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Cervical cancer screening among migrant women in Portugal

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Cervical cancer screening among migrant women in Portugal

This thesis is part of the requirements for the Degree of Doctor in Global Public Health, under supervision of Professor Sónia Dias and co-supervision of Professor Bruno Heleno

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Marques P, Geraldes M, Gama A, Heleno B, Dias S. Non-attendance in cervical cancer screening among migrant women in Portugal: A cross-sectional study. Women's Health. 2022;18:17455057221093034.

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Abstract

Background: Cervical cancer is one of the most common female cancers worldwide, with a high mortality rate, despite being preventable and treatable. Cervical cancer screening has been shown to be highly effective in reducing disease-specific mortality. However, inequities in participation in screening persist, particularly among migrant women. Understanding why these women have low screening attendance is essential to increase their participation. Considering that Portugal has important migrant populations from countries with a high incidence of cervical cancer, this thesis aims to explore factors related to cervical cancer screening participation among migrant women living in Portugal.

Methods: Firstly, a scoping review was conducted to summarize scientific evidence on the factors influencing cervical cancer screening participation among migrant women EU/EFTA countries. Then, a web-based survey targeting migrant women living in Portugal was conducted to estimate women's screening attendance and to explore factors associated with non-attendance. Finally, the perspectives and experiences of healthcare and community workers on the screening participation among migrant women were explored through focus groups discussions.

Results: Like in other European countries, migrant women living in Portugal have a low cervical cancer screening participation (around 25% were non-attenders). Lack of knowledge about screening and difficulties in accessing healthcare services are the factors most associated with lower participation, according to the focus groups with healthcare and community workers and the survey of migrant women. Data from the qualitative and quantitative studies both suggest that women should be provided with adequate information to make the informed decision to participate in screening, and healthcare services need to be able to provide culturally and linguistically adapted care to meet these women's needs and overcome some of the barriers identified.

Conclusions: Migrant women face several challenges when accessing cervical cancer screening. It is important to implement a culturally sensitive migrant friendly healthcare system, able to deliver the care needed by these women but also able to provide to healthcare workers the necessary competences to deliver appropriate care to them. Establishing partnerships with other relevant stakeholders, such as community workers who work closely with these populations, to collaborate in interventions to increase health literacy and promote screening, could be key actions to promote cervical cancer screening among migrant women.

Keywords: cervical cancer screening, migrant women, women's health.

Resumo

Contexto: O cancro do colo do útero é um dos cancros femininos mais comuns, com uma elevadas taxa de mortalidade, apesar de ser altamente evitável e tratável. O rastreio do cancro do colo do útero tem provado ser bastante eficiente na redução da mortalidade por este tipo de cancro. No entanto, desigualdades no acesso ao rastreio persistem, em particular entre mulheres migrantes. Perceber porque é que estas mulheres têm baixa adesão ao rastreio é essencial para aumentar a sua participação. Considerando que Portugal tem um número considerável de migrantes vindos de países com elevada incidência de cancro do colo do útero, esta tese tem como objetivo explorar os fatores relacionados com a participação no rastreio do cancro do colo do útero entre mulheres migrantes residentes em Portugal.

Métodos: Primeiro, foi feita uma revisão de âmbito para sumarizar a evidencia científica sobre os fatores que influenciam a participação das mulheres migrantes no rastreio, em países da EU/EFTA. De seguida, foi feito um questionário online, cuja população-alvo foram mulheres migrantes residentes em Portugal, para estimar a participação das mulheres no rastreio e explorar que fatores se associavam à baixa participação. Por fim, foram exploradas as perspetivas e experiências dos profissionais de saúde e de estruturas de proximidade na participação das mulheres migrantes através de grupos focais.

Resultados: Como observado em outros países europeus, as mulheres migrantes residentes em Portugal têm uma baixa participação no rastreio do cancro do colo do útero (cerca de 25% eram não-participantes). A falta de conhecimento sobre o rastreio e as dificuldades no acesso aos cuidados de saúde são os fatores mais associados à baixa participação, de acordo com os grupos focais com profissionais de saúde e de estruturas de proximidade e com o questionário feito a mulheres migrantes. Os dados dos estudos qualitativos e quantitativos sugerem que as mulheres precisam de obter informação adequada para tomarem uma decisão informada de participarem no rastreio, e que os serviços de saúde necessitam de providenciar cuidados de saúde atendendo às diferenças culturais e linguísticas, de forma a ir de encontro às necessidades destas mulheres e ultrapassar algumas das barreiras identificadas.

Conclusões: As mulheres migrantes enfrentam vários desafios para aceder ao rastreio do cancro do colo do útero. É importante implementar um sistema de saúde amigo dos migrantes, culturalmente sensível, capaz de prestar os cuidados que estas mulheres precisam, mas também de dar aos profissionais de saúde as competências necessárias

para oferecer cuidados adequados a essas mulheres. O estabelecimento de parcerias com outras entidades relevantes, como profissionais de estruturas de proximidade que trabalham em estreita colaboração com essas populações, para colaborar em intervenções para aumentar a literacia em saúde e promover o rastreio, podem ser ações-chave para aumentar a participação no rastreio do cancro do colo do útero entre as mulheres migrantes.

Palavras-chave: rastreio do cancro do colo do útero, migrantes, saúde da mulher

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List of Abbreviations

ARS – Administração Regional de Saúde (*Regional Health Administration*)

CCS – Cervical Cancer Screening

CI95% - 95% Confidence Interval

CIN - Cervical Intraepithelial Neoplasia

CW – Community Worker(s)

DNA - Deoxyribonucleic Acid

EFTA - European Free Trade Association

EU – European Union

FG – Focus Group(s)

GP – General Practitioner(s)

HIC – High Income Countries

HPV – Human Papillomavirus

HW – Healthcare Worker(s)

IARC - International Agency for Research on Cancer

IOM - International Organization for Migration

LMIC – Low- and Middle-Income Countries

MeSH - Medical Subject Headings

NHS – National Health Service

OR – Odds Ratio

PH – Public Health

STI – Sexual Transmitted Infection

UN – United Nations

WHO – World Health Organization

CHAPTER 1: Introduction

1.1. Cervical Cancer

1.1.1. Cervical Cancer and HPV

Cervical cancer, also known as cancer of the *cervix uteri*, is the 4th most common female oncological disease with a high incidence and mortality rate (1–3), which affects mainly young women between 30 and 50 years old (4–8). Virtually all cases of cervical cancer result from persistent Human Papillomavirus (HPV) infection, suggesting that contact with HPV is a necessary cause for the disease to develop, although it may not be a sufficient cause (9–11).

HPV is a non-encapsulated DNA virus belonging to the Papillomaviridae family. This virus infects mainly epithelial cells (12–14). More than 100 HPV genotypes have been identified. HPV genotypes are classified into high- and low-risk, and it is known that high-risk genotypes are often associated with precancerous lesions of the cervix that may develop into neoplastic lesions if left untreated (12,15,16). About 70% of all cases of cervical cancer are associated with two HPV genotypes - HPV-16 and HPV-18 -, although the disease may be caused by other genotypes, including infections by multiple genotypes (13,15,16).

HPV infection is frequent. According to the World Health Organization (WHO), HPV is the most common sexually transmitted infection worldwide (16,17). Estimates for United States of America suggest that over 80% of the sexually active individuals (male and female) will be infected by HPV at some point in their lives (18). In fact, most men and women have a high chance of becoming infected with HPV shortly after sexual activity begins (16). HPV can also be transmitted through contact with the skin and/or mucous membranes, and from mother to child, during pregnancy or childbirth (vertical transmission) (19,20).

Although HPV infection is the cause of nearly all cases of cervical cancer, it is known that in most cases of HPV infection women do not develop the disease, even when she is infected with a high-risk genotype. In fact, most HPV infections are harmless, being eliminated by the body spontaneously, often without causing any symptoms, within a maximum period of two years (16).

Only a small percentage of HPV infections progress to precancerous lesions that may lead to cancerous lesions (16). These lesions are called cervical intraepithelial

neoplasias (CIN). They can be classified into 3 levels depending on their degree of severity, and in some cases can progress to invasive cancer (21,22). Thus, the process of carcinogenesis of cervical cancer requires a previous persistent HPV infection, that leads to the formation of a precancerous lesion that may later progress into cancer (23). The carcinogenesis process is determined not only by the HPV genotypes that caused the infection, but also by environmental and behavioural factors (9,10). It is a long process that may take years to decades until cancer develops, which offers a window of opportunity for its early detection and appropriate treatment (9,24).

1.1.2. Incidence and Prevalence of Cervical Cancer

As stated before, cervical cancer is the fourth most common cancer among women and the second most frequent in women of reproductive age worldwide (25). Data from 2020, adjusted for the 15-64 age group, estimates that, globally, the incidence of the disease is around 17.6 per 100,000 women, and mortality is around 8.5 per 100,000 women, being only surpassed by breast cancer (3).

The geographic distribution of the incidence and the mortality of this disease is not equal, as represented in **Figure 1**. These indicators in low- and middle-income countries (LMIC) are significantly higher than in high income countries (HIC) (3,22). Data from the WHO indicates that 90% of deaths from cervical cancer in 2018 occurred in LMIC (26).

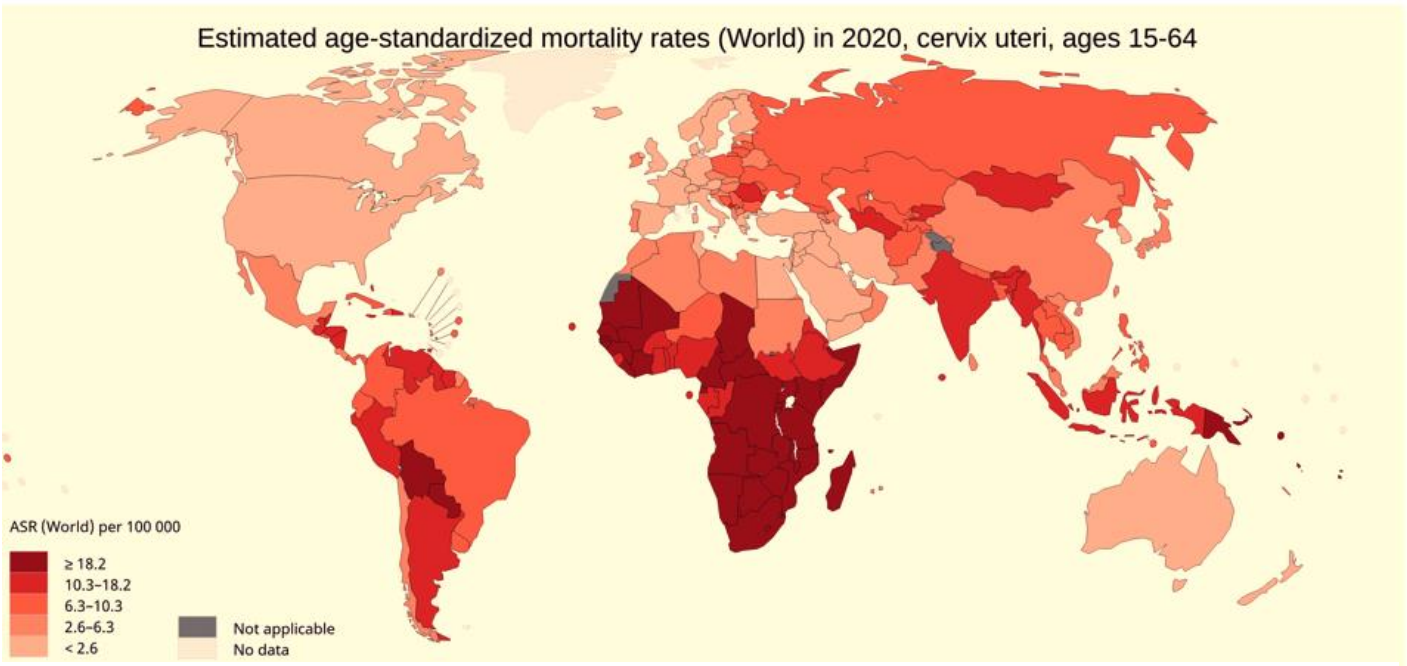

Figure 1 - *Worldwide Estimated age-standardized mortality rates for Cervical Cancer among, females aged 15-64, in 2020* *(Source: Global Cancer Observatory (3))*

According to the International Agency for Research on Cancer (IARC), in 2020, 471,564 new cases of cervical cancer were expected to appear among women aged 15 to 64. Globally, the highest incidence and mortality rates of cervical cancer in women aged 15-64 years of age are observed in Africa (Incidence of 31.6/100,000 women and mortality of 19.9/100,000 women), followed by Asia (Incidence of 16.5/100,000 women and mortality of 7.9/100,000 women) and South and Central America (Incidence of 14.3/100,000 women and mortality of 7.6/100,000 women), according to data from 2020 (3). On the other hand, a lower incidence and mortality is observed in North America (8.8/100,000 and 2.6/100,000 women respectively), Oceania (14.9/100,000 and 6.1/100,000 women respectively), and Europe (15.4/100,000 and 4.6/100,000 women respectively); however, it is important to notice that within Europe there are geographic differences in incidence and mortality of cervical cancer, with the highest values of these indicators being observed in Eastern Europe (3,27).

1.1.3. Cervical cancer in Portugal

In Portugal, estimates indicate a cervical cancer incidence rate of 15.3 per 100,000 women and a mortality rate of 3.6 per 100,000 women between 15 and 64 years old, in 2020. It is the fourth cancer with the highest incidence and mortality at national level (3). However, although Portugal is part of the southern region of Europe, it has a higher incidence and mortality rate than the averages observed in that area and, for instance, compared to Spain (incidence of 5.4/100,000 women and mortality of 1.7/100,000 women) or Italy (Incidence of 6.9/100,000 women and mortality of 1.6/100,000 women) (27,28). Nevertheless, an increase in the relative survival rate of cervical cancer has been observed (29,30). Data from a Portuguese study indicate that the age-standardized mortality rate in women aged 30 years or over decreased from 19.4 to 4.4 per 100,000 women between 1955 and 2014, 2020 data from IARC (2020) suggest a decrease in mortality to 3.6/100,000 women (3,28,31).

A study on time trends in cervical cancer mortality in Portugal (31) shows that since 1995, a decrease in the mortality rate associated with the disease has been observed. The greatest reduction happened in the 1970s associated with the improvement in access to health care in Portugal. This trend continued until the beginning of the millennium when the variations in mortality became less pronounced (31,32).

1.1.4. Risk factors for cervical cancer

The main risk factor for cervical cancer is HPV infection (16,26,33,34). This factor is a necessary but not sufficient, cause for the development of cervical cancer. The role of other risk factors is less consensual. The most consistent associations with cervical cancer are other sexually transmitted co-infections, use of oral contraceptives, risky sexual behaviours, lifestyles, and socioeconomic factors. It is unclear whether these variables are direct risk factors for HPV infection or potentiate the oncogenic risk of HPV.

Co-infection with other sexually transmitted infections is associated with an increased risk of developing cervical cancer. Studies show that in women infected with *Chlamydia trachomatis* there is a greater difficulty in elimination of the HPV infection (35–37). Immunocompromised women, such as those infected with HIV, are more exposed to acquiring an HPV infection and have an increased risk of this infection progressing to serious disease (16,38–40).

