the project 'Immigrants' Health in Norway', approved by the Regional Committee for Medical and Health Research Ethics and the Norwegian Data Inspectorate.

Statistical analyses

We performed comparisons of demographic characteristics for nonimmigrants and immigrants using χ^2 and analysis of variance for categorical and continuous variables, respectively. In addition, we compared the demographic characteristics of women with and without a Pap smear test for each of the regions of origin.

Binary logistic regression analyses were carried out with 'being registered with a Pap smear test in 2008' as the dependent variable. Our main explanatory variable was the patients' region of origin, with nonimmigrants as the reference group. Other explanatory variables included the woman's age, income, marital status, municipal centrality, pregnancy, and GP's characteristics. We constructed several logistic regression models. First, we included each of the explanatory variables one by one. Model 1 included age categorized into three intervals in addition to region of origin. Model 2 added other socioeconomic variables: marital status, income, and municipality's centrality to model 1. Model 3 further included GP's sex and immigrant background. We used pregnancy in the preliminary analyses, but did not include it afterwards as the inclusion of this variable did not further improve the model measured by the Nagelkerke R^2 value.

Finally, to explore effect modifications between region of origin and the other explanatory variables, we performed binary logistic regression of model 3 by region of origin.

We used SPSS 22.0 software package for statistical analyses. (SPSS - Statistical package for social sciences), IBM Corp. 2013. Armonk, New York, USA).

Results

A total of 1 321 632 women with a mean age of 47.1 years (SD 12.6) were included in our study. Table 1 describes the sociodemographic characteristics of the study population by regional groups.

Table 1 Sociodemographic characteristics of the study population by world regions

	Norway	Western Europe ^a	Eastern Europe	Asia	Africa	South America ^b
Age [mean (SD)]	47.1 (12.6)	45.1 (12.7)	39.1 (10.9)	39.5 (10.5)	37.2 (9.3)	40.2 (10.7)
Length of stay [mean (SD)]	–	17.5 (14.9)	8.6 (8.6)	12.0 (9.5)	9.5 (8.4)	12.5 (10.1)
Income (%)						
Low	38.5	41.5	53.2	64.4	72.5	56.6
Medium	42.2	35.2	35.8	28.3	22.3	34.0
High	19.4	23.3	11.1	7.3	5.2	9.3
Education (%)						
No education	0.1	0.3	0.8	5.1	9.5	1.5
Low	21.7	14.1	26.8	43.0	46.2	29.5
Middle	43.2	28.8	30.3	25.2	26.7	34.8
High	35.0	56.8	42.2	26.7	17.6	34.2
Municipal centrality (%)						
Rural	34.3	23.0	24.9	15.7	15.1	17.6
Urban	65.7	77.0	75.1	84.3	84.9	82.4
Marital status (%)						
Married	27.3	28.8	18.0	10.2	17.8	15.0
Unmarried	53.4	54.7	64.9	72.4	55.2	61.2
Others	19.4	16.4	17.0	17.4	27.0	23.8
Gave birth in 2008 or 2009 (%)						
Yes	5.7	7.7	9.8	10.1	17.6	9.9
GP's sex (%)						
Male	62.2	62.5	63.6	54.4	62.0	66.8
Female	37.8	37.5	36.4	45.6	38.0	33.2
GP's origin (%)						
Born in Norway	76.4	66.1	54.8	57.4	58.1	63.4
Born abroad	23.6	33.9	45.2	42.6	41.9	36.6
Registered Pap smear in 2008 by GP (%)						
Yes	7.7	6.0	4.6	5.7	4.6	6.3
Number of observations	1 168 832	40 761	35 046	55 866	14 008	7119

GP, general practitioner.

^aWestern Europe also includes Nordic countries and North America.^bSouth America includes Central America.

Immigrants had lived in Norway from 8 to 18 years. Compared with nonimmigrants, immigrant women were younger and more often lived in urban areas. Women from Western Europe had the highest income and education levels, whereas more than half of the women from Africa had either low or no reported education and had the lowest income levels. Women from Eastern Europe, Asia, and South America were often unmarried. A higher percentage of immigrants had been pregnant in 2008. Those from Asia more often had female GPs. Immigrants more often had GPs born outside Norway. Of the total 7.4% Pap smear registered in 2008, the highest registration was made among nonimmigrant women (7.7%) and the lowest among immigrant women from Africa and Eastern Europe (4.6%).

Demographic characteristics for women, both with and without Pap smear by region of origin, are presented as Supplementary data (Table S1), Supplemental digital content 1, <http://links.lww.com/EJCP/A118>. For both immigrants and nonimmigrants, younger women, with higher income, in rural areas and those who had not been pregnant were among those who took Pap smear more often. Among immigrants, no significant differences in taking Pap smears were observed by length of stay. Generally, women with female GPs had more Pap smears registered. The proportion of women with a Pap smear was significantly lower among women with an immigrant GP, except for women from Africa.