Some studies also suggest that women who use oral contraceptives for a long period of time are at increased risk of being infected by HPV. Barrier methods are the only contraceptives that prevent HPV transmission. Since women who use oral contraceptives may choose not to use barrier methods, they may be more exposed to HPV infection (41–45). A higher risk of developing this disease is also present in women with higher parity (41,42,46–48). A recent systematic review on parity and cervical cancer states that the mechanism for this association is not completely clear, but it may be related to hormonal changes during pregnancy or vaginal trauma during childbirth that leads to alterations in the cervical cells (46).

Some other risk factors for the development of cervical cancer are an early onset of sexual life (16,45,49,50), and risky sexual behaviours such as multiple sexual partners (16,45,50), as they can increase the risk of being infected by HPV.

Although less consensual, unhealthy lifestyle habits, such as smoking, lack of physical activity and unhealthy diets that lead to overweight seem to be associated with an increased risk of cervical cancer (44,51,52). In some studies, these lifestyle factors have been found to be associated with a lower concern about one's own health status and lower adherence to preventive measures, which in turn increases the risk of developing the disease (53,54). Moreover, other studies found that women with lower economic resources, less educated, and from rural environments also have a higher risk of developing cervical cancer, which may be justified by lower health literacy and lower access to prevention initiatives and/or treatment (55–59). It is important to note that these factors may not affect cervical cancer risk independently but have a cumulative effect.

For instance, it is known that smoking, sedentarism and unhealthy diets can be also linked with low socioeconomic status, which in turn affect the risk of having cervical cancer.

1.1.5. Prevention of cervical cancer

The long-time window for the appearance of cervical cancer and the knowledge that HPV is linked to virtually all cases of the disease, allows to efficiently prevent this disease with different interventions.

According to the WHO's Comprehensive Cervical Cancer Control - A guide to essential practice (16), cervical cancer prevention can be divided into three levels:

- **Primary prevention:** Primary prevention aims to reduce HPV infections. It focuses mainly on HPV vaccination of girls between 9 and 13 years old, before the onset of sexual activity. At the same time, age-adapted youth sexual health interventions for boys and girls should be undertaken in order to reduce risky sexual behaviour and prevent possible HPV infections.
- **Secondary prevention:** Secondary prevention is aimed at reducing cervical cancer incidence and mortality through early detection and treatment of HPV infections or precancerous lesions. The public health intervention that allows this early identification is cervical cancer screening.
- **Tertiary prevention:** The aim of tertiary prevention is to reduce mortality associated with cervical cancer. These include interventions at the level of the treatment of cancerous lesions.

In 2020, WHO set three goals to eliminate cervical cancer screening based on these levels of prevention. By 2023, countries must commit to having 90% of girls under age 15 vaccinated against HPV, 70% of adult women screened for cervical cancer screening, and 90% of women diagnosed with lesions pre-cancerous and cancerous receiving appropriate treatment (60). Efforts are being made at the European level to meet these goals, especially with regard to the implementation of population-based screening programs in European countries (61). On the other hand, most low- and middle-income countries face numerous challenges and have not been able to develop strategies to meet the WHO targets to eliminate cervical cancer, due to lack of resources and adequate healthcare systems to implement these strategies (62).

While all levels of cervical cancer prevention are of high importance, this thesis will focus on secondary prevention – Cervical Cancer Screening.

1.2. Cervical Cancer Screening

Cervical cancer screening is a public health measure aimed at early detection of precancerous lesions of the cervix or asymptomatic early stages of cancer so that they are properly treated in time (16,60).

The first method of screening for cervical cancer was developed by George Papanicolaou, through his experiments developed in the first half of the 20th century, which consisted of collecting a cellular smear from the women's cervix, which was then observed under a microscope to detect cancer cells - the so-called cytology or Pap-smear (63).

Currently, cytology is still one of the most used screening methods, although other screening strategies have been developed. Three different screening methods are included in WHO recommendations for cervical cancer screening (16):

- **Cytology-based screening**: Similarly to the method that was developed by Papanicolaou, cytology-based screening is based on collecting a sample from the cervix using a swab. This sample is then placed in a liquid medium (liquid-based cytology) or fixed on a slide (Pap-smear) to be analysed under a microscope.
- **Visual screening:** Also called Visual Inspection with Acetic acid (VIA), it is a method that consists of the direct observation of cellular changes in the cervix using a speculum and the use of a diluted solution of acetic acid that reacts with the areas where there are cell changes, which may indicate pre-cancerous or cancerous lesions.
- **HPV testing:** Unlike the previous methods, this test is intended to identify the presence of HPV infection, particularly high-risk HPV, by taking a sample from the cervix. This test does not detect the presence of cancer cells, but it can determine the risk of developing lesions in the cervix in the future.

Regardless of the chosen screening methods, it is recommended that cervical cancer screening should be offered to women aged 30 and over on a regular basis by a healthcare professional, with recommended intervals between 3 and 5 years, although these guidelines may vary between countries (16,64–67).

Cervical cancer screening can reach populations in an opportunistic way, that is, a screening test that is offered when a woman goes to a public or private health unit for routine consultations; but it can also reach populations in an organized way –population-based screening – in which screening is offered to women systematically through a periodic invitation (68–72). In some countries, such as Portugal, Spain, and Finland for instance, both screening approaches are used simultaneously (30,73,74).

Recently, due to the implementation of HPV vaccination programs among adolescents, studies have been conducted to understand the association between HPV vaccine and CCS attendance, and the effect of both interventions on cervical cancer to maximize the potential of both preventive measures. Some studies suggest that, regardless of having a vaccination program implemented, there is still a fully implemented CCS program available for all women of the target ages despite their vaccination status (6,75,76). This is a recent, yet relevant question as only recently the first vaccinated cohorts are reaching the screening age. The effect of vaccination in screening initiatives is a complex issue that requires further investigation.

1.2.1. Cervical Cancer screening in Portugal

The beginning of opportunistic cervical cancer screening in Portugal dates to 1978. It was not until 1990 that the first population-based cervical cancer screening program appeared on the Regional Health Administration of Center region (30,77). However, only in 2008 cervical cancer screening programs began to be progressively implemented in the other regions of the country: in 2008 it was implemented in the Regional Health Administration of Alentejo; in 2010 in the Regional Health Administration of Algarve and in Azores Autonomous Region; in 2016 the implementation of the screening program in the Regional Health Administration of the North (started in 2009) was concluded, and in 2017 the implementation began in the Regional Health Administration of Lisbon and Tagus Valley (78). The only area of the country where there is no population-based screening is in the autonomous region Madeira (78).

Although the geographic coverage of organized screening is high in Portugal (98,4%), there are variations in the specificities of the programs of each of the Regional Health Administration, namely in terms of the age group of the target population, the frequency of screening and the screening test methodology (79), as described in **Table 1**.

Table 1 *- Characteristics of cervical cancer screening in Portugal in 2018 (Source: Adapted from "Avaliação e Monitorização dos Rastreios Oncológicos Organizados de Base Populacional 2017/2018" (79)).*

	Regional Health Administration of North	Regional Health Administration of Centre	Regional Health Administration of Lisbon and Tagus Valley	Regional Health Administration of Alentejo	Regional Health Administration of Algarve	Autonomous region of Azores	Autonomous region of Madeira
Primary Screening Test	HPV test	Conventional cytology (Pap-smear)	HPV test	Liquid-based cytology	Liquid-based cytology	HPV test and cytology	-
Target Population	Women 25-60 y	Women 25-64y	Women 30-65y	Women 25-64y	Women 25-64y	Women 25-64y	-
Periodicity	Every 5 years	Every 3 years	Every 5 years	Every 3 years	Every 3 years	Every 3 years	-
Implementation of the screening program	2009	1990	2017	2008	2010	2010	-

To standardize cervical cancer screening nationwide, in 2017 an order was published in the *Diário da República* that regulates the cervical cancer screening program. This order defines a single methodology to be applied throughout the territory (80):

- The primary screening test should be the DNA detection test for high-risk HPV genotypes, and in positive cases for HPV-16 and HPV-18, the woman should be referred for cervical pathology consultation and in positive cases with other high-risk genotypes the woman should undergo cytology.
- The frequency of the test should be every 5 years.
- The age group of the target women should be between 25 and 60 years old.

However, there are no studies or official reports reporting whether the implementation of this standardization of methodology has been completed.

Women who meet the eligibility criteria for the screening program and are registered in a primary care unit are invited to cervical cancer screening periodically through a letter (77). However, other methods of invitation for screening have been explored, namely via text message or phone call, which have shown promising results in increasing adherence to screening (81).

The attendance rate for the screening program in 2020 was 88.4% (78). It is worth noticing that, although the rate is high, there was a reduction in the number of women invited to screening in 2020 when compared to 2019 (129.839 vs 283.368), possibly due

to the COVID-19 outbreak that led to a mobilization of healthcare professionals in response to the pandemic needs (78). There has been a progressive increase in women screened through the organized cervical cancer screening program since 2014, which is also associated with the geographic coverage rate of the screening (77,78,82,83). This information must be analyzed with caution as these numbers only reflect the size of female population registered in primary healthcare units which receive the invitation letter, so there may be women belonging to the target population that are not registered in healthcare units and therefore do not receive the letter, and there are women who receive the letter but decide to not attend the population-based program. However, studies indicate that the percentage of women who have had at least one cytology in their lifetime is high (83,84), and data from the 2014 National Health Survey report a non-adherence rate (last screening performed in more than 5 years) was 13.2% (85). The high adherence to screening, population-based or opportunistic, has led to a reduction in mortality from cervical cancer in women in Portugal (31).

1.2.2. Benefits and limitations of cervical cancer screening

Cervical cancer screening has been shown to be a cost-effective strategy to increase survival rates by reducing cervical cancer mortality (64,66,86–88), especially when included in screening programs and when there is follow-up of the screened women(60).

Comparing organized and opportunistic approaches, evidence shows that organized screening presents a reduction of 51-89% in the mortality rate of cervical cancer (86,89), whereas opportunistic screening presents values of reduction of mortality rate ranging between 10% and 60% (64,90). Opportunistic screening has some disadvantages compared to organized screening. It depends on the woman's initiative to seek the healthcare services, which in turn limits this intervention to women who have access to health care. On the other hand, it can lead to an overuse of screening by some population groups, which is associated with increased health costs, overdiagnosis, cumulative false-positives, and overtreatment, with possible negative consequences for women (91–93). Organized screening tends to have a higher coverage, since it is based on inviting all eligible women and not on the individual initiative of the woman. Thus, it reduces inequalities in access to health care, especially related to socioeconomic differences in populations, and increasing its cost-effectiveness. However, even in organized screening, invitations may not reach all women, namely women who do not have a fixed address or phone number or undocumented migrants (89,91,94–96).

There are also some harms and limitations associated with cervical cancer screening that must be considered. Screening may lead to false positives which have a negative effect on the patient in terms of mental health, but also physical health if any medical procedure is performed; on the other hand, false negatives may also appear, putting the patient at risk of developing the disease, with a negative impact on their health (16,97). Within the true positives, there is a risk that the medical procedures conducted are not adequate to the type of lesion (e.g. Surgical interventions such as cervical conization in women who do not need them), or may cause harm in the patient (e.g. pre-term birth in pregnant women) (98,99).

Another challenge associated with screening is to guarantee that there is an appropriate referral system of the screened women so that they can receive the appropriate treatment for their diagnosis. Screening women without giving them the possibility of an adequate follow-up and treatment due to delays or failures in referral have a negative impact on the health outcome, and raises distress in the patients (16,60).

1.2.3. Disparities in the uptake of cervical cancer screening

WHO advocates that health is a fundamental human right and that all individuals should have access to healthcare, which includes screening for cervical cancer (100,101). Therefore, as mentioned above, all women who meet the eligibility criteria for screening should have equitable access to this preventive health intervention, as well as to the treatment appropriate to their individual situation (16,60,102). However, despite efforts to circumvent this trend, not all women have equal access to cervical cancer screening. This problem is of high importance, as there are multiple studies showing that women who do not participate in screening are at a higher risk of developing cervical cancer (103–106), and that in many cases, even a single lifetime screening can reduce the risk of illness (66,86).

Disparities in access to cervical cancer screening can be divided into two broad areas which will be detailed below: firstly, disparities in the implementation and coverage of screening (which varies between countries and within the country) and disparities in screening attendance.

In terms of the implementation of cervical cancer screening, there are numerous discrepancies between high income countries and low- and middle-income countries (64). In a 2008 study that included data from 57 countries (107) the results suggest that crude cervical cancer screening coverage is 94% in developed countries and only 45% in developing countries. Another study published in 2020 with data from 55 developing

countries (108) shows that only 44% of women in these countries have participated at least once in screening. The findings of these two studies suggest that since 2008 no effective measures have been taken to reverse this situation and increase coverage of cervical cancer screening in these countries. This is a serious situation because it is in these countries that most of the world's population is concentrated (about 73%) and also where the incidence and mortality of cervical cancer is higher (3,16,22,108). However, it is also important taking into consideration that other public health issues, such as malnourishment and other infectious diseases, must be priority in the development of public health interventions. There are variations within each country in screening coverage, even in countries where an organized screening program exists (64,66,85,109–113).

In addition, there are several factors that have been identified as determinants for women to participate in cervical cancer screening. Some women who face several barriers to accessing screening and therefore remain out of scope of these interventions – the so-called hard-to-reach women (112,114).

Non-adherence to screening is related to several factors that vary from the organization and access to health care, socioeconomic characteristics, or individual perceptions, among others. Several conceptual models have been used to understand health promotion and disease prevention, which includes screening attendance, such as The Health Belief Model, Social Cognitive Theory, Theory of Planned Behaviour, and Ecological Model (115). This thesis will be following the Ecological Model framework (116), which also has been used in some other studies on cervical cancer screening attendance (117–120). The Ecological Model is a “conceptual framework which serves to direct attention to both behaviour and its individual and environmental determinants” and states that behaviour is determined by intrapersonal factors, interpersonal factors, institutional factors, community factors, and public policy (116), described in **Figure 2**.

Most studies conducted on barriers to cervical cancer screening attendance have identified barriers at three levels of the Ecological Model: Intrapersonal, interpersonal, and organizational.