Table 2 shows the results from logistic regression analyses. Immigrants from all regions had a significantly lower probability of having a Pap smear registered compared with nonimmigrants in all models. Increasing age was associated negatively with Pap smear rates. Higher income, living in rural areas, having a female GP, and a Norwegian GP were associated significantly with more Pap smears in multivariate models. Although being married was associated with a Pap smear test in univariate analyses, the opposite was true in the adjusted models.

Table 3 shows the adjusted logistic regression analyses for immigrant women by region of origin. The associations between screening and socioeconomic variables were in the same direction as for the population as a whole in terms of income and living in rural areas, but differed slightly for the various immigrant groups for other characteristics. Younger age was associated significantly with Pap smear for women from Eastern Europe and the age pattern seemed to be different for women from Asia, where women aged 41–55 years took the test significantly more often. The effect of length of stay in Norway on screening varied with the immigrant group, being positively associated for women from Eastern Europe, whereas most other groups had significantly lower attendance after 2 years. Being single was positively associated for women from Eastern Europe, Asia, and South America, whereas being married was associated with lower rates of Pap smears for women from Asia and South

Table 2 Binary logistic regression. Associations between Pap-smear attendance and immigrant background

	Models							
	Unadjusted		Model 1		Model 2		Model 3	
	Adjusted OR	95% CI	Adjusted OR	95% CI	Adjusted OR	95% CI	Adjusted OR	95% CI
Origin								
Norway (reference)	1	1	1		1		1	
West Europe	0.78	0.75–0.81	0.76	0.73–0.80	0.79	0.76–0.82	0.84	0.81–0.88
East Europe	0.58	0.55–0.61	0.54	0.51–0.57	0.56	0.53–0.59	0.64	0.60–0.67
Asia	0.73	0.70–0.76	0.68	0.66–0.71	0.73	0.71–0.76	0.74	0.71–0.77
Africa	0.58	0.53–0.62	0.53	0.49–0.57	0.59	0.54–0.64	0.61	0.56–0.67
South America	0.80	0.73–0.89	0.75	0.69–0.83	0.80	0.73–0.89	0.87	0.79–0.96
Age in years								
25–40 (reference)	1		1		1		1	
41–55	0.95	0.94–0.97	0.93	0.91–0.94	0.89	0.88–0.91	0.91	0.89–0.92
56–75	0.75	0.74–0.77	0.72	0.71–0.73	0.73	0.72–0.75	0.75	0.74–0.77
Marital status								
Married (reference)	1				1		1	
Unmarried	0.99	0.97–1.00			1.12	1.10–1.14	1.12	1.10–1.14
Other	0.87	0.86–0.89			1.03	1.01–1.05	1.05	1.02–1.07
Income								
Low	1				1		1	
Medium	1.34	1.32–1.36			1.22	1.20–1.24	1.19	1.17–1.21
High	1.29	1.27–1.31			1.21	1.19–1.23	1.16	1.14–1.18
Municipal centrality								
Rural	1				1		1	
Urban	0.82	0.80–0.83			0.82	0.81–0.83	0.80	0.79–0.81
GP's sex								
Male	1						1	
Female	1.70	1.68–1.73					1.70	1.67–1.72
GP's origin								
Norway	1						1	
Born abroad	0.88	0.86–0.89					0.89	0.88–0.91
Nagelkerke			0.005		0.008		0.019	

Unadjusted: includes one variable at the time.

Model 1: includes age in three categories in addition to region of origin.

Model 2: added other socioeconomic variables: marital status, income, and municipality's centrality to model 1.

Model 3: includes GP's sex and immigrant background in addition to models 1 and 2.

95% CI, 95% confidence interval; GP, general practitioner; OR, odds ratio.

America. In terms of GP's characteristics, having a female GP significantly increased the probability of taking a Pap smear for all groups, whereas having a GP born outside Norway was associated with significantly lower rates of Pap smear for Europeans and Asians, but not for women from Africa and South America.

Discussion

Our study confirms lower rates of participation in the preventive CCS program in Norway among immigrants compared with nonimmigrants. Higher income, residence in rural areas, and having a female GP were associated positively with Pap smear for both immigrants and nonimmigrants. Younger age was associated with Pap smears for nonimmigrants and most immigrant groups. Longer stay in Norway was significantly positively associated with higher attendance for women from Eastern Europe, but not for other immigrants. Having a Norwegian-born doctor was positively associated with screening for women from Western and Eastern Europe and Asia, but not for women from Africa or South America.

Our findings are in agreement with several international studies that report lower rates of CCS for immigrants

(Woltman and Newbold, 2007; Lofters *et al.*, 2010; Berens *et al.*, 2014; Campari *et al.*, 2015; Ghebre *et al.*, 2015; Lee *et al.*, 2015), but with wide variations in screening by ethnic background (McDonald and Kennedy, 2007). In our study, women from Africa and Eastern Europe had the lowest rates of participation in CCS. Given the nature of our study, we cannot provide explanations for this finding, but several barriers described earlier could contribute toward explaining our results. We group these barriers into individual (including cultural, economic, and life situation related) and structural.