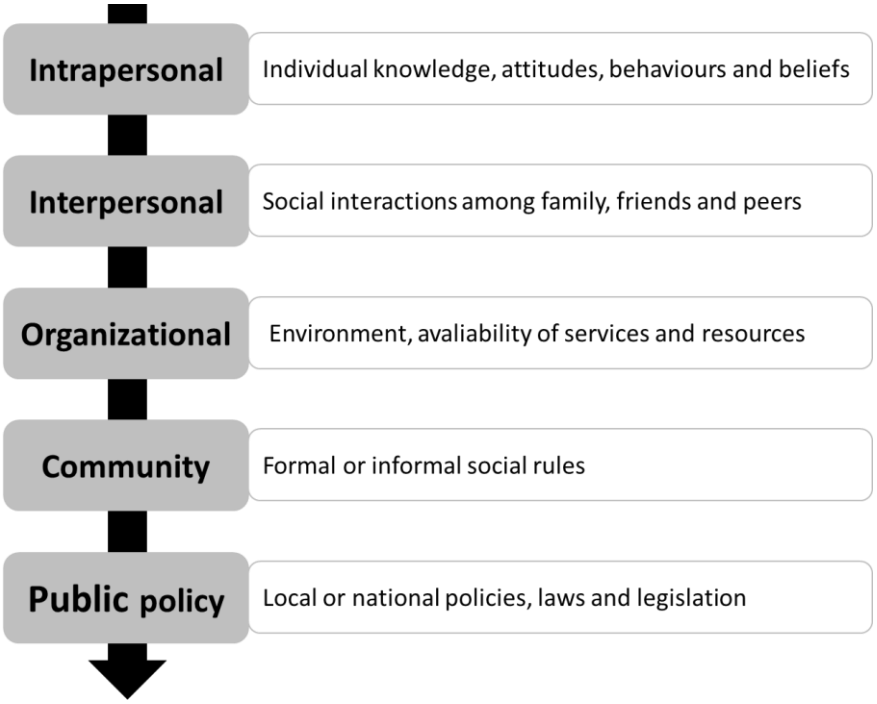

Figure 2 - *Ecological framework: levels of influence for health-related behaviors (Source: McLeroy et al. (116))*

In terms of intrapersonal factors, feelings of fear, shame, or discomfort in relation to the screening procedure make many women avoid doing it, even knowing the benefits (121–124). On the other hand, lack of knowledge about screening and its benefits, and low health literacy can also limit access to screening (121,122,125–127). Several socioeconomic factors have also been identified as barriers to screening. This is the case of women with a low educational level, unemployed and/or with low resources (85,121,123,128–130). These factors are also related to low health literacy and low income to access screening. On the other hand, age (younger or older), marital status (married or single), and parity (whether they have children or not) have also been identified as influencing factors for screening, but their effect has been shown inconsistent among studies (85,121,123,130,131). Individual lifestyle and habits, namely obesity and smoking, are also associated with low adherence to screening, under the premise that these women tend not to participate as actively in preventive actions because they have a lower perception of risk, and also because they have a greater tendency not to adhere to medical recommendations (85,127,132–134). Women who do not attend other screenings, such as breast cancer, or do not regularly visit their doctors for routine appointments also show lower adherence to screening (85,123,135–137).

Additionally, women with chronic illnesses tend to participate more in screening, probably due to their proximity to health care due to their health conditions (137).

At an interpersonal level, women whose partner or family are not supportive of cervical cancer screening practices may restrain from attending the screening test (96,138,139). Some women, particularly those from patriarchal societies, may need approval to attend medical practices from the male figure of the household, and this may be an important barrier to the access to cervical cancer screening (138). Also, there is an influence of the female progenitor in their daughter's screening attendance: women whose mothers do not attend Pap-smear are more likely to be non-attenders as well (140–142)

Some organizational and community level barriers are also highlighted in the literature. Although cervical cancer screening programs exist in many countries, they are not always available to all women. Many women are unable to access screening because they cannot access healthcare services, and these barriers to access can be caused by distance to health services (121,122,126,143), by costs associated with health care (121–123,126,144–146), or due to difficulties in understanding how the healthcare system works (122,143–147). Also, many women are not comfortable with having a gynaecological exam with a male doctor and therefore avoid having it when there is no option for a female doctor to do it (122,125,127,130,148).

Finally, a particularly vulnerable group that faces increased difficulties in access to health services in general are migrants. There are several studies that demonstrate that migrant women have a lower rate of adherence to cervical cancer screening (85,110,122,130,148–150). Indeed, WHO has already highlighted that there are serious inequalities in health care, including secondary prevention of cervical cancer, affecting migrant women (16,151). Particular social, economic, and cultural backgrounds, along with origin from countries with high incidence and mortality rates for cervical cancer, and difficulties in accessing healthcare services, increase migrant women health vulnerabilities and influences their uptake of cervical cancer screening (16,96).

Considering the Portuguese context, only a few studies were conducted to understand the disparities in the access to cervical cancer screening. Nevertheless, data from a study carried out in central Portugal suggest that women's knowledge of cervical cancer and its screening was quite limited (152). In fact, many women expressed a lack of knowledge regarding cervical cancer risk factors, including its relationship to HPV infection, and regarding the objectives, timing and target population of cervical cancer screening, and demonstrated a fatalistic attitude towards the disease, believing it to be

deadly (152,153). Lack of knowledge about cervical cancer, HPV infection and the link between the two can also lead women to downplay the need for screening (152,153). This information is relevant as it is important that women are able make informed decisions about screening considering the importance of the test but also that are congruent with their individual values.

Although there are few studies that focus on the factors that influence the participation of women in cervical cancer screening in Portugal, it is known that, similarly to what happens in other countries, women are in the most unfavorable socioeconomic positions, with lower levels of education or unemployed, who have a lower adherence to screening (82–85). Women who do not have frequent contact with health care, namely those who do not have frequent appointments with their general and family doctor or who do not have regular gynecology appointments, or women who do not participate in other screenings, such as the breast cancer also tend to have a lower participation in screening (82,83,85). Women under 35 or over 64 have a lower participation than those in the 35-44 age group, and this disparity is more pronounced among women with lower educational levels (29,83,85). Finally, migrant women have a lower rate of adherence to cervical cancer screening than Portuguese women (85,154). A study by Rosano *et al.* (2017) points out that, in Portugal, women born in European countries have the lowest rate of participation in screening, followed by those from non-European countries (154), which may be explained by sociocultural differences, knowledge about screening, or having cervical cancer screening in their country of origin.

Considering that migration is a reality in Portugal, that migrant women living in Portugal come from countries where the incidence and mortality of cervical cancer is high, and that these women are very likely to not covered by cervical cancer screening and, therefore, they are at greater risk of developing the disease, it is important to understand what difficulties and barriers these women face in order to increase their participation in screening and decrease their risk of developing the disease.

1.3. Migration and health

According to the International Organization for Migration (IOM), a migrant is defined as "*a person who moves away from his or her place of usual residence, whether within a country or across an international border, temporarily or permanently, and for a variety of reasons*" (155,156). Migrant is considered and "umbrella" term, as it groups different categories and concepts, ranging from refugees, migrant workers or international students, among others (156).

The present work will be focused on immigration, so the term “migrant” will be used to refer only to immigrants.

Migration has always been part of human history. However, in the last century, migration has been facilitated due to technological development and increased resources (157).

Worldwide, there has been an increase in world populations. According to data from Migration Data Portal (158), in 1990, there were 153 million migrants in the world, and that number has been increasing consistently, reaching 280.6 million migrants in 2020. According to the United Nations (UN) in 2020, 3.6% of the world's population were migrants (155,158).

Of the world migrant population in 2019, it is known that 74.2% of migrants are in the age group of 20 to 64 years, corresponding to working age, and 47.9% are women (158). Regarding the origin of these individuals, they are mostly from Asian countries, especially migrants from India, China, Bangladesh and Pakistan, but also from South America (e.g. Mexico), Africa (e.g. Egypt) and Europa (e.g. Ukraine and Russia) (159). Another relevant fact shown by UN data is that around 24 million people globally have moved from their country of birth in an involuntary and forced manner, that is, due to issues of insecurity or war (159,160).

Europe is the continent that hosts the largest number of migrants, with 82.3 million migrants residing in the continent in 2019 (158), and this number increased to 87 million in 2020 (159,160), which means that in one year about 5 million people migrated to Europe. Among the European countries, Germany is the one that receives the largest number of migrants, followed by the United Kingdom and France (159).

1.3.1. Migration in Portugal

Portugal is a country with a long history of immigration. The migratory processes had positive effects on the country's social, cultural and economic development, helping to shape the current Portuguese society (161).

Since the beginning of the 21st century, Portugal has seen a continuous increase in the resident migrant population. In 2020, a maximum increase in the migrant population residing in Portugal was reached (162,163). According to recent data, 5.8% of the total population residing in Portugal is migrant (163), and this value corresponds to an increase of 12.2% compared to the 2019 data (162). Of the total of 5.8% of foreign

citizens residing in Portugal, 4.3% come from countries outside the European Union and 1.5% come from countries within the European Union (163).

The migratory waves towards Portugal have been changing over the last few decades. Firstly, between 1990 and 2000, migration to Portugal came mainly from African countries, especially the Portuguese-speaking African countries; then, between 2000 and 2010 there was a significant increase in the number of migrants from European countries and also from South America, mainly from Brazil, which is still visible nowadays; after 2010, there was an increase a progressive increase of migrants from Asia, especially from China and India (161,163,164).

In 2020, the main countries of origin of migrants residing in Portugal are, in descending order of percentage of the total population, Brazil, United Kingdom, Cape Verde, Romania, Ukraine, Italy, China, France, India and Angola, with Brazil contributing with about 28% of the total migrant population (162,163).

The geographic distribution of migrant populations in Portugal is heterogeneous, with a predominance of these populations in coastal regions. The municipalities of Lisbon, Setubal and Faro are those with the highest number of migrants, with respectively 43.1%, 15.6% and 9.2% of the total migrant population residing in Portugal, in 2020 (162,163).

In terms of gender distribution, the percentage of men and women is balanced, with women representing 49.2% of the total migrant population in 2020. Among the main countries of origin, more than 50% of migrants from Angola, Brazil, Ukraine and Cape Verde were female (162,163).

Regarding age, migrant populations tend to be younger than the native Portuguese population, noting that 60.6% of migrants are in the age group of 20 to 49 years, while the Portuguese population in this age group represents 36.6%. At the same time, while 22.9% of citizens of Portuguese origin are 65 years old or over, only 9.5% of migrants belong to this age group (163).

When it comes to health, migrants living in Portugal generally tend to self-assess themselves as healthier when compared to their Portuguese counterparts, with more than 60% of individuals reporting good or very good health; however, it should be taken into account that migrants in Portugal are, on average, younger than the resident population (163). With regards to access to health care, it is observed that foreign citizens use less health services in Portugal, but with regard to hospital and emergency services, they have a higher use than the native population (163,165), similarly to what has been observer internationally (165,166). Evidence from studies on access to health

care in migrant populations residing in Portugal show that these populations have increased difficulties when trying to access health services (167–170). Many of the barriers reported by migrant populations in terms of access to healthcare are related to difficulties in navigating the national health system, language difficulties, economic difficulties and being undocumented (170–172).

1.3.2. Migration and Health: an overview

Migration can have positive and adverse social and health impacts. It is known that migration contributes to the development of the economy, society, and culture of the country of destination (159,173). Most importantly, upon arrival to the destination countries, migrants have access new opportunities and resources, including health resources, and often to a safer environment, which improves their quality of life and health (159,173). On the other hand, the conditions surrounding the migratory process may increase risks exposure and exacerbate health vulnerabilities of migrants, which can negatively impact their health and well-being (159).

Integration of migrant communities in their country of destination involves offering these migrant people quality health care that responds to their needs (163,174). The right to health and health care is a fundamental human right described by the WHO in its 1946 constitution (175). At the same time, the European Union has made migrant health issues a priority in order to implement the values of equity and social cohesion in all member states (176).

Evidence suggests that, upon arrival, migrant populations often present better health indicators than native populations - the so called “healthy migrant effect” (177,178). Reasons that partially explain this phenomenon include a self-selection of healthy individuals, with high physical and mental resistance required for the migration process, which would exclude those with poorer health, but also those related to the better conditions in the host country when compared to their country of origin, where migrants often struggle poor healthcare resources, poor living conditions, war, among others (151,177,179,180). However, this apparent “advantage” tends to vanish over time. During settlement in the host country, some migrant groups are more likely to experience poor living conditions or precarious employment, as well as trauma associated to the migration process, leading to negative effects on their health (151,177,178,181). Sedentary lifestyles, changes in diet and adoption of other unhealthy behaviors such has smoking and drinking alcohol, are also among the reasons for negative health outcomes over time (151,178,182). Some countries have a higher

incidence of communicable diseases such as tuberculosis and sexual transmitted diseases such as HPV, which may compromise the health indicators of migrants coming from these countries (151). Therefore, health disparities between migrant and native communities exist and persist (174,178).

Even though women migrate at the same rate as men, migrant women appear to be at higher risk of poorer health outcomes (183). During the migration process and upon arrival to the host countries, women are disproportionately more exposed to gender-based and sexual violence and human trafficking with severe impact in their health status (151,183,184). Sexual exploitation also increases their risk of developing sexual transmitted infections (STIs) (151). Migrant women also lack access to family planning support, show lower use of contraceptives and their knowledge about contraceptive methods is often limited (151). This is concerning considering that many migrant women are at a reproductive age. Their use of healthcare services, including gynecological and maternal healthcare services, is low compared to the natives, leading to a delayed access to appropriate screening, diagnosis, and treatment (183), This is reflected, for instance, in poorer pregnancy outcomes (e.g. higher risk of abortions, caesarians, complications during child-birth, low birth weight and higher infant mortality) (151,183). Also, evidence has been consistently showing that migrant women have lower use of preventive healthcare services, such as breast or cervical cancer screening (151,165).

These facts demand that these populations have easy access to healthcare services, which is the opposite of the reality, as migrant populations' access to health care is poor (166,178). Evidence shows that migrants have a lower utilization of healthcare services when compared to natives of the same country. The only exception seems to be hospitalization and emergency services where migrants show a higher attendance in emergency services and longer length of stay during hospitalization when compared to natives (165,166). Migrants have also a lower utilization of preventive health services, including screening (166).

1.3.3. Cervical cancer screening among migrant populations

Migrants have a higher risk of having a cancer diagnosis at a later stage of the disease when compared to the native population, which increases the mortality in these populations (151,181). This is particularly true to cervical cancer, as evidence shows that migrant communities have a higher risk of developing the disease and a higher risk of being diagnosed later, leading to a higher mortality of cervical cancer (151,185).

Migrant women have lower adherence to cervical cancer screening than native women (109,166), which may lead to a late diagnosis of cervical cancer in these women (130,149,151,181,186–188). Some reasons have been pointed out for these differences in the level of participation in screening between migrants and natives. In summary, many of the barriers to screening are like the barriers faced by these women in accessing health care in general, namely language barriers, lack of economic resources, low health literacy and issues associated with the legal status of migrant women (91,167,181). Others are like what native women face, such as fear, embarrassment, among others. Barriers associated with cervical cancer screening among migrant women will be further described in detail using the Ecological Model (116).

At the individual level, lack of knowledge about cervical cancer and its screening, leads women to devalue this disease and avoid being screened (96,117,145,146,189–192). Feelings and attitudes about cervical cancer screening also greatly influence participation. The fear associated with the screening procedure and regarding the diagnosis also leads many women to avoid screening (96,124,145,190,192,193). In fact, many migrant women believe that cervical cancer is an incurable, deadly disease, and therefore do not want to know if they have it (191,192). The shame and stigma associated with gynecological exams are factors identified by several studies as a barrier to screening, and that may be associated with the cultural and religious beliefs of these women, where issues about female sexual health are taboos (96,117,124,139,145,146,189,192,194).

At the interpersonal level, the role of the male figure in the family may influence attendance to cervical cancer screening. In some cultures, men have a preponderant role in women's health and may themselves serve as a barrier for these women to access screening, as they do not allow them to participate in screening (96,139).

Finally, at an organizational level, the low adherence to non-urgent and preventive health care, as cervical cancer screening, by migrants is mainly due to the various barriers that these individuals face when accessing health care (154,165,166). The organization of healthcare services, lack of knowledge of the availability and benefits of using health services, language difficulties, lack of health literacy, legalization issues, and cultural differences are among the most reported barriers for low adherence of migrants to health care (166,174,195). Also, medical advice is essential to increase participation in screening, yet many migrant women do not have access to health care, do not seek health care, or, when they are able to access health care, health professionals do not provide the necessary information, this being a barrier to screening (96,117,124,193). On the other hand, many women do not feel comfortable being

examined by a male doctor, especially regarding gynecological exams, and when there is no possibility of screening with a female doctor, they refuse to do it (96,117,191,193).

Migrant women have a higher risk of late diagnosis of cervical cancer due to their lower attendance in cervical cancer screening initiatives. This leads to a higher morbidity and mortality from a disease that may be effectively prevented and treated if diagnosed early. Migrant women face several barriers to access screening: difficulties in accessing healthcare services, health literacy, communication difficulties, legal issues associated with migration, and other barriers associated with cultural and individual characteristics such as fear or shame. The effect of some these barriers may vary based on the healthcare systems and screening practices of the host countries as well as the socioeconomic and cultural background of the women. Therefore, to develop better strategies to increase migrant women it is important to identify the factors associated with cervical cancer non-attendance in context these strategies will be implemented.

CHAPTER 2: Objectives

This doctoral thesis' goal is to understand cervical cancer screening participation among migrant women residing in Portugal. The knowledge gathered in this work may contribute to develop new strategies and interventions to improve and increase cervical cancer screening participation among this population. To accomplish this goal, four specific aims were defined, corresponding each one to a study:

- To synthetize the evidence on factors associated with participation in Cervical cancer screening among migrant women in Europe (Study 1: *Factors associated with cervical cancer screening participation among migrant women in Europe: a scoping Review)*

- To examine participation in cervical cancer screening among migrant women in Portugal and identify factors associated with non-attendance (Study 2: *Non-attendance in cervical cancer screening among migrant women in Portugal: a cross-sectional study*).

- To assess attitudinal barriers to cervical cancer screening and its association with non-attendance among migrant women living in Portugal (Study 3: *What is the role of attitudinal barriers on cervical cancer screening non-attendance? Findings from a cross-sectional study with migrant women in Portugal*).

- To explore the barriers to cervical cancer screening among migrant women and potential strategies to overcome them in the perspective of healthcare workers and community workers (Study 4: *Understanding cervical cancer screening barriers among migrant women: A qualitative study with healthcare and community workers in Portugal*).

The four studies that compose this doctoral thesis resulted in four papers (three published and one submitted) that are presented in the Results chapter.

CHAPTER 3: Methods

This thesis comprises four studies with three different methodological approaches: a scoping review, a quantitative approach, and a qualitative approach. A brief description of each study will be provided below. A detailed description of the methods used in each study were presented in the respective article (see Chapter 4).

- Scoping Review (Study 1)

This study aimed to explore the available evidence about cervical cancer screening among migrant women in Europe, to identify the factors related to screening practices, and to analyze knowledge gaps in the topic (199). A scoping review was conducted, and it provides a broader, systematic and rigorous overview of the knowledge on the topic.

This scoping review included qualitative and quantitative studies developed in EU/EFTA, with data on migrant women. A comprehensive search was conducted in PubMed, Web of Science, EMBASE, CINAHL, PsycINFO, Scopus. Studies were screened by two authors: firstly, titles and abstracts were screened, then the full texts. Information from the included studies (first author, year of publication, country where the study was conducted, study design, study population, sample size, and factors associated with cervical cancer screening participation) were extracted by two authors. Factors were classified in barriers and facilitators and were subdivided into further categories.

The information gathered in the scoping review was used in the development of the qualitative and quantitative studies.

- Quantitative approach (Studies 2 and 3)

A web-based online survey was designed to characterize non-attendance in cervical cancer screening (Study 2), and to explore the attitudinal factors related to screening (Study 3) among migrant women living in Portugal. The survey allows to quantitatively analyze perceived barriers to screening. It is an easy and low-cost method to collect data, reaching a wide number of participants in a short period (196).

Foreign-born women residing in Portugal, aged over 20 years were recruited, regardless of their migration status. Due to the pandemic outbreak restrictions,

recruitment was conducted exclusively online. The survey included items related to sociodemographic characteristics, migration, health services use, and cervical cancer screening, based on the findings of the scoping review (77,96,117,154,197). The sociodemographic items were also based on the Portuguese Census 2011 questionnaire (198). The survey also included a section about attitudinal barriers regarding cervical cancer screening, that was based on Marlow *et al*. (199) study, conducted in England.

The outcome of interest in Study 2 and Study 3 was cervical cancer screening attendance (considering "attenders" as those who had their last screening ≤5 years ago and "non-attenders" as those who had their last screening >5 years ago or never). Statistical analysis was adapted according to each study specific goals. Overall, descriptive analysis of the variables and logistic regression models were performed. A p-value <0.05 was considered significant in both studies.

- Qualitative approach (Study 4)

A qualitative study with online focus groups was conducted to explore the barriers to cervical cancer screening and potential strategies to overcome them. This method was considered adequate as it allows to collect in-depth data on participants perspectives. Focus group discussions encourage participation, expression of opinions and elaboration of ideas, simultaneously reducing inhibitions as bonds are created between participants (200). Participants were purposively sampled and included healthcare workers experienced in cervical cancer screening and community workers working with migrant communities. Given their professional experiences with screening and migrant populations, these groups can provide deep insights on the barriers faced by these women. Due to COVID-19 pandemic restrictions, these focus groups had to be conducted online.

A semi-structured guide was used covering the topics of participation of migrant women in CCS, barriers to screening, and strategies to overcome them. Data was analysed through content analysis. This method consists in systematizing the key ideas obtained in the discussions and organizing them into codes of analysis (200). To do so, a codebook with themes, sub-themes, and codes was created, based on previous literature (96), and in the scoping review conducted in this thesis, and were organized based on the ecological model as a framework (116).

CHAPTER 4: Results

4.1. STUDY 1: Factors associated with cervical cancer screening participation among migrant women in Europe: a scoping Review

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Abstract

Background: Cervical cancer screening has been effective in reducing incidence and mortality of cervical cancer, leading European countries to implement screening programs. However, migrant women show lower screening participation compared to nationals. This scoping review aims to provide a synthesis of the growing evidence on factors associated with participation in cervical cancer screening among migrant women in Europe.

Methods: Electronic peer-reviewed databases were searched in November 2019 for studies on factors related to the participation of migrants in cervical cancer screening conducted in EU/EFTA countries, using comprehensive search expressions. Retrieved articles were screened and those eligible were selected for data extraction. Quantitative and qualitative studies were included. Factors were classified in barriers and facilitators and were divided into further categories.

Results: Twenty out of 96 articles were selected and analyzed. Factors associated with participation in cervical cancer screening were classified in categories related to sociodemographic, healthcare-system, psychological, migration, knowledge, language, and cultural factors. Lack of information, lack of female healthcare providers, poor language skills, and emotional responses to the test (especially fear, embarrassment and discomfort) were the most reported barriers to cervical cancer screening. Encouragement from healthcare providers and information available in migrants' languages were frequently stated as facilitators. Results on the role of sociodemographic factors, such as age, education, employment and marital status, are the most conflicting,

highlighting the complexity of the issue and the possibility of interactions between factors, resulting in different effects on cervical cancer screening participation among migrant women. Several identified barriers to screening are like those to access to healthcare services in general.

Conclusions: Efforts to increase migrant women's participation in CCS must target barriers to access to healthcare services in general but also specific barriers, including cultural differences about sexuality and gender, past traumatic personal experiences, and the gender and competences of healthcare professionals performing CCS. Healthcare services should strengthen resources to meet migrants' needs, including having CCS information translated and culturally adapted, as well as healthcare providers with skills to deal with cultural background. These findings can contribute to improve CCS programs among migrant women, reducing health disparities and enhancing their overall health and well-being.

Keywords: Migrants and Transients, Emigrants and Immigrants, Uterine Cervical Neoplasms, Early Detection of Cancer

Introduction

Cervical cancer ranks as the second most common cancer in females in Europe (201). In 2018, the incidence of cervical cancer reached 15.9 and mortality was 4.6 per 100,000 women aged 15-64 in the region (3). In nearly all the cases, cervical cancer is characterized by a persistent infection caused by one or multiple different genotypes of Human Papillomavirus (HPV) (11). Early detection of the cancerous lesions through preventive strategies and tools leads to a positive prognosis and a higher chance of the patient being fully cured (6).

Cervical cancer screening (CCS) is a public health intervention that includes identifying and inviting an eligible population at risk of cervical cancer, providing a screening test to detect HPV-virus or abnormal cervical cells, providing diagnostic tests to women who screen-positive and direct these women for treatment. The screening test requires that a healthcare professional performs a gynecological examination and collects a cervical sample (16). According to the International Agency for Research on Cancer (IARC), CCS programs have been shown to be an effective strategy to reduce the incidence of the disease (6,64,69,90). Evidence shows that cervical cancer mortality was reduced in European countries that implemented organized CCS programs (89). Reduction in cervical cancer incidence and mortality in opportunistic screening ranged from 10% to 60% worldwide (64).

By 2016, 22 out of 28 EU member states had started planning or implementing publicly-funded, organized CCS programs (68). However, participation in CCS programs has been suboptimal, with low coverage of the population (6). According to the report of the Council Recommendation on the implementation of cancer screening in 19 European countries, 59.2% of the annual target women aged 30-59 years were invited for screening and mean participation rate was 50.7% (ranging from 11.6% to 67.7%) (201). This means that there is still a significant part of the eligible female population who is not screened regularly for cervical cancer.

Migrant women are a vulnerable group to cervical cancer. Several studies conducted in high-income countries found higher incidence rates of cervical cancer among migrant women compared to native counterparts (103,150,188,202,203). Additionally, lower participation rates in CCS have been found among migrant women, which increases the risk of being diagnosed in later stages of the disease, with negative impact on treatment outcomes (16,151).

Indeed, underuse of health services among migrant populations has been well documented in the literature, including for early detection measures (154,165,166) such as CCS (163). Lower access and utilization of health services, especially for preventive and primary care, have been associated to barriers such as economic constraints, undocumented migration status, poor living conditions and social integration, and limited knowledge about the host country's healthcare system and migrants health rights (154,169,204–206). In addition to these barriers, other factors seem to influence participation in CCS among migrants, and are related to limited knowledge on cervical cancer and screening (117,207,208), emotional attitudes toward CCS, such as fear and embarrassment (207), cultural and religious factors (208), and lack of culturally-adapted responses of the health services for provision of health care to migrant women, such as interpreters and female healthcare providers (117,208).

Official data estimate that in mid-2019 the number of international migrants in Europe was around 82.3 million, of whom 51.4% were women (158) mostly in reproductive age (209). Despite the evidence that many migrant women are particularly vulnerable to cervical cancer and are under-screened, knowledge on the factors influencing their participation in CCS is limited and sparse. An overview of the body of evidence currently available on the barriers and facilitators to CCS is crucial to inform strategies to increase migrant women participation in CCS and reduce the prevalence of the disease in this population. The aim of this study is to provide a synthesis of the growing evidence on factors associated with participation in CCS among migrant women

in Europe, that can be useful for recommendations to increase participation. A scoping review was performed as it is an appropriate approach to explore the available evidence, to provide trends in the literature and to identify key factors related to a concept (210–212). The core research question guiding this review was "What are the factors influencing participation in cervical cancer screening among migrant women in Europe?".

Methods

This study followed the PRISMA extension for scoping reviews (PRISMA-ScR) framework (213).

Data sources and search strategy

The search was conducted in the following electronic peer-reviewed databases: CINAHL, EMBASE, PsycINFO, PubMed, Scopus, and Web of Science. "Migrant" was defined as *"any person who is moving or has moved across an international border or within a State away from his/her country of origin",* regardless of the reason or duration of the movement (155), including documented migrants, undocumented migrants, asylum seekers, and refugees among others. "Europe" was defined as the 28 member states of the European Union (EU) and the four states of European Free Trade Association (EFTA), as they share similar legislation regarding cancer screening and implementation of population-based CCS practices (214).

Search expressions combined controlled vocabulary and free text and included relevant keywords and Medical Subject Heading (MeSH) terms related to the main topics, namely "migrant", "cervical cancer", "screening", and "Europe". Boolean operator "AND" was used to combine the main topics and "OR" was used to combine keywords of each of the topics. Search expressions were adjusted to each database's specifications **(Table 2).** The search strategy was developed by the first author with the collaboration of a health information specialist.

The search involved three steps:

1. A pilot search was conducted in three databases (PubMed, Web of Science and Scopus) to refine the search strategy and ensure it was precise enough to include relevant literature.
2. A complete analysis using the final search strategy was conducted in all databases on 11th November 2019. All the articles retrieved were stored in Mendeley reference management software, and duplicates were removed.

3. Supplementary electronic searches were conducted by manual searching the references of included papers.

Study Selection

The present review included studies that focus on participation in CCS among migrant women, from the perspective of migrant women and/or healthcare providers and/or stakeholders that work with migrants living in EU/EFTA countries. Original research articles, regardless of the publication year or the study type, published in English, Portuguese, or Spanish were included to have a broader view of the existing evidence. Articles were excluded if they did not present data about migrant women, were not conducted in the EU/EFTA countries, or if the full version of the article was not accessible, after attempting to contact the authors. Grey literature was not included due to resources and time limitations.

Two authors performed an independent assessment of 20% of the included articles, whereas the remaining articles were screened by a single author. In case of disagreements, a third reviewer was contacted to reach an agreement.

Data extraction and synthesis of results

Data was extracted by one of the authors, and included: author, year of publication, country where the study was conducted, study design, study population, sample size, and factors associated with CCS participation **(Table 3).**

Factors associated with CCS participation were categorized into barriers (i.e., factors reducing CCS participation) and facilitators (i.e., factors enhancing CCS participation) and were further divided in categories. The construction of the initial categories was developed based on literature review (96) and was completed with additional categories that emerged through data analysis. Each category aggregated subcategories according to the data analyzed. Categories were organized from the most frequently cited to the least frequently cited among the studies retrieved and presented in a table form

Results

Sources of evidence

Figure 3 presents the PRISMA flowchart of the search and selection process of the studies. Through electronic databases, 91 peer-reviewed articles were found - 44 in PubMed, 32 in EMBASE 11 in Scopus, three in Web of Science, and one in PsycINFO. No results were found in CINAHL. Five additional records were retrieved by citation

tracking of the included papers, among which four were not indexed to any database at the time the search was conducted. After removing duplicates (n=29), 67 articles were screened for title and abstracts. A total of 19 articles were excluded for not meeting the inclusion criteria. Of the 48 articles eligible for full-text screen, 28 were excluded, mostly for not being related to migrants or cervical cancer screening. The final review included 20 original research articles.

Characteristics of selected studies

Table 4 shows the main characteristics of the studies included in the review. Studies were published between 2009 and 2019 and were written in English except for one article in Spanish. Most of the studies were conducted in northern Europe (Norway, Sweden, Finland, and Denmark), and in southern Europe (Spain and Italy). A total of ten studies were quantitative, the majority being cross-sectional (n=7), and three being longitudinal. Among the ten qualitative studies, five used focus groups, one used interviews, and four used both methods.

Study populations were diverse across the studies. In total, eight studies included migrant and native women, eight studies included only migrant women, two included healthcare providers, one included stakeholders, and one included migrants, healthcare providers and stakeholders. Several studies focus on specific groups of women (mostly Somali, Russian, Kurdish, and Pakistani women), and seven studies include migrant women irrespective of place of birth. Healthcare providers included in the studies were general practitioners, gynecologists and midwives. Among stakeholders, one study included doulas and another study included consultants and advocates.

Factors associated with cervical cancer screening participation

Seven main categories were used to classify both barriers and facilitators of CCS participation, providing a wider and complete framework to characterize the factors associated with participation in CCS. The categories related to sociodemographic, healthcare-system, psychological, migration, knowledge, language, and cultural factors.

Barriers to CCS participation

All 20 studies mentioned barriers to the participation in CCS among migrant women.