Cultural barriers mentioned in other studies include the belief that the healthcare system is for treatment not for prevention (Akers *et al.*, 2007), embarrassment, and the fear that screening threatens virginity (Coughlin *et al.*, 2006; Akers *et al.*, 2007). These barriers might, however, influence immigrants differentially. Embarrassment regarding circumcision, for example, can be especially important for women from Somalia (Lofters *et al.*, 2011; Shelton *et al.*, 2012; Ekechi *et al.*, 2014; Harcourt *et al.*, 2014), who represent the main group among women from Africa in our study.

Table 3 Binary logistic regression. Pap-smear attendance for immigrant women by region of origin

	Western Europe ^a		Eastern Europe		Asia		Africa		South America ^b	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Age										
25–40 (reference)	1		1		1		1		1	
41–55	0.94	0.85–1.04	0.78	0.69–0.88	1.09	1.01–1.18	1.07	0.88–1.29	0.86	0.69–1.07
56–75	0.74	0.65–0.84	0.60	0.48–0.74	0.61	0.51–0.72	0.63	0.39–1.01	0.70	0.48–1.02
Stay in Norway (years)										
0–2	1		1		1		1		1	
Above 2	0.86	0.76–0.98	1.17	1.02–1.33	0.93	0.82–1.04	0.74	0.59–0.92	0.74	0.56–0.98
Marital status										
Married	1		1		1		1		1	
Unmarried	1.06	0.96–1.18	1.19	1.02–1.38	1.68	1.44–1.99	0.98	0.78–1.22	1.41	1.02–1.94
Others	0.98	0.84–1.13	1.19	0.99–1.44	1.56	1.30–1.86	0.90	0.69–1.16	1.58	1.10–2.27
Income										
Low	1		1		1		1		1	
Medium	1.23	1.11–1.35	1.25	1.12–1.40	1.26	1.16–1.37	1.42	1.18–1.71	1.26	1.02–1.57
High	1.04	0.93–1.17	0.99	0.83–1.18	1.23	1.07–1.41	1.11	0.77–1.62	1.12	0.79–1.58
Municipal centrality										
Rural	1		1		1		1		1	
Urban	0.84	0.76–0.93	0.76	0.68–0.86	0.82	0.74–0.90	0.77	0.62–0.96	0.83	0.64–1.06
GP's sex										
Male	1		1		1		1		1	
Female	1.81	1.66–1.96	1.87	1.68–2.07	1.73	1.61–1.87	1.50	1.27–1.77	1.40	1.15–1.73
GP's origin										
Norway	1		1		1		1		1	
Born abroad	0.88	0.80–0.97	0.85	0.76–0.95	0.87	0.80–0.94	1.07	0.91–1.27	0.83	0.67–1.03
Nagelkerke R ²	0.020		0.023		0.021		0.013		0.013	
Number of observations	37 068		30 587		51 908		12 998		6558	

Results adjusted for all the variables in the table.

95% CI, 95% confidence interval; GP, general practitioner; OR, odds ratio.

^aWestern Europe also includes Nordic countries and North America.

^bSouth America includes Central America.

However, culture and beliefs are not static, and acculturation tends to increase with longer stay in the new country. Although several studies describe a positive association between longer stay in the host country and Pap smear (McPhee *et al.*, 1997; Lofters *et al.*, 2011), other studies find that disparities in CCS attendance persist despite longer stay in the host country (Echeverria and Carrasquillo, 2006). In our study, length of stay in Norway was positively associated with screening for women from Eastern Europe, but negatively associated for women from Western Europe, Africa, and South America, despite different cut-offs of length of stay used in the analyses (Supplementary Table 2, Supplemental digital content 2, <http://links.lww.com/EJCP/A119>). This indicates an effect modification between length of stay and attendance for the different immigrant groups. Women from Poland represent the majority of immigrant women from Eastern Europe. A possible explanation for the association between length of stay and Pap smear for Eastern Europeans could be that these women prefer direct access to specialist healthcare as in their home countries compared with gatekeeping by GPs in Norway and might therefore travel to their own country to receive healthcare services during the first years in Norway (Lamkaddem *et al.*, 2012).

Economical barriers such as patient charges to obtain health services may have a greater impact on women with low income. Immigrant women's life situation such as taking care of the elderly and children, language barriers in

the new host country, and lack of knowledge of cancer and screening programs might also prevent them from participating in screening programs (Grandahl *et al.*, 2012). In our study, the association between being married and screening attendance varied for the different immigrant groups. Unmarried women from Eastern Europe, Asia, and South America took more Pap smear than married women from the same areas. Most of the previous studies showed that younger women take more Pap smears than older women, but information on marital status and Pap smear had been scarce. One report from British Columbia showed a positive association between being married and Pap smear for immigrants (Fletcher, 2011).

Our result showing that women in rural areas take more Pap smear was consistent for all groups. This is, to our knowledge, a new finding not described before. Immigrant women from rural areas tend to be better integrated into society and rural GPs have lower numbers of patients. As a result, information on and availability of the system might be higher.

Structural barriers include those related to physicians and the availability of the health system in the host country. Among the GP characteristics in our study, the main factor that was positively associated with Pap smear was having a female GP. There are other studies that show similar findings both related to women's preferences (Nguyen *et al.*, 2002), but also to female GPs more actively asking new patients whether they have had a Pap

smear (Harcourt *et al.*, 2014). This may also be the case in Norway. A recommendation by the GP has been described previously as an important facilitator to cancer screening (de Alba and Sweningson, 2006). Our study points to a lower screening attendance among women who have a GP with an immigrant background. This is in agreement with other studies suggesting that when the physician and the patient have the same immigrant background or ethnicity, the rate of CCS is reduced (McPhee *et al.*, 1997). In addition, lack of time to discuss screening and to communicate with the patient in a culturally appropriate way are mechanisms described to explain the low rate of CCS among immigrants (de Alba and Sweningson, 2006; Akers *et al.*, 2007).

Strength and limitations of the study

Our study has several strengths. First, it is register based and includes over one million women. By including all the women registered in 2008 as having had a Pap smear, we avoid self-selection bias and by using GPs registration of tests, recall bias or errors with respect to diagnosis are minimal. Furthermore, grouping immigrant women by major world regions, we disentangled some of the differences between immigrant groups. Patterns observed among different immigrant groups in Norway are likely to be applicable to other Western countries.

However, our study also has limitations. The world regions that we use can be quite heterogeneous as they include many countries, religions, and cultures. GPs have a gate-keeper function in Norway and they take most of the Pap smears, but Pap smears taken by gynecologists or other health providers were not included in our data. However, women cannot seek a public gynecologist without a referral from a GP. Because we are using HELFO's diagnosis system, we are dependent on GPs registering the Pap smears correctly. Some women might not be registered if they visit their GP for other reasons even though the consultation resulted in taking a Pap smear. For example, when a woman comes to see her GP for irregular bleeding, the diagnosis of menorrhagia is made even though the GP takes a Pap smear. Last but not the least, screening in Norway is recommended every 3 years, whereas we have studied Pap smear for only 1 year (2008). The lack of registration when several diagnoses are discussed in the consultation is probably the main reason for the discrepancy between our numbers (7.7% in 2008) and the ~64% (around 20% per year) of women who take a Pap smear in a given year. However, on the basis of several other studies using HELFO data, there is no indication that GP's registration is different for immigrants and non-immigrants. Thus, we believe that these shortcomings will not change our results as our aim is not to determine the prevalence, but to compare the proportion of screening among nonimmigrants and immigrants.

Implication for clinical practice

Our findings indicate the need for policy makers to develop and implement measures targeting the prevention of cervical cancer among immigrants. Increased awareness among primary care providers of low attendance among immigrants is required to increase participation of immigrants to preventive programs. GPs and other health providers need to know and learn more about barriers related to sex, communication, and culture to address these in an appropriate way.

Conclusion

The participation of immigrant women to CCS in Norway must be increased. Appropriate interventions targeting both immigrant women and care providers need to be developed and evaluated. User participation and seeking information from immigrant women and health-care personnel could further shed light on potential barriers and to decrease the screening gap between immigrants and nonimmigrants.

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Conflicts of interest

There are no conflicts of interest.

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Paper II: Cervical cancer screening among immigrant women in Norway- The healthcare providers' perspectives

by Kathy Ainul Møen, Laura Terragni, Bernadette Kumar and Esperanza Diaz



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Cervical cancer screening among immigrant women in Norway- The healthcare providers' perspectives

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ABSTRACT

Objective: To explore health care providers' (HCPs) experiences regarding cervical cancer screening (CCS) among immigrant women, their strategies to facilitate these consultations and their need for further information.

Design: Exploratory qualitative design.

Setting: HCPs who perform CCS: general practitioners, midwives and private gynaecologists, working in Oslo, Norway.

Subjects: We interviewed 26 general practitioners, 3 midwives and 3 gynaecologists.

Method: Both focus groups and personal in depth semi structured interviews. Interview transcripts were analysed using a thematic analysis approach.

Results: Some of the HCPs' experiences related to CCS were common for all women regardless of their immigrant background, such as the understanding of routines and responsibilities for prevention. Aspects specific for immigrant women were mainly related to organization, language, health literacy levels, culture and gender. Several strategies targeting organizational (longer consultations), language (using interpreters), health literacy (using anatomy models to explain) and culture (dealing with the expression of pain) were reported.

Most HCPs had not previously reflected upon specific challenges linked to CCS among immigrant women, thus the interviews were an eye-opener to some extent. HCPs acknowledged that they need more knowledge on immigrant women's' reproductive health.

Conclusion: HCPs' biases, stereotypes and assumptions could be a key provider-level barrier to low uptake of CCS test among immigrants if they remained unexplored and unchallenged. HCPs need more information on reproductive health of immigrant women in addition to cultural awareness.

KEY POINTS

- The participation rate of immigrant women to cervical cancer screening in Norway is low, compared to non-immigrants. This might be partly attributed to health care system and provider, and not only due to the women's preferences. Our focus groups and interviews among health care providers show, that in addition to cultural competence and awareness, they need knowledge on reproductive health of immigrants. We recommend an intervention targeting health care providers to close the gap in cervical cancer screening.