Table 4 provides an overview of the barriers documented in the articles, classified in the different categories.

- *Sociodemographic-related barriers*

Age appears as one of the most common sociodemographic determinants of low participation in CCS. However, studies offer contradictory evidence on the role of age on screening participation. Older age (over 40 years of age) was associated with lower participation in CCS in four studies (110,147,148,187). It is suggested that higher attendance to CCS among younger migrants (below 40 years of age) might be related to their desire to get pregnant, which leads to increased contact with healthcare services (110,147). Yet, in other research, younger age was associated with lower participation in CCS among Russian (149) and Asian (148) migrants. One of the studies showed that younger women from high income countries (HIC) participate less in CCS, in opposition to the trend found in low and middle income women, where older women are the ones that participate the least (110). This might be related to the migratory pressure, where women from low and middle income countries migrate at a younger age and, therefore, might be screened opportunistically for cervical cancer as they look for healthcare support for fertility reasons (110,147).

Parity and pregnancy were also considered factors influencing CCS participation, but also with conflicting results (139,186,197). Quantitative data suggests that having no children is associated with lower attendance of screening among migrants from either Western and Nonwestern countries (186,197). A qualitative study offers a nuanced perspective on the influence of pregnancy in the use of screening. Younger women stated that the desire to get pregnant encouraged them to take the screening test as cervical cancer was a dangerous disease that could compromise pregnancy. Conversely, since pregnancy is a period marked by frequent contact with healthcare professionals, some women felt that they could monitor their health without doing the screening test. Additionally, after giving birth priorities change and CCS is not a priority (139).

Several studies show that screening participation may be influenced by the marital status of the women, but its effect is not consistent across studies. Some studies suggest that unmarried migrants are less likely to participate in CCS (110,149,186,215), while others show that married women participate the least (139,148,149). These conflicting results might be related to different cultural norms in different countries of origin, or generational effects. For example, in one of the studies, older women mentioned that participation in CCS tend to be lower when their husbands do not think CCS is important, while younger women stated their partners were more likely to be supportive of CCS participation (139). Indeed, having social support, either by the partner or husband, or even by family or friends has been showed to have positive impact on

CCS participation (139). Lack of social support was linked to postponing or avoiding screening (190,215).

Lower education has been negatively associated with CCS participation (110,197), as well as being unemployed (149,186,197) and having a low income (148,186). There are exceptions. Being employed was associated with lower participation among Somali women (149). Some migrant women with a very high socioeconomic position participated less in organized screening. This may reflect a higher utilization of private medical care (110). Having no private insurance or no insurance at all also seems to be a barrier to CCS among migrants living in Spain, as shown in two Spanish studies (144,215).

Household setting and household size also have been found to be associated with CCS adherence. Living in urban areas was associated with lower participation in CCS among European, Asian and African migrants (148,149), which is thought to be the result of a better integration of migrant women in rural communities and a higher proximity with healthcare providers of those regions as they have less patients (148). However, among Somali women living in rural areas, the opposite trend is observed (149,197). These two studies indicate that these women face difficulties in accessing healthcare services due to long distances and lack of transportation.

- *Healthcare system barriers*

One of the barriers to participation in CCS most reported among migrant women (117,146,148,191,193,216) and healthcare providers (193) is the lack of availability of female healthcare providers to perform the screening test when the patient requires it. In two qualitative studies, Somali women stated that having a male doctor performing the exam is not acceptable within their cultural and religious values, and believed that it might compromise their modesty and virginity (191,216). Feelings of shame, awkwardness and shyness have been reported when a male healthcare provider is present (117). Healthcare providers are also aware of this barrier and male doctors mention that they often send migrant women to a female colleague to do the screening test (193). Among women from Eastern Europe a barrier to screening participation is having a practitioner who is not a gynecologist perform the test. This might reflect differences in screening practices between the country of origin and the host country; in Eastern European countries usually a gynecologist performs the test (145,193).

Lack of access to healthcare services, mainly by not being registered in the country's healthcare system, reduces the likelihood of participating in CCS (147). Migrant woment that were invited to an organized CCS in Norway by an invitation letter perceived

it as impersonal (139). Long waiting times, for both the exams and the results, also leads women to postpone cervical screening (139,145,190). Eastern European women (Polish, Slovak, and Romanian) in a English study referred poor hygiene in healthcare services as a barrier to participation in screening in England (145).

Negative attitudes from healthcare providers prevent women from attending cervical screening, either by unprofessional treatment (139,145,191) or failing to establish a good patient-healthcare provider relationship (117). Some women felt discriminated against because of their migrant status or language skills (145), or felt that their beliefs and culture were disrespected (191). This can be exacerbated by a lack of skills to work with migrant women, as referred to by healthcare providers (193). A study showed that having a GP with a migrant background was associated with lower CCS participation among European and Asian women (148). Also, some women felt like their healthcare providers do not give them enough time to discuss their issues, or that the appointment time was insufficient to address their issues (117,193).

Women originating from countries with different health systems and preventive practices might not be accustomed to preventive healthcare services (146,194) or attending medical checkups regularly (194) and, therefore, they become unaware of their needs regarding CCS.

- *Psychological barriers*

CCS attendance may be affected by women's specific individual characteristics related to their experiences, emotions and behaviors. Fear of the screening procedure was one of the main barriers leading women to postpone screening, stated by migrants (145,146,190,216), healthcare providers (193), and doulas (194). Female migrants stated that they fear the test procedure and materials, and fear the pain they associate with the exam (145,216). Fear of the result of the test also stopped women from taking the screening test. A large number of women did not want to know if they had cancer, and therefore they decided to not take the test (139,145,191,194,216). Other psychological and emotional barriers included shyness, embarrassment, defenselessness, and discomfort for exposing their body (139,145,146,190,191,194). Emotional responses can also show up as fatalistic views about cancer, believing that it cannot be prevented nor cured and therefore it would be pointless to do the screening test (194). Some women also believe that it would be God's will if they have cancer or not so they did not attend the screening test (191).

Lack of trust in healthcare services also prevents many women from using them (117,145,191,194). This distrust in the services is most likely the result of negative past

experiences and fear of misdiagnosis (117,145,190,194,216). Negative past experiences, such as pain, bleeding, or unprofessionalism from healthcare providers has been shown to be a barrier either if the women experienced it herself or if she was told about it (216).

Past traumatic experiences may also act as a barrier to attending CCS. Previous experiences of sexual assault (139), or suffering from female genital mutilation (117,191) may lead women to postpone attendance as these experiences might cause discomfort, fear or shame.

Lack of time and having other priorities were also referred (139,145,191,193,194,216). Healthcare providers (193) and doulas (194) observe that women do not prioritize CCS, or even if they find it important, they do not have spare time to attend it due to other priorities, included children (191,194,216), tasks related to their migration status (139), or work (145).

- *Migration-related barriers*

There is contradictory evidence on the association between country of birth and CCS participation among studies. Immigrant women from low and middle income countries showed a lower screening participation when compared with immigrant women from high income countries in an Italian study (110). Asian women, particularly those coming from China, were the ones with the lowest participation rates (110,147,187,217). Being born in an African country was associated with lower participation in an Italian study (110), but in a Spanish study, Sub-Saharan African women are the ones with the highest participation rate (187). A cohort study conducted in Sweden showed that migrants from Australia and New Zealand are the ones who participate the least in CCS, and that the low participation might be the result of past negative experiences in their home countries (150).

A shorter length of stay in the hosting country is associated with lower screening participation, and this might be related to migration-related stress, lack of knowledge about healthcare services in the host country, or difficulties with the language (148,186,217). One example of this situation are transient migrants, who after having arrived to the host country often move around within and between countries and, therefore, might not be invited for organized screening nor be screened opportunistically (139,145). However, in a Norwegian study, it was found that Western European that stay in the country for longer are less likely to attend to screening. This could be related to their preference of attending screening in their home country (148).

Other migration-related factors with a negative impact on CCS participation include older age at migration (150), not being the first time a woman migrates (re-immigration) (186). Also, some women showed preference to attend CCS in their home countries (145,190).

- *Knowledge-related barriers*

Low knowledge about CCS was largely referred to as a barrier to CCS participation by migrants (117,146,190,191,216), healthcare providers (144,145), and doulas (194). Women that expressed limited knowledge about cervical cancer often do not attend CCS (117,146,191). Also, women frequently state that they do not need CCS in the absence of symptoms, showing a low risk perception of the disease (117,139,191,216). In the included studies, women expressed a wide range of knowledge about cervical cancer and cancer screening (145,190,191,216). Despite the hosting country, evidence shows there is a high level of unawareness regarding CCS among Somali women (190,191,216). Additionally, a study from the England showed that the level of awareness of CCS varied according to the countries of origin (145). The lack of knowledge of how the healthcare system of the host country works leads to low service utilization, resulting in lower attendance to CCS (139,144–146).

- *Language-related barriers*

Language difficulties was one of the most commonly cited barriers to CCS in the studies, either by migrants (117,145,190,197,216), healthcare providers (193), or doulas (194). Most healthcare providers communicate in the host country's native language, in which migrants are seldom fluent (117,216). In addition, information about healthcare services and specifically about CCS is frequently only provided in the host country's native language, which prevents migrant women to get properly informed about screening practices in the country (190,216). In a cross-sectional study conducted in Finland (149), Russian women participated more frequently in CCS than Somali or Kurdish women and it was proposed that this difference might result from a similarity between Russian and host country's language which could facilitate communication and knowledge diffusion among that specific population.

The type of interpreters used during appointments can also be a barrier to CCS. Most migrant women end up using their husbands or other relatives as interpreters and this, per se, works as a barrier because their privacy is compromised and women might not feel comfortable to talk about intimate issues in the presence of their relatives (117). This problem is also perceived by healthcare providers (193). On the other hand, frequently when women are provided with interpreters to help them with the

appointments, many are not satisfied with the quality of the interpreters which may prevent them to further attend screening appointments as shown in a study with Somali women in Camden, England (216).

- *Cultural barriers*

Different cultural backgrounds between migrants and host society can also act as a barrier to CCS (139,145). In some cultural contexts, social stigma about women's health exists (146,194). Especially among Muslim women, for whom talking about reproductive health might be a taboo topic, leaving women feeling uncomfortable with approaching these issues (117,146,194). In certain countries women's health is undervalued, and that prevents women from attending preventive healthcare services and being screened for cervical cancer (146). Also, there is the belief in some communities that only married women should have gynecological examinations. An unmarried woman might be stigmatized for going to the gynecologist, related to social prejudice on the need of an unmarried woman having the exam (146).

Religious beliefs and values also have a strong role in the decision of participating in CCS. In a study with Pakistani and Somali women, some participants stated that religion protects them against diseases and therefore they do not need to be screened (117). The same study states that this belief might be more related to the fear of the disease rather than a religious imposition. Another study with Somali women stated that the invasiveness of this test could interfere with beliefs of modesty that are intrinsically related to their religion and they therefore seem to be reluctant to take the screening test (191).

Facilitators of CCS participation

Among the 20 articles retrieved, 11 explored facilitators to participation in CCS (110,117,216,139,144–147,191,193,197): eight were qualitative studies, one was conducted with healthcare providers, and one included migrants, healthcare providers, and stakeholders. Facilitators were classified under three categories: healthcare system, knowledge and language-related, and cultural factors, which are presented from the most cited in the articles to the least cited. **Table 5** summarizes the facilitators found in the literature.

- *Healthcare system facilitators*

Well organized programs, that are easy to navigate, well promoted and with no costs associated were mentioned as facilitators both in qualitative and quantitative

studies (144–146). Regular invitations and reminders seemed to be appreciated and were also mentioned as ways to increase CCS participation (117,139,144,145). Women who were invited regularly also manifested a feeling of security and that their health is being checked (139).

Healthcare providers encouragement, by being proactive in inviting women to do CCS (191,216), investing enough time on their patients to explain the procedure (117,193,216), and being careful and respectful while doing the test (145) were healthcare provider behaviors that stood out as facilitators in CCS among studies. Also, having a recent general practitioner's or gynecological appointment is associated with a higher attendance to CCS, as these practitioners might incentivize those women to attend CCS during the appointments (147,197).

- *Knowledge and language-related facilitators*

Providing migrant women with relevant, and easy to understand information about cervical cancer and screening has been mentioned as a key facilitator to increase CCS participation (117,145,191,216). Some studies suggest that this information should be provided by medical doctors (145) or through workshops and community activities (191), Also, information should be accessible in places frequented by the target women (191).

Additionally, it was shown that activities in collaboration with community stakeholders could also help to increase participation. One study described an intervention of doulas in a specific community of migrants and the results were highly positive (194): doulas worked as a link between healthcare professionals and migrant women and provided them information and help regarding CCS, in migrants' native language, which facilitated the process of participation. Another study with Somali women said they preferred education about CCS provided by Somali speakers (216).

Offering information leaflets and sending invitation letters in migrants' native language was also one of the most highlighted facilitators (110,117,145,146,191). Another facilitator is having bilingual healthcare providers or having interpreters experienced in medical contexts to assist the appointments and help with the communication between the healthcare providers and women (117,193,216). Additionally, the use of simpler language, body language, translated materials, and anatomic models to provide explanations about CCS by healthcare providers is a strategy that can be used to increase participation (193).

- *Cultural facilitators*

One study mentioned that women were more open to participate in CCS if they knew that healthcare providers would consider their preferences regarding, for instance, having the CCS test taken by a female doctor (191). Another facilitator is the perception that healthcare workers try to understand and to overcome cultural barriers that they might face when working with migrant women (193).

Discussion

Participation in CCS among migrant women is influenced by several factors. This is a complex issue, in which a wide range of factors may affect independently, synergistically, or antagonistically the participation in CCS among migrant women.

Results of this scoping review show that language barriers (117,145,190,193,194,197,216), lack of information about CCS (117,144–146,190,194,216), unavailability of female healthcare providers to do CCS (117,146,148,191,193,216), and emotional factors (139,145,146,190,191,193,194,216) were the most commonly reported barriers to CCS, whereas healthcare providers encouragement of regular CCS (117,145,191,193,216), regular reminders and CCS invitations (117,139,144,145), and having information in migrant women's native languages (110,117,145,146,191) were the facilitators most reported.

Many of the documented barriers to CCS are similar to those faced by migrants in healthcare services in general. For migrants arriving at a new country, accessing healthcare services is challenging - differences in the healthcare structure of the host country, language, low health literacy and cultural differences – highlighting what are described as barriers to health services utilization among migrants (154,166). The role of health services-related factors in CCS participation shown in this scoping review highlights that migrant-friendly healthcare services can positively impact migrants' healthcare access and participation in CCS. Our findings show that strategies aiming to provide adequate medical provision adapted to migrants' specific needs and helping them navigate the healthcare services could be the key to improve their access to healthcare services and CCS access, in line with the World Health Organization and the International Organization for Migration recommendations (151,218).

There are, however, specific factors that are particularly relevant when it comes to promoting participation in a CCS program. CCS can be a quite invasive test that requires sampling from the uterine cervix. In addition, sexual health can be a sensitive issue for many women. As found in this study, women's health is considered a taboo

issue for some women, and many of them are not comfortable talking about it even with their healthcare providers (146,194). The gender of the health professional was found to be one of the main barriers to CCS, as women might feel uncomfortable with a male healthcare provider and might avoid CCS practices when no female provider is available. This barrier is consistent across studies (219–221), highlighting the importance of gender. Also, our results suggest that some migrant women, especially coming from European countries, may expect having a gynecologist doing CCS, rejecting to do the test if it is performed by other healthcare professional (145,193). To engage migrants in CCS programmes it seems important to offer the option of having a female healthcare provider or a gynaecologist for issues related to sexual health.