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Cervical cancer screening; emigrants and immigrants; intervention; health care providers

Introduction

In 2017, immigrant women comprised 11% of the European female population [1]. The majority of these women have migrated from Africa, Latin America and Asia, and the proportion of non-European immigrants continues to increase [2]. Many female immigrants work as caregivers or domestic helpers, and are often part of the informal labor force impacting their social

position and access to resources, including access to health care [3].

Although there are more similarities than differences in the disease profiles of migrants and non-migrants, the prevalence of different types of cancer could be related to migrants' background [4,5]. This is the case for cervical cancer, with a higher prevalence among some groups of immigrants, particularly those

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from East, West and Central Africa and Melanesia [6]. Although most European countries aspire to achieve equity in health care, it may not be the case for cervical cancer screening (CCS). Lower attendance to CCS programs among immigrant women might indicate inequities in access [7–10]. Our research group has also documented that this is also the case for the Norwegian CCS program [11].

In Norway, every legally residing individual is entitled to a general practitioner (GP). Since 1995, all women between 25 and 69 years receive a letter from the Norwegian cancer registry every three years inviting them to make an appointment with their GP for a CCS test. It is the GP who usually performs the CCS. As GPs are private practitioners, a co-payment from patients is usually required. Midwives provide free services for pregnant women and children up to pre-school age at health clinics, and their appointments with patients are usually longer than the typical GP appointment. Recently, a few midwives have begun to perform CCS tests.

Gynaecological consultations raise several challenges for both patients and providers and could be even more pronounced when the patient is an immigrant woman. Previous studies have focused on barriers for users [8,12,13]. Our recent study concurs [14] revealing barriers for attendance to CCS among immigrant women. Our findings relate to individual attitudes and perceptions on CCS; such as poor knowledge about the disease, lack of perceived necessity, language barriers or fear of pain/procedural discomfort and receiving bad news related to the test. Our study also pointed out sociocultural barriers such as stigma attached to the disease, female circumcision, or the shame for unmarried women undertaking a gynaecological examination. Our findings concur with those from Canada regarding barriers such as poor knowledge about cancer and its risk factors and lack of open discussion about issues related to female reproductive organs [15]. Another Norwegian study [16] also revealed barriers related to navigating health care system in a new country, although this was not specific for CCS.

According to the literature, health care providers (HCPs) could improve the attendance to CCS among immigrants by helping women to understand the importance of regular screening and the benefits of the CCS test [17,18]. However, immigrant women from Somalia and Pakistan report [14] that they neither receive the invitation letters from Norwegian cancer registry, nor were asked by their GPs about CCS in our recent study. Few studies have described

barriers at the physicians' and system level [17,19] and studies on HCPs' perspectives and roles are scarce [20–22].

The aim of this study was firstly, to understand the HCPs' experiences related to gynaecological examinations and CCS among immigrant women, secondly to learn what kind of strategies HCPs already used to overcome any barriers encountered in these consultations, and finally their need for additional information or assessment tools.

Method

Design

This study took place in Oslo, Norway, and has an exploratory qualitative research design [23]. Data were gathered through focus groups and personal semi-structured interviews.

Participant selection and recruitment

As mentioned earlier, performing CCS tests is one of the GPs' tasks. However, GPs refer women to gynaecologists in case of complexity. It is not the practice for midwives to undertake CCS, but recently as part of an experimental project, a few of them have begun to do so. Therefore, we have included some gynaecologists and midwives also as participants.

GPs attend two kinds of educational meeting groups: i) compulsory groups in order to become specialists for a two-year period, and ii) thematic courses to obtain or renew their specialty. Two supervisors of these compulsory groups were contacted by e-mail using the authors network (KAM, ED). The GPs participating were relatively young, most worked in Oslo and not known to us previously. Furthermore, we contacted the supervisor of one thematic course, comprising participants from different age groups and working in different places in Norway. All supervisors and GPs in the three groups agreed to participate in the study.

Gynaecologists and midwives were invited to the project by leaders of the midwives' association and gynaecologists' association. Although we intended to conduct focus groups for all the professions, the numbers of those willing to participate were few among private gynaecologists and midwives. Therefore, we conducted three focus groups (FG) among GPs and two personal semi-structured interviews with gynaecologists (one interview was with 2 participants) and two personal semi-structured interviews with midwives

Table 1. Characteristic of participants.

	GPs [27]	Midwives [3]	Gynecologists [3]
Age			
30–40	18	0	0
41–50	2	2	0
51–60	6	1	2
61–70	1	0	1
Sex			
Female	17	3	2
Male	10	0	1
Immigrant background			
Norwegian	20	3	3
Non-Norwegian	7	0	0
Length of practice			
<10 years	17	0	0
>10 years	10	3	3

(one interview was with 2 participants). The first and the last author interviewed a total of 33 participants, 27 GPs, 3 gynaecologists and 3 midwives from November 2015 to March 2016 in different areas in Oslo.

Data collection and analysis

The interview guide covered three main topics: 1. HCPs' experiences regarding gynaecological examinations and CCS, 2. their strategies (if any) to make these consultations work well and 3. their need for more information or other materials in order to improve uptake to CCS among immigrant women.

The interviews were conducted in Norwegian, recorded and transcribed verbatim and anonymized. Interviews were analyzed using thematic analysis [24]. Themes were developed using a hybrid approach combining deductive and inductive coding [25]. Codes for the analysis were developed after an initial reading of all the transcripts and were based on the main interview questions, prior research, and emergent concepts from the current data. To develop the codes, three of the authors (KAM, LT and ED) independently reviewed two focus group transcripts. These initial codes were discussed among the authors and a codebook was developed. The codes were further refined during coding of subsequent transcripts. Codes were successively aggregated in overarching themes. Quotes were selected to illustrate the results.

Ethical aspects

Written informed consent was obtained from every participant before the focus group or interview started. The project (2015/1156) was approved by the Norwegian Regional Committees for Medical and Health Research Ethics.

Results

The characteristics of the 32 participants are summarized in Table 1. The length of their professional experience varied from a few months to thirty years. Most GPs and all the recruited gynaecologists and midwives had extensive experience with immigrants.

Health care providers' experience regarding gynaecological examinations and cervical cancer screening

Most of the participants had contact with immigrant patients on a regular basis, however, very few had reflected previously upon specific challenges linked to CCS among this group. A typical comment at the beginning or the end of the interviews was:

I have never thought about this before – that immigrant women do not come for cervical cancer screening test or that they might have different prevalence/risk for cervical cancer GP2(F2FG1).

For many, these interviews were to some extent an eye-opener. Through the analyses of the data, HCPs' experiences were classified into two broad groups: i) HCPs' perspectives that are related to all women and ii) Perspectives that are specific for immigrant women.

Perspectives related to all women

Routines and 'not my responsibility'

GPs explained that they usually did not invite women (Norwegian or immigrant) to the CCS test on a regular basis. Very few GPs, especially females, raised the subject with every woman, regardless of immigrant background or type of consultation. Some raised the subject during consultations related to contraception, pregnancy or routine post-natal check-ups.

The attitude of some GPs was that the CCS test is not compulsory, it is the women's responsibility to make an appointment with their GPs and ensure that its done. As one participant shared his view:

I never ask unless it's about bleeding or something like that. They get invitation-letters from Cancer Registry every three years and reminder-letters. I think that this is something they should take responsibility for GP4(F4FG1).

Perspectives related specifically to immigrant women

In addition to the above mentioned common perspectives, other themes emerged during the FG that were

specific for immigrant women. We have grouped these into (i) organizational, (ii) language and health literacy, and (iii) culture and gender.

Organizational

Most HCPs had experienced that immigrant women neither made specific appointments for CCS, nor raised the issue themselves upon receipt of the Cancer Registry's invitation letter. As several issues were raised often in one consultation, CCS test was either not prioritized or forgotten. Thus, GPs experienced the usual time constraints as a bigger obstacle for their meetings with immigrant women. As one GP said:

(...) there are many immigrant women who have several somatic illnesses and their list of issues is long when they come to us. The fact is that consultation is over before we come to CCS, it will be either postponed from time to time or forgotten before you reach the bottom of the list GP10(F7FG1).

However, some GPs gave a more nuanced picture of their experiences regarding consultations with immigrants. Women from Eastern Europe were used to taking the CCS test with their gynaecologist in their home countries. These women often asked their Norwegian GPs for direct referrals to a gynaecologist.

It is true that many immigrant women are used to go to gynaecologists and they may not realize that these are tests that we GPs do here in Norway (...) GP6(F5FG1).

Some GPs reflected upon the possibility of taking the CCS test within primary care, but out of the GP office referring to some midwives in different parts of Oslo who have recently started to perform CCS test. Accordingly, the interviewed midwives confirmed that in their experience immigrant women have low threshold to come to them for CCS test.

From my experience, I have the impression that because GPs do not have the same function as us and GPs may not have enough time, the women really have confidence in us and want to come to us because we have time, this is a 100% female workplace (laughs) and the CCS test is free of charge JM2(F19PI2).

Language and health literacy

HCPs described that language is important for better communication. As one HCP told us;

Language is really a key, (...) I often have the impression that also immigrant women could actually

be open about sex and intimate things (...) GN2(F22PI4).

HCPs explained that most of immigrant women, especially first generation, had low health literacy. This resulted in time-consuming consultations.

It is in a way very difficult to know where one can start when you have 20 minutes available. We can hardly let it become an anatomy lecture every time GN2(F22PI4).

Cultural aspects and gender

As explained above, GPs tended not to ask any women about CCS test, and a few GPs thought that it was generally not their responsibility to ask women about CCS test since they got the invitation letter from the Cancer Registry. However, some GPs seemed to have an even higher threshold to ask when the patient was an immigrant woman belonging to another culture. As one of the female GPs mentioned:

I think the threshold to take the initiative to ask about CCS is higher the more different the woman is from me. For example, clothes, just think that you're going to get rid of that 'burka', it is a signal about the type of shyness/embarrassment one must pass through GP19(F12FG2).