Most women, despite their country of origin, are more likely to participate in CCS when recommended by a trusted healthcare provider (219,222). Limited knowledge among migrants about CCS seems to be a challenge, as reported by both migrant women and healthcare providers. Evidence shows that the greater the knowledge about CCS, the highest the level of participation (223). However, knowledge is influenced by other factors, such as cultural and religious factors, misconceptions about the risk of developing the disease. Emotional responses to the screening test such as fear or embarrassment may also discourage women participating in CCS or even seeking information about CCS (219,224,225). Language difficulties also limit the access to information, compromising participation in CCS as well (226). Also, in some situations, women need their husbands or family members to be interpreters in medical appointments (117,193) which may make them feel uncomfortable to open up with their medical doctor and avoid doing the CCS. An additional obstacle is related to past traumatic experiences of sexual assault or genital mutilation (117,139,191) which may be difficult to address as it requires additional competencies and, for instance, psychological support for those women.

The development and implementation of a cultural-sensitive healthcare system requires allocating appropriate resources and healthcare personnel prepared to provide the care needed by these underscreened groups (154,165,221). Based on this study's findings, some key recommendations can be highlighted. It is important that the information about CCS is delivered in a linguistically adapted and culturally sensitive way to target these groups. Skilled healthcare workers to intervene with different cultural backgrounds to better meet the migrants needs and encouraging medical doctors to promote CCS in appointments with migrant women may also play a role in increasing CCS participation. However, interventions aiming only to increase knowledge may be insufficient (227). A multi-factor-oriented strategy can be a more effective approach to

increase participation in CCS besides targeting individual-level factors or barriers. Establishing partnerships with community workers can be an approach to reduce the gap between healthcare providers and migrant populations. These professionals can help migrants navigating through health system and can also inform healthcare providers of specific needs of these populations. Some examples of successful community-based interventions regarding CCS documented elsewhere include: partnerships with doulas sharing language and cultural background with migrant women (194) or faith-based community organizations (228), and interventions based on community education activities to increase awareness of CCS and help women navigate through the system (229).

One of the major limitations of this review is that studies about some European countries with high percentage of migrants (e.g. Luxembourg, Switzerland, Greece) (230) were not found. Grey literature was not included in the study so some relevant information could be overlooked. Language restrictions were applied in this review; therefore, potentially relevant articles might have been excluded. Studies selection and data extraction were mainly performed by one author due to resources constraints; nevertheless, the authors are confident that the quality of the data was not compromised as 20% of the included abstracts was independently assessed by two authors and concordance was 100%.

The major strength of this scoping review relies in the comprehensive search conducted in different databases using a robust search expression, and complemented by citation tracking of the documents, based on an existing conceptual framework (96). The studies included represent the context among different EU/EFTA nations and different migration populations which provides a wide perspective about the topic. Additionally, most CCS programs in these countries share similar guidelines (214) which means that factors identified may also be relevant to other EU/EFTA countries.

Conclusions

Migrant women continue to show lower CCS participation rates when compared to native women. The findings of this scoping review reinforce that strategies targeting the improvement of access to healthcare services in general can have a positive effect also on CCS participation. Additionally, specific barriers related to access to CCS must also be addressed and include social stigma, gender and cultural-based values, religious beliefs, fear and embarrassment, and past traumatic personal experiences. Developing a migrant-friendly healthcare system is crucial to increase migrants' participation in

preventive care. Healthcare services should strengthen resources to meet migrants' needs, including having CCS information translated and culturally adapted, as well as healthcare providers with competences to deal with cultural background and different experiences. Having female professionals available to do the screening test may already be put in place with existing resources. These findings can be used by policymakers, healthcare providers, and community workers to improve CCS programs, increasing migrant women' participation, reducing health disparities and enhancing their overall health and well-being.

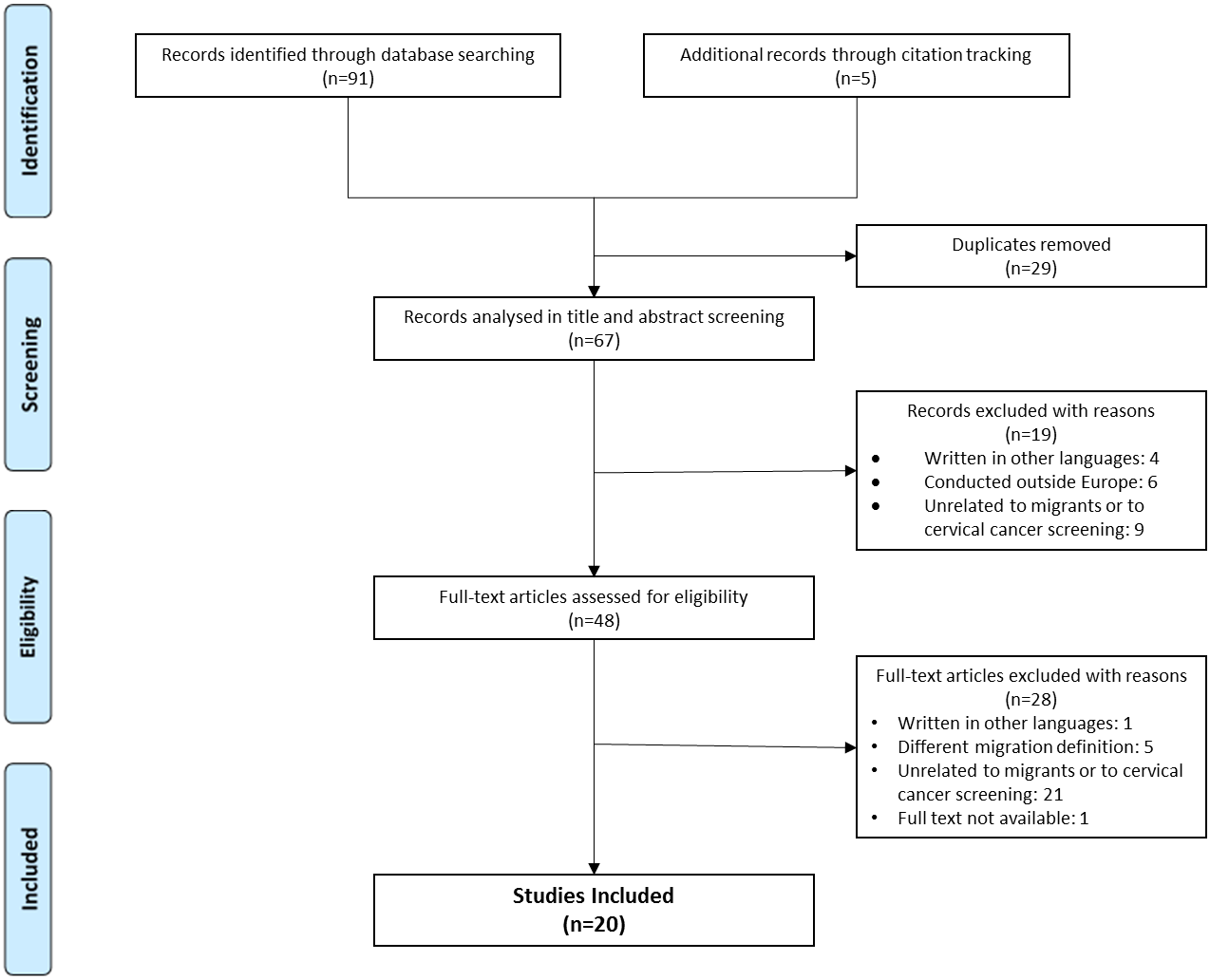

Figure 3 - *PRISMA flowchart of the search process and data selection (Study 1).*

Table 2 - *Search strategy for each database (conducted in 11th November, 2019) (Study 1).*

	Search expression	Nº Studies
PubMed	(uterine cervical neoplasms[MeSH Terms]) OR cervical cancer[Title/Abstract] AND ((papanicolaou test[MeSH Terms]) OR cytology[MeSH Terms]) OR early detection of cancer[MeSH Terms] AND ((((((transients and migrants[MeSH Terms])) OR (emigrants and immigrants[MeSH Terms])) OR migrant[Title/Abstract]) OR emigrant[Title/Abstract]) OR immigrant[Title/Abstract]) OR refugee[Title/Abstract] AND Europe[MeSH Terms]	44
Web of Science	TOPIC: ("uterine cervical neoplasms") OR TOPIC: ("cervical cancer") AND TOPIC: ("papanicolaou test") OR TOPIC: (cytology) OR TÓPICO: ("early detection of cancer") AND TS=(migrants) OR TS=(emigrants) OR TS=(immigrants) OR TS=(refugees) AND TOPIC: (Europe)	3
EMBASE	exp uterine cervix tumor/ OR cervical cancer.mp. AND exp Papanicolaou test/ OR exp cytology/ OR exp early cancer diagnosis/ AND "emigrant*".m_titl. OR "migrant*".m_titl. OR "immigrant*".m_titl. OR "refugee*".m_titl. AND exp Europe/	32
CINAHL	SU cervix neoplasms OR SU cervical cancer AND SU papanicolaou test OR SU cytology OR SU early detection of cancer AND SU (transients and migrants) OR SU (emigrants and immigrants) OR TI migrants OR TI emigrants OR TI immigrants OR TI refugee AND SU Europe	0
PsycINFO	uterine cervical neoplasms.mp. OR cervical cancer.mp. AND papanicolaou test.mp. OR exp Cytology/ OR exp Cancer Screening/ AND emigrant.mp. OR exp Human Migration/ OR exp Immigration/ OR undocumented immigrant.mp. OR exp Refugees/ AND Europe.mp.	1
Scopus	("uterine cervical neoplasms").kw OR ("cervical cancer").ti.abs.kw AND ("papanicolaou test").kw OR (cytology).kw OR ("early detection of cancer").kw AND ("Transients and Migrants").kw OR ("emigrants and immigrants").kw OR (migrant).ti.abs.kw OR (emigrant).ti.abs.kw OR (immigrant).ti.abs.kw OR (refugee).ti.abs.kw AND (Europe).kw	11

Table 3 - *Data extraction form (Study 1).*

Study	Year	Country	Study Type	Study population	Sample Size	Population characteristics	Factors associated with CCS
Reference of the article	Year of publication of the study	Country where the study was conducted	Type of study and main data collection strategies used (E.g.: Qualitative study - Focus Groups)	Description of the population studied (E.g.: Migrants, healthcare professionals, stakeholders)	Number of participants of each group defined in study population	Description of the following characteristics of the study population, if available: Age, country of origin, occupation	Factors associated with CCS participation among migrant women organized in barriers and facilitators

Table 4 - *Study characteristics (Study 1).*

Study	Year	Country	Study Type	Study population	Sample Size
Abdullahi *et al*. (216)	2009	England	Qualitative Focus Groups and Interviews	Migrant women (Somali)	Migrants: 50
Otero *et al.* (144)	2011	Spain	Qualitative Interviews	Healthcare providers (Midwives)	Healthcare providers: 10
Azerkan *et al.* (150)	2012	Sweden	Quantitative Longitudinal	Migrant women (Not specified) Native women	Total: 2,621,802 Migrants: 445,547
Jackowska *et al*. (145)	2012	England	Qualitative Focus Groups and Interviews	Migrant women (Polish, Romanian, and Slovak) Healthcare providers (Nurses, consultants, GP practice manager, gynecologist, and healthcare assistant) Stakeholders (Advocate working with migrants)	Migrant women: 42 Healthcare providers: 10 Stakeholders: 1
Rodríguez-Salés *et al*. (187)	2013	Spain	Quantitative Cross-sectional	Migrant women (Not specified) Native women	Total: 1,562,968 Migrants: 251,679
Olsson *et al.* (194)	2014	Sweden	Qualitative Focus Groups	Stakeholders (Doulas)	Stakeholders: 13
Azerkan *et al.* (139)	2015	Sweden	Qualitative Focus Groups	Migrant women (Danish and Norwegian)	Migrants: 40
Grandahl *et al.* (146)	2015	Sweden	Qualitative Focus Groups	Migrant women (Middle Eastern, African, Asian, and East European)	Migrants: 50
Akhagba (190)	2017	Poland	Qualitative Focus Groups	Migrant women (African)	Migrants: 12
Bianco *et al*. (217)	2017	Italy	Quantitative Cross-sectional	Migrant women (European, African, Asian, and American)	Migrants: 464
Comparetto *et al*. (147)	2017	Italy	Quantitative Cross-sectional	Migrant women (Not specified) Native Women	Total: 69,459 Migrants: 7,339

Gallo *et al.* (110)	2017	Italy	Quantitative Longitudinal	Migrant Women (High income countries and low- and middle-income countries) Native women	Total: 1,610,855 Migrants: 227,061
Gele *et al*. (117)	2017	Norway	Qualitative Focus Groups	Migrant women (Pakistani and Somali)	Migrants: 35
Idehen *et al.* (197)	2017	Finland	Quantitative Cross-sectional	Migrant women (Russian, Somali, and Kurdish)	Migrants: 620
Møen *et al*. (148)	2017	Norway	Quantitative Cross-sectional	Migrant women (Western Europe, Eastern Europe, Asia, Africa, and South America) Native women	Total: 1,321,632 Migrants: 152,800
Addawe *et al*. (191)	2018	Norway	Qualitative Focus Groups and Interviews	Migrant women (Somali)	Migrants: 57
Idehen *et a*l. (149)	2018	Finland	Quantitative Cross-sectional	Migrant women (Russian, Somali, and Kurdish) Native women	Total: 973 Migrants: 537
Møen *et al*. (193)	2018	Norway	Qualitative Focus Groups and Interviews	Healthcare providers (General practitioners, midwives, and gynecologists)	Healthcare providers: 33
Barrera-Castillo *et al*. (215)	2019	Spain	Quantitative Cross-sectional	Migrant women (Not specified) Native women	Total: 8,944 Migrants: 886
Hertzum-Larsen *et al*. (186)	2019	Denmark	Quantitative Longitudinal	Migrant women (Western, and Nonwestern) Native women	Total: 610,907 Migrants: 57,329

Table 5 - *Barriers to cervical cancer screening participation among migrant women (Study 1).*

Factors	Study	Participants' country of origin
Sociodemographic		
Older age groups	(110)	Low- and middle-income countries
	(147)	Not specified
	(148)	Eastern Europe
	(187)	Not Specified
Younger age groups	(110)	High income countries
	(148)	Asia
	(197)	Russia
Being unmarried	(110)	Low- and middle-income countries
	(149)	Somalia
	(186)	Not specified
	(215)	Not specified
Being married/cohabiting	(148)	Asia and South America
	(149)	Russia and Kurdistan
	(139)	Denmark and Norway
Not having children	(197)	Kurdistan
	(186)	Not specified
	(139)	Denmark and Norway
Having children	(139)	Denmark and Norway
Low social support	(139)	Denmark and Norway
	(215)	Not specified
	(190)	Africa
	(194)	Not Specified
Low educational level	(110)	Not specified
	(197)	Kurdistan
Being unemployed	(149)	Russia and Kurdistan
	(197)	Kurdistan
	(186)	Not specified
Being employed	(149)	Somalia
No insurance	(215)	Not specified
	(144)	Not specified
Low socioeconomic status	(117)	Pakistan and Somalia
	(148)	Not specified
	(186)	Not specified
	(144)	Not specified
	(194)	Not Specified
Very high socioeconomic status	(110)	Not specified
Having a smaller household	(149)	Kurdistan
Having a bigger household	(149)	Russia and Somalia
Living in urban areas	(148)	Not specified
	(149)	Russia and Kurdistan

Living in rural areas	(149) (197)	Somalia Somalia

Healthcare system

Not having a female healthcare provider	(117) (148) (191) (216) (146) (193)	Pakistan and Somalia Not specified Somalia Somalia Not specified Not specified
Not having a gynecologist doing the screening test	(193) (145)	Not specified Poland, Slovakia, Romania
Perception of the screening as impersonal	(139)	Denmark and Norway
Long waiting time in healthcare services	(139) (190) (145)	Denmark and Norway Africa Poland, Slovakia, Romania
Lack of time and/or information from healthcare providers	(117) (193)	Not specified
Poor hygiene in healthcare services	(145)	Poland, Slovakia, Romania
Lack of access to healthcare services	(147)	Not specified
Negative relationship with healthcare provider	(117)	Pakistan and Somalia
Unprofessional healthcare providers	(139) (191) (145)	Denmark and Norway Somalia Poland, Slovakia, Romania
Healthcare providers lack of skills to work with migrant women	(193)	Not specified
Having a migrant healthcare provider	(148)	Western and Eastern Europe, Asia
Unaccustomed to preventive healthcare	(146) (194)	Not specified Not Specified
Lack of regular medical checkups	(197) (186) (194)	Russia, Somalia, Kurdistan Not specified Not Specified

Psychological

Fear of the screening test	(190) (216) (146) (193) (145) (194)	Africa Somalia Not specified Not specified Poland, Slovakia, Romania Not Specified
Fear of the test result/fear of cancer	(139) (191) (216) (145) (194)	Denmark. Norway Somalia Somalia Poland, Slovakia, Romania Not Specified

Emotional discomfort about the screening test	(139) (190) (191) (146) (145) (194)	Denmark, Norway Africa Somalia Not specified Poland, Slovakia, Romania Not Specified
Fatalistic views about cancer	(191) (194)	Somalia Not Specified
Lack of trust in healthcare services	(117) (191) (145) (194)	Pakistan, Somalia Somalia Poland, Slovakia, Romania Not Specified
Negative past experiences in healthcare services	(117) (190) (216) (194)	Pakistan and Somalia Africa Somalia Not Specified
Experiencing sexual assault	(139)	Denmark, Norway
Experiencing female genital mutilation	(117) (191)	Somalia Somalia
Other life priorities	(139) (216) (193) (194)	Denmark, Norway Somalia Not specified Not Specified
Lack of time	(191) (216) (145) (194)	Somalia Somalia Poland, Slovakia, Romania Not Specified

Migration-related

Country of birth	(150) (110) (147) (187) (217)	Not specified Africa, Asia Not specified South-Central Asia, Western Europe, South-Eastern Asia, North America Not specified
Short length of stay in the country	(148) (197) (186) (139) (145) (217)	Not specified Russia Not specified Denmark, Norway Poland, Slovakia, Romania Not specified
Long length of stay in the country	(148)	Western Europe, Asia, Africa, South America
Older age at migration	(150)	Not specified
Re-immigration	(186)	Not specified
Attending cervical cancer screening in home country	(190) (145)	Africa Poland, Slovakia, Romania

Knowledge-related

Lack of information about cervical cancer screening	(117) (190) (144) (191) (216) (146) (145) (194)	Pakistan, Somalia Africa Not specified Somalia Somalia Not specified Poland, Slovakia, Romania Not Specified
Lack of information about cervical cancer	(117) (191) (146)	Pakistan, Somalia Somalia Not specified
Low perceived need of screening	(139) (191) (216)	Denmark, Norway Somalia Somalia
Lack of information regarding the healthcare services	(139) (144) (146) (145)	Denmark, Norway Not specified Not specified Poland, Slovakia, Romania

Language-related

Language difficulties	(117) (197) (190) (216) (193) (145) (194)	Pakistan, Somalia Russia Africa Somalia Not specified Poland, Slovakia, Romania Not Specified
Family member/male interpreter during the screening test	(117) (193)	Pakistan, Somalia Not specified
Not having an interpreter during the screening test	(216) (194)	Somalia Not Specified

Cultural

Cultural differences	(139) (145)	Denmark, Norway Poland, Slovakia, Romania
Social stigma about women's health	(146) (194)	Not specified Not Specified
Religious beliefs	(117) (191)	Pakistan and Somalia Somalia

Table 6 - *Facilitators to cervical cancer screening participation among migrant women (Study 1).*

Facilitating factors	Study	Participants' country of origin
Healthcare System		
Healthcare providers' explanations and encouragement	(117) (191) (216) (193) (145)	Pakistan, Somalia Somalia Somalia Not specified Poland, Slovakia, Romania
Having had a recent medical appointment	(147) (197)	Not specified Russia, Somalia, Kurdistan
Good organization and promotion of screening programs	(144) (146) (145)	Not specified Not specified Poland, Slovakia, Romania
Regular invitations to cervical cancer screening	(117) (139) (144) (145)	Pakistan. Somalia Denmark, Norway Not specified Poland, Slovakia, Romania
Knowledge and language-related		
Providing information about cervical cancer and screening	(117) (191) (216) (145)	Pakistan, Somalia Somalia Somalia Poland, Slovakia, Romania
Providing information leaflets/invitation letters in women's mother languages	(117) (110) (191) (146) (145)	Pakistan, Somalia Not specified Somalia Not specified Poland, Slovakia, Romania
Providing experienced interpreters	(117) (216) (193)	Pakistan, Somalia Somalia Not specified
Collaboration with stakeholders to promote CCS	(216) (194)	Somalia Not Specified
Cultural		
Dialogue about cultural issues	(191) (193)	Somalia Not specified

4.2. STUDY 2: Non-attendance in cervical cancer screening among migrant women in Portugal: a cross-sectional study

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Abstract

Objectives: Cervical Cancer has a high mortality rate among women worldwide. Although Cervical cancer screening (CCS) is an effective strategy reducing mortality of the disease, inequalities in accessing screening exist, particularly among migrant women. This study aims to characterize migrant women's participation in CCS and determine factors associated with non-attendance to CCS.

Methods: A cross-sectional study based on a web-based survey targeting adult migrant women living in Portugal was conducted. Prevalence of non-attendance to CCS was examined, and its associations with socioeconomic, migration-related, and health-related factors were determined using adjusted logistic regression models.

Results: A total of 1100 migrant women were included in the study. Prevalence of CCS non-attendance was 24.5%. CCS non-attendance was associated with younger age, being born in Africa or Asia, being single/divorced/widowed, never having had a GP appointment in Portugal and not having regular gynecology appointments. Being born in South and Central America, shorter length of stay in Portugal, having had HPV vaccination, and not having children are associated with CCS attendance.

Conclusion: These findings point out that an important percentage of migrant women do not attend CCS. Strategies to increase participation should be developed, considering the inequalities identified and designed to target the specific needs of migrant women to improve their CCS attendance and increase cervical cancer prevention.

Key words: Uterine Cervical Neoplasms, Early Detection of Cancer, Transients and Migrants, Emigrants and Immigrants, Women's Health, Reproductive Health

Introduction

Cervical cancer has the second highest cancer incidence and mortality among women of reproductive age worldwide (231). This disease originates from a persistent HPV infection (6,11). Its geographic distribution is uneven, with prevalence and mortality being higher in low and middle income countries (LMIC) compared with high income countries (232).

Evidence suggests that cervical cancer screening (CCS) is an effective strategy to reduce mortality from cervical cancer (6,16,89,90). CCS is a program that consists in collecting a sample from the cervix for early identification of HPV infection or abnormal cells and referring women with positive screening tests to secondary care, allowing for a timely and adequate diagnosis and treatment. CCS is performed by a health professional in an opportunistic manner or in organized screening programs (6,16,89). However, inequities in CCS exist, particularly among migrant women. When compared to native women, migrant women have lower CCS uptake (16,151), increasing their risk of developing serious disease and, ultimately, the mortality from cervical cancer.

In the past few decades, the number of international migrants in Europe has been increasing (233,234), and in 2020, 51.6% of the migrant population in the region was female (233). In Portugal, in 2019, the foreign population represented 10.8% of the total population residing in the country, among which approximately 50% were women. Migrants in Portugal are mainly from Brazil, Eastern Europe, Portuguese-speaking African Countries and China (162,235), where incidence and mortality rates for cervical cancer are high (232).

Portugal has a population-based CCS program implemented that covers all the regions of the country, except for Madeira Autonomous region. There are variations in the CCS program specificities across regions in terms of primary screening test (HPV test, liquid based cytology, or conventional cytology), periodicity (every 3 or every 5 years) and target age groups (women aged 25-60, 25-64 or 30-65 years old)(79). Non-attendance in CCS programs is around 22%(78) in Portugal; on the other hand, a study that included that from organized as well as opportunistic screening showed that non-attendance is around 13.2% (85). However, data on migrant women's attendance to CCS is scarce.

Studies have been conducted to identify facilitating factors and barriers faced by migrant women when accessing CCS (96,236–238). Factors that have been consistently associated with a lower CCS attendance among migrant women include lack of knowledge about CCS, difficulties in accessing healthcare services, legal issues, and

language barriers. However, other factors such as education, marital status, socioeconomic conditions, or cultural and religious background have not been consensual in the literature (96,236). Further research is important to clarify how these factors influence migrant women's CCS attendance.

This study aims to characterize migrant women CCS non-attendance in Portugal and identify its associated factors.

Methods

This cross-sectional study consisted of a web-based survey conducted between February and July of 2021.

Study population and recruitment

The inclusion criteria for the study were being a migrant woman, being >20 years old and residing in Portugal. The exclusion criteria were not residing in Portugal at the time of the survey, being younger than 20 years of age, did not provide information on the country of birth, age, or cervical cancer screening participation.

For the purpose of sample size calculation, it was considered the total number of migrants residing in Portugal in 2020 with legal resident status, which according to the data available was 662,095 (239). We added an estimate of 10% of migrants in irregular status (i.e., undocumented), which is a conservative value to ensure the robustness of the sample size given that there is no official data available on the size of this subgroup in the country, and our study population included both documented and undocumented migrants. Sample size was calculated considering the existence of 50% of the characteristics under study (i.e., the worst-case scenario, as the prevalence of the characteristics to be studied is not known), at a 95% confidence level and with a margin error rate of 3%. It was estimated a minimum of 1066 migrants to be surveyed.

Migrant women were recruited exclusively through online campaigns through Facebook groups and official pages of associations that collaborate with migrant communities. Administrators of the selected groups and pages were contacted for permission to disseminate the link of the survey in their online communities.

Data collection

The online survey was available through Google Forms platform in Portuguese and in English.

Visitors interested in participating accessed the survey by clicking in the link, which lead them to an informative page in Google Forms, providing information about the objective of the study, the anonymity and confidentiality of the data collected, and contacts of the researchers responsible for the study. Each visitor had to fill in an informed consent form to access the questionnaire. The survey was anonymous and voluntary. No mandatory answers were required, and participants could skip questions or leave the webpage without completing the survey. No incentives were given to the participants for participation in the study.

Instrument and variables

The questionnaire was developed based on the results of a previous literature review (236) and can be found in **Table 7**. A pretest was conducted with a sample of ten migrant women – five Portuguese speaking women and five English speaking women – to ensure the questions were clear and the survey platform was working correctly.

Participants were asked about if they ever participated in CCS (with 'yes' or 'no' response options). In case they did, participants were also asked when their last CCS was performed (<1 year, 1-5 years, >5 years ago).

Socioeconomic variables included age (≤34, 35-54, or ≥55 years), continent of birth (Europe, Africa, Asia, North America or Oceania, South or Central America), university degree holder (yes or no), employment status (employed or unemployed/retired/housewife), marital status (married/living together or single/divorced/widow), perceived difficulty in paying rent/bills (yes or no), perceived difficulty in paying food (yes or no), and religion (Religious or Atheist/Agnostic).

Regarding migration-related variables, participants were asked about their length of stay in Portugal (≤5 years or >5 years), if they had Portuguese nationality (yes or no), current migrant situation (Documented or undocumented), and their ability to speak Portuguese ("yes, without difficulty", "yes, with some difficulties" or "I don't understand Portuguese"). Participants were also asked about if they had family history of cervical disease (yes or no), had been vaccinated for HPV (yes or no), had children (yes or no), had a general practitioner (GP) appointment in Portugal (yes or no), when was their last gynecology appointment in Portugal or other country (<5 years ago, ≥5 years ago (includes never)), if they had a family doctor in Portugal (yes or no), and if they ever felt discrimination in healthcare services (yes or no).

Statistical analysis

Data collected was stored in Google Forms platform server and extracted to an excel file to be analyzed. Statistical analysis was performed using IBM SPSS – 27 version IBM SPSS Statistics for Windows (Armonk, NY: IBM Corp.).

A descriptive analysis of the study variables was conducted. Two multivariate logistic regression models were used to determine the associations between CCS non-attendance among migrant women and independent variables. For logistic regression models, the dependent variable was classified in two categories: “CCS Attendance” if the last screening was ≤5 years ago and “CCS Non-attendance” if the last screening was >5 years (as this is the upper limit of the recommended screening intervals (77)) or if participants were never screened.

Model 1, adjusted for age and continent of birth, was elaborated including all the variables in study. This adjustment was used as these two variables are consistently associated with CCS participation (96,236,237). Model 2 included variables from model 1, using a threshold of $p<0.200$, and was optimized using backward elimination selection (LR), until only the significant variables ($p<0.05$) remained in the model. Odds Ratio (OR) and 95% confidence intervals (CI95%) were determined.

Ethics approval

This study was performed in line with the principles of the Declaration of Helsinki and was approved by The Ethics Research Committee of NMS|FCM-UNL (nr. 03/2020/CEFCM).

Results

Sample characteristics

A total of 1157 women accessed the link, yet 57 did not fulfil the inclusion criteria for the study (were not migrants, were not living in Portugal at the time of the survey or did not specify their country of birth) and were excluded from the analysis. Therefore, this study included a sample of 1100 migrant women.

Table 8 shows the characteristics of the participants. Half the participants were between 35 and 54 years old (50.2%), and the majority were from South and Central America (40.8%), mostly Brazil, or Europe (39.5%). Around 73% of the participants reported having a university degree, 51% were employed, and 68.9% were married or living with a partner. Almost one-third of the sample (31.1%) reported to have difficulties paying rent or bills and 15.6% reported difficulties in buying food. Concerning religion,

67.2% reported to be religious. Finally, more than half of the participants (56.9%) had, at least, one child.

Concerning migration-related characteristics, most participants were living in Portugal for 5 years or less (69.6%), and 19% had Portuguese nationality. Regarding current migration situation, 12.3% of all participants were undocumented. About 11% of women did not understand Portuguese language, while the majority (56.9%) were able to understand the language without difficulties.

Family history of cervical disease was reported by 20.3% of participants, and most were not vaccinated against HPV (85.2%). Concerning access to healthcare services, around 77% of the sample had at least one GP appointment in Portugal, and 73.3% had their last gynecological appointment (in Portugal or another country) less than 5 years ago. Additionally, 54.0% of the total sample reported to have a family doctor in Portugal, and 33.8% reported to have felt discriminated when in healthcare services in Portugal.

Characterization of CCS non-attendance among migrant women

A total of 24,5% women report to be CCS non-attenders in the sample. **Figure 4** shows the distribution of reported CCS attendance by continent of birth.