Some participants also had experienced that some groups of immigrant women often expressed more pain under gynaecological examinations, and this was understood as cultural. As one participant said:

I have a slight impression that women from particular countries, for example, African and some Asian countries, seem like they express more pain and anxiety about such type of examinations. I was wondering if this was something to do with the culture (...) GP21(F14FG3).

Differences regarding attitudes and behaviour of immigrants and their offsprings were also observed.

Potential barriers in the interaction between women and male HCPs were often brought up during the interviews. According to male GPs' experience, immigrant women expressed their preference to take the CCS test with a female physician more often than Norwegian women. Male GPs reported therefore that the threshold to refer the women to a female colleague or female gynaecologist was low:

No, I do not take many CCS tests, eh, it's really because they probably want a female doctor who does this or to go to a gynaecologist GP12(M5FG2).

Male HCPs also indicated that they experienced discomfort in taking up the topic of CCS test with immigrant women.

It's a cultural barrier, especially for me who is a male, (...) when it comes to how to relate to women who have a different woman-man relationship than what we have in the West GN3(M11P14).

However, the same male gynaecologist also explained that once he got to know the immigrant women and established a good relationship, some of them continued to make appointments with him despite gender. This experience was similar to a male GP.

I think I should establish some kind of trust with the patient, 'is it okay, are you prepared to take the CCS test today, it may be that you are not ready for it today, but I will set up a new appointment' (...), but I think trust is important before I do a gynaecological examination.

Health care providers' strategies to overcome challenges

Organizational

Investing enough time was key for facilitating the consultations. Some spent more time when they took CCS test or gynaecological examinations. This helped also when they explained medical findings to the women. One female GP told us the following:

I experience that often it's hard to perform a gynaecological exam, I use more time to talk and explain in these situations GP21(F14FG3).

Gynaecological examination and CCS are sensitive issues, that are further complicated for both immigrant women and their GPs when there is a male interpreter in the same room or family members as interpreters. There were different strategies to overcome these challenges, as one of the GPs explained:

What I did was that I explained him (male interpreter) inside my office first what we were going to do, and I asked him to wait outside when I took the CCS test, I fetched him when we were done (...) GP22(F14FG3).

Language and health literacy

HCPs tried to use interpreters, speak slower, use simple words and sentences, and sometimes used body-language. They often used anatomy models and drawings to communicate. As one midwife told us:

We have anatomy models; a doll, pelvis or spinal column, so I sit so many times with that doll or the pelvis and explain what happens when they give birth JM3(F20FG5).

Most HCPs agreed that they often simplified or even skipped explanations due to language difficulties or assumed a lack of basic knowledge among women about their own body as compared to non-immigrants. In addition, one gynaecologist mentioned that she took CCS test sometimes without informing the women due to lack of time.

Culture

Dialogue about cultural issues between HCPs and the patient regarding gynaecological consultations were seldom described in the focus groups. Some HCPs, often those with contact with many immigrants, had tried to adapt to what they understood as cultural or religious barriers. A midwife shared her experience as follows:

Norwegian women may be satisfied with hormonal IUD, but we found out that it may not be suitable for many Muslim women. So, we read what was said in Quran about contraception and we mapped out carefully before we started guiding them which method was acceptable in a way. Culture and religion are very important, so what matters to them is important for us (...) JM1(F18FG4).

Health professional's preferences on how to get more information

After sharing their experiences and strategies, all participants identified the need for more information about this subject both for themselves and for other colleagues. We discussed the possibilities to provide this information in the future, such as courses, visits to GP offices or written information such as e-mails, brochures, letters and posters. Given a choice, most of them preferred short visits by experts in this field during lunch or morning meetings at the GP offices. In addition, giving information to the women directly through other channels was mentioned by all.

Discussion

Despite the lack of attention given by HCPs to possible challenges in gynaecological consultations and CCS among immigrant women, several experiences were shared through focus group reflections by all three professions. The inclusion of gynaecologists and midwives in addition to GPs enriched our perspectives, mainly regarding organizational and gender-barriers. Some of the experiences shared were applicable for all women, while others were specific for immigrant women. While HCPs shared with us strategies to

facilitate consultations with immigrant women, they also reflected upon their need for more information on migrant health to improve their case management.

Previous studies have explored HCPs' perspectives on immigrant women's health [26–29], but very few have explored the specific challenges of gynaecological consultations and CCS [20,21]. Consistent with earlier findings [17,19,21], the HCPs considered time-constraints, communication and cultural discordance as challenges to varying degrees. Use of interpreters for gynaecological examinations, in particular a man, came up as a sensitive issue, and could also be linked to other challenges related to confidentiality and vulnerability. Additionally, low health literacy levels often co-exist with language challenges and was also mentioned by several informants. However, our study adds some new knowledge by suggesting that organizational challenges might be as important as cultural differences in the HCP's performance.

The main challenge for HCPs was that CCS was seldom on the agenda for the consultation. On the one hand, immigrant women to a lesser degree than non-immigrants took the responsibility for making CCS appointment themselves. On the other hand, the HCPs seldom informed the women about CCS either, as some previous studies have described [17,19,30]. Although the lack of CCS on the agenda was not specific for immigrants, other factors seemed to make the informational task more difficult for the GPs when working with immigrants as compared to non-immigrants.

Organization of time seemed to be a key issue. Due to additional time constraints for the consultations with immigrants because of different language, health literacy levels and expectations for the consultation, GPs claimed that taking the CCS test was more often forgotten for immigrants. Time constraint in GP consultations was thus considered by GPs as a more important barrier in consultations with immigrants as compared to the majority population. Although GPs undertake most of the CCS tests, there is an on-going discussion regarding the role of midwives in Norway for this task, given that they have longer consultation time and are already in contact with women in relation to pre- and postnatal care.

Midwives included in this study had already started to take CCS tests, mostly as pilot projects. They had longer consultations and seemed to engage in more partnership-building with the immigrant women. In our study, GPs raised the issue that the CCS test should be conducted elsewhere within the health system, in particular with midwives whose consultations

are free of charge and with more time to talk and build a better interpersonal relationship with the women. While this concurs with a study from Finland [31], the midwives recruited to our study worked with a greater proportion of immigrant women and might not be representative for midwives working with the general population. Therefore, the results should be interpreted with caution. However, our findings clearly point to organizational matters as key to improve uptake to CCS programs, and the benefits and possible pitfalls of midwives taking CCS test should be further evaluated.

Although the participants shared with us several challenges they encountered and how they tried to manage in the best possible way, a general discomfort regarding religion and cultural themes related to gynaecological consultations came up in all the groups and has been previously described [21]. Culture is a complex social phenomenon that can include knowledge, experience, belief, values, actions, attitudes, meanings, religion, notions of time, spatial relations and concepts of the universe for a group of people [32]. Furthermore, culture is not static and there are different degrees of acculturation within immigrant groups. In addition, HCPs, regardless of gender, should be aware of his or her own cultural beliefs, perceptions and values [33].

In the intercultural communication process, when people of dissimilar cultural backgrounds interact with one another, they are likely to rely on their preconceived stereotypes concerning certain cultural groups [34]. In our study, GPs seemed to be too busy to raise and reflect upon their own cultural and socioeconomic background, and eventually their stereotypes, bias or prejudices towards patients with different backgrounds. As such, many challenges were experienced as only related to the patient's cultural background, and the HCPs seemed to have several non-empirically tested assumptions of what women expected, especially regarding gynaecological issues. In this regard, a novel finding of our study is that HCPs' biases, stereotypes and assumptions could be a key provider-level barrier to low uptake of CCS test among immigrants if they remained unexplored and unchallenged. In agreement to this, previous studies show that immigrant women prefer physicians who speak their language and from their own immigrant groups for reproductive consultations [15].

Furthermore, the interaction between HCPs in European countries and immigrants might in itself be a barrier to utilization of the health care system [35], not only based on cultural differences but also on

other sociocultural differences. As previous studies have shown [27], male providers could be an obstacle for some women seeking help, but according to two of the male participants (one gynaecologist and one GP), the gender difference between male HCP and his female immigrant patients could be bridged by building a good physician-patient relationship over a period of time and being aware of the cultural background of the patient. Acculturation and time trends regarding gender were also mentioned by some HCPs when they referred to an increasing number of women attending the consultations for gynaecological examinations without their husbands.

The main strength of this article is the specific focus on gynaecological consultations and CCS for women with immigrant background from the perspective of all involved HCPs. The inclusion of GPs, gynaecologists and midwives give us insight on different perspectives of HCP and possible future implementations that could make CCS more efficient. As GP participants were selected from continued education groups and not individually, we avoided those particularly interested in either immigrant or reproductive health. Through the three focus groups among GPs we reached information saturation. Additionally, the four personal interviews gave us in-depth information that can sometimes be difficult to achieve in groups when it comes to sensitive issues.

However, both the gynaecologists and midwives participating in the study were more likely to be self-selected because of the study theme, as compared to GPs. Almost all HCPs were from urban areas, which might be a limitation since living in rural areas has previously been related to higher attendance to CCS [11]. As a common limitation in this type of study, HCPs shared their perceptions about immigrant women and CCS, but validating actual practice and implementation of strategies was beyond the scope of our study.

Conclusion

The gap in uptake for CCS test between immigrants and non-immigrants seems not only to be caused by the immigrant women's preferences, but also by provider level barriers that are organizational, including factors such as HCPs' biases, stereotypes and assumptions and lack of knowledge. In addition to cultural competence, there is a need for HCPs for knowledge on immigrant reproductive health. In the light of our findings, we believe that educating HCPs and students about cultural sensitivity and awareness is important

in order to respond to increasing diversity. Besides practicing patient-centred communication, the HCP, regardless of gender, should be aware of his or her own cultural beliefs, perceptions and values. We recommend an intervention targeting HCPs to close this gap in the attendance of CCS.

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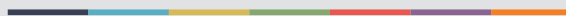
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