The highest percentage CCS non-attendance was higher among participants born in Africa and Asia (29,5% and 32,3%, respectively). The lowest percentage of CCS non-attendance was observed among participants from South or Central America (16,1%) and North America or Oceania (17,8%).

Factors associated with CCS non-attendance among migrant women

Table 9 shows results of the multivariate logistic regression models with the associations between CCS non-attendance and its associated factors.

Results of Model 1 suggest that non-attendance to CCS was more likely among women aged ≥55 years, Africans and Asians, single/divorced/widowed women, those with no university degree, women reporting difficulties paying rent/bills or difficulties buying food. Undocumented women were also more likely to report CCS non-attendance. Women who never had a GP appointment in Portugal, those whose last gynecology appointment was ≥5 years ago, those without a family doctor, and those who reported experience of discrimination in healthcare were also more likely to non-attend CCS. A lower CCS non-attendance was found among women from North America or Oceania and from South or Central America, and among women who have HPV vaccine.

Model 2 provided the set of the factors with the strongest association with CCS non-attendance, which included age, continent of birth, marital status, having children, HPV vaccine, GP appointment in Portugal, last gynecology appointment. Women aged ≤34 years have a higher chance to CCS non-attendance, as well as African and Asian women compared to Europeans. Single/divorced/widowed women are 2.746 times more likely to be non-attenders compared to married women. Finally, CCS non-attendance in higher among those who never had a GP appointment in Portugal and among women whose last gynecology appointment was ≥5 years ago. On the other hand, lower CCS non-attendance was observed among South and Central American women, women who had children, those with a length of stay in Portugal of ≤5 years, and among women who have had HPV vaccine.

Discussion

Overall, it was observed a prevalence of non-attendance of 24,5% among this sample of migrant women. Younger age, being born in Africa or Asia, being single/divorced/widowed, never having had a GP appointment in Portugal and not having regular gynecology appointments are the factors with a higher association with non-attendance to CCS, whereas, being born in South and Central America, shorter length of stay in Portugal (≤5 years), having had HPV vaccination, and not having children have a lower association with CCS non-attendance. The strongest associations were found between CCS non-attendance and age, continent of birth, marital status, HPV vaccination, and having had a medical appointment.

CCS non-attendance among migrant women in this study is higher than CCS non-attendance of the general population in Portugal in 2014 (13.2%) (85); however it is lower than the proportions found in recent European studies with migrant populations (109,186,215). These discrepancies may be explained by the educational level of the sample (73.2% of this study sample has a university degree whereas in other studies the percentage may be lower), by different sociocultural norms of the target migrant populations, and by the definition of CCS non-attendance, which in this study was classified as having the last screening >5 years but in other studies a different time interval may be used. Furthermore, 40.8% of our sample come from South and Central America, mainly from Brazil, and evidence suggests that these women are particularly active in seeking CCS (186,236). This study's results show that African and Asian women are more likely to be CCS non-attenders, whereas women from South and Central America are more likely to attend CCS.

Scoping reviews about participation in screening among migrant women suggests that sociodemographic characteristics and migration related factors can influence cervical cancer screening non-attendance (96,236).

Numerous studies mention conflicting evidence about the influence of age, marital status, and parity with CCS non-attendance (96,236). In this study, a non-linear relationship of age and screening attendance was found, which may help explain why women in extreme age groups (younger and older) had higher participation and other studies a lower participation in CCS. Being married seems to be a strong determinant of CCS attendance in this study. The role of the husband may be influenced by the different cultural norms: in some countries having the support of the husband or partner may be an incentive to CCS participation in certain cultural backgrounds, whereas in others the husband may influence negatively the participation (139,240). Parity is negatively associated with screening attendance, possibly because women with children tend to prioritizing children's care, and have other life priorities that stops them to attend preventive measures, as argued by other authors (139).

Lower education, lower income and unemployment have been consistently associated with lower CCS participation (96,236). In this study, no strong associations with education or employment were found, possibly because most participants in this study may have a higher socioeconomic status, as most of the women have a university degree, are employed, and do not report difficulties in paying rent or buying food.

Fluency in Portuguese is not associated with CCS non-attendance in this study, unlike what is described previously (96,236); yet, a shorter length of stay was associated with lower CCS non-attendance. This was also observed in a Norwegian study, in which most women migrated from South America or Europe (148). While the continent of origin may explain this trend, as women from America and Europe seem to attend more to CCS, other variables not included in this study may account for this lower non-attendance, such as women being screened in their home countries. Further studies are needed to better understand the reasons why migrant women who moved recently have a higher participation in CCS.

In this study, the underuse of healthcare services, namely GP appointments or gynecological appointments, is associated with CCS non-attendance. Access to healthcare services is a major issue among migrants (154), which therefore affects CCS participation (96,236). In Portugal, to participate in the population-based CCS program, women must have an appointment with a GP (77), but they can also participate in opportunistic screening, if followed by a gynecologist or if they access private healthcare

services. Thus, the underuse of GP and gynecological appointments are associated with lower CCS non-attendance; however, women may have an appointment with their GP for other reasons and are screened opportunistically.

Finally, even though most women in this study have not been vaccinated (as HPV vaccination has been recently used as a primary prevention strategy for cervical cancer, (241), results suggest that vaccinated women are more likely to attend CCS. It is hypothesized that vaccinated women may be more conscious about Cervical Cancer and may also have a better economic condition since HPV vaccine may be expensive in certain situations.

A main strength of this study is its large and diverse sample, with a wide range of different countries of birth and different sociocultural backgrounds. Also, using adjusted statistical analysis allow a robust association of the factors associated with CCS non-attendance. Also, the use of an online survey has several advantages, including more accuracy of the data as the answers of the participants get directly into the system which eliminates human error on manual data insertion, and participants tend to be more honest answering an online questionnaire. Also, participants have the flexibility to take the survey according to their time availability which may increase participation.

Some limitations may be considered. This sample is not representative of the Portuguese migrant population. Also, this is a cross-sectional study which implies that it is not possible to make causal inferences. Additionally, by providing the survey only in Portuguese and English, the team was unable to reach migrant women residing in Portugal who are unable to speak neither of the languages. Women had to have access to the internet to fill in the questionnaire, which may have led to sample bias as only women with access to the internet could participate. The high percentage of women with university degree may be the result of selection bias. Finally, the small sample size in some origin groups would affect the precision of the model and could jeopardize drawing robust conclusions. Therefore, the model preformed included all women, with the continent of origin being one of the independent variables, although this option limits the identification of CCS attendance determinants that may differ by cultural background.

Conclusion

The results of this study show that migrant women have a high CCS non-attendance, especially when compared with studies on CCS non-attendance on Portuguese women. It is necessary to develop strategies to increase participation considering the inequalities identified and the findings suggest that these strategies

should consider the continent of birth, which is related to the women's cultural background, beliefs, and previous experiences, as well as marital status and parity of women, as they seem to be the strongest predictors of CCS non-attendance. These findings may help to develop interventions targeting migrant women to improve their CCS attendance and increase cervical cancer prevention.

Table 7 - *Survey on cervical cancer screening among migrant women (Study 2).*

Dear Madam,

We would like to invite you to participate in a study on cervical cancer screening (also called Pap smear or cytology) among migrant women living in Portugal, developed by the National School of Public Health, Universidade NOVA de Lisboa (ENSP - UNL).

If you are over 18, we'd like to ask you to complete a short online survey that will take no more than 5 minutes.

The information collected with this survey is anonymous and confidential - we will not ask you for your name or contact details. There is no risk in participating in this questionnaire and you can withdraw at any time. Data collected will be used only for academic works and scientific publications, at Universidade NOVA de Lisboa.

If you have any questions or need additional information, you can contact us by e-mail at the following contacts: Patrícia Marques - psm.marques@ensp.unl.pt and Mariana Geraldes - mf.geraldes@ensp.unl.pt

Your opinion is very important! Your participation will contribute to improving cervical cancer screening and respond to the needs of migrant women living in Portugal.

Do you accept to participate in this study?

__ I accept to participate in this study
__ I do not accept to participate in this study

PART 1 – Inclusion criteria for the study

In this first part, we will ask you some questions about yourself. All responses are anonymous, meaning no one will be able to identify you.

Q1 – What is your date of birth? __/__/____	**Q2 –** What is your country of birth? _____
Q3 – How long have you been living in Portugal? __ Less than a year __ Between 1 and 5 years __ Between 6 and 10 years __ More than 10 years __ I do not live in Portugal **(Jump to the end)**	

PARTE 2 – Cervical cancer Screening

In this part, we are going to ask you about cervical cancer screening.
Screening for cervical cancer, also called Pap smear, is a medical test to examine cells in the cervix (lower part of the uterus) to prevent the onset of cervical cancer. It is a painless examination, usually done by a doctor, which consists of the collection of cells from the cervix that will then be analyzed to check for the presence of cancer cells.

Q4 – Before participating in this study, have you ever heard of cervical cancer screening (also called Pap smear)? __ Yes __ No __I don't know	**Q5-** Have you ever participated in cervical cancer screening (had a Pap smear)? __ Yes __ No **(Jump to Q11)** __I don't know **(Jump to Q11)**
Q6 – When was the last time you had the cervical cancer screening (Pap smear)? __ I did in the last year __ I did it between 1 and 5 years ago __ I did it over 5 years ago __ I don't know	**Q7** – In which country did you have your last cervical cancer screening (Pap smear)? __ In Portugal __ In my country of birth __ In another country __ I don't know

Q8 – In which healthcare service did you have your last cervical cancer screening (Pap smear)? __ Healthcare center __ Hospital __ Private clinic or hospital __ I don't know __ Other (Which one?_____)	**Q9** – After your last cervical cancer screening (Pap smear), did your doctor Schedule another medical appointment because of the result of the test? __ Yes __ No __I don't know
Q10 – When you had your last cervical cancer screening (Pap smear), were you diagnosed with a cervix disease? __ Yes __ No __I don't know	**Q11** – Has anyone in your family or group of friends been diagnosed with cervical cancer? __ Yes __ No __I don't know
Q12 – Have you been vaccinated against HPV (Human Papilloma Virus)? __ Yes __ No __I don't know	
PART 3 – Migration characteristics **In this section, we will ask you some questions regarding migration to Portugal, ensuring the confidentiality of your answers.**	
Q13 – How old were you when you moved to Portugal? __ I was born in Portugal __ Before 18 years of age __ At or after 18 years of age __ I don't know	**Q14** – What is your nationality? __ Portuguese __ Foreign nationality __ Dual Nationality (Portuguese and other) __ Dual Nationality (Other)
Q15 – What is your current migration situation? (Select "Not applicable" if you are Portuguese) __ Documented __ Undocumented __ In the process of regularization __ Refugee __ Other (Which one?_____) __ Not applicable	**Q16** – What is your native language? __ Portuguese __ Other (Which one? _____)
Q17 – Can you speak and understand Portuguese? __ Yes, without difficulty __ Yes, with some difficulties __ I don't understand Portuguese	**Q18** – In which country was your mother born? __ Portugal __ Other (Which one? _____) __ I do not know
Q19 – In which country was your father born? __ Portugal __ Other (Which one? _____) __ I do not know	
PART 4 – Sociodemographic characteristics **In this section, we have some questions about your social context - your education, profession, among others.**	

Q20 – What region of Portugal do you live in? __ Norte __ Center __ Lisbon and Tagus Valey __ Alentejo __ Algarve __ Azores __ Madeira	**Q21 –** How many years of school have you completed? __ I didn't go to school __ Between 1 to 4 years (1st Cycle) __ Between 5 to 6 years (2nd Cycle) __ Between 7 to 9 years (3rd Cycle) __ Between 10 and 12 years old (Secondary education) __ Higher education __ Other (Which one? _____)
Q22 – What is your professional situation? __ Worker or student worker __ Unpaid domestic worker or informal caregiver __ Retired or retired due to disability __ Unemployed __ Student __ Other (Which one? _____)	**Q23 –** What is your marital status? __ Single __ Married / In a de facto union __ Divorced / Separated __ Widow
Q24 – Do you have difficulty paying rent or gas, water or electricity bills? __ Never __ Sometimes __ Always	**Q25 –** Do you have difficulty buying food? __ Never __ Sometimes __ Always
Q26 – What is your religion? _____ __ Prefer not to say	
<u>PART 5 – Access to healthcare services</u> **Finally, we wanted to ask you some questions about your experiences in the healthcare services.**	
Q27 – When was the last time you went to a doctor's appointment at a healthcare center or family health unit in Portugal? __ Less than 12 months ago __ At or over 12 months ago __ Never	**Q28** – How long ago was your last gynecology or family planning appointment in Portugal or in your country of origin? __ less than a year ago __ Between 1 and 4 years __ 5 years or more __ Never been
Q29 – Do you have a family doctor? __ Yes __ No __I don't know	**Q30** – Have you ever felt discriminated against in healthcare services in Portugal? __ Yes, in the last 12 months __ Yes, over 12 months ago __ No
Your survey is over. **Thank you for your participation!**	

Table 8 - *Characteristics of the study participants (Study 2).*

		TOTAL (n=1100)	
Sociodemographic variables		**N**	**%**
Age	≤34 years	326	30.7
	35-54 years	534	50.2
	≥55 years	203	19.1
Continent of Birth	Europe	435	39.5
	Africa	78	7.1
	Asia	65	5.9
	North America or Oceania	73	6.6
	South or Central America	449	40.9
University degree	Yes	803	73.2
	No	294	26.8
Employment status	Employed	561	51.3
	Unemployed/ Retired/ Housewife	532	48.7
Marital status	Married/ Living together	756	68.9
	Single/ Divorced/ Widow	341	31.1
Difficulties in paying rent/bills	Yes	340	31.1
	No	755	68.9
Difficulties in paying food	Yes	171	15.6
	No	924	84.4
Religion	Religious	669	67.2
	Atheist/Agnostic	326	32.8
Having Children	Yes	624	56.9
	No	473	43.1
Migration-related variables			
Length of stay in Portugal	≤5 years	766	69.6
	>5 years	334	30.4
Portuguese nationality	Yes	209	19.0
	No	891	81.0
Current migrant situation	Documented	959	87.7
	Undocumented	134	12.3
Ability to understand Portuguese	Yes, without difficulty	622	56.9
	Yes, with some difficulties	352	32.2
	Unable to understand Portuguese	119	10.9
Health-related variables			
Having family history of cervical disease	Yes	223	20.3
	No	876	79.7
Having had the HPV vaccine	Yes	163	14.8
	No	937	85.2
Having ever had a GP appointment in Portugal	Yes	849	77.2
	No	251	22.8
Last Gynecology appointment	<5 years ago	806	73.3
	≥5 years ago	294	26.7
Having family doctor in Portugal	Yes	593	54.0
	No	505	46.0
Having ever felt discriminated in healthcare services	Yes	369	33.8
	No	724	66.2

Table 9 - *Logistic regression models of CCS non-attendance among migrant women and independent variables (Study 2).*

		Model 1		**Model 2**	
		OR (CI 95%)	P	OR (CI 95%)	P
Sociodemographic variables					
Age	≤34 years	1.368 (0.975-1.920)	0.070	1.684 (1.058-2.568)	0.027
	35-54 years (reference)	1		1	
	≥55 years	1.907 (1.302-2.795)	<0.001	1.023 (0.644-1.625)	0.923
Continent of Birth	Europe (*Reference*)	1		1	
	Africa	1.754 (1.040-2.958)	0.035	2.623 (1.393-4.939)	0.003
	Asia	2.195 (1.259-3.829)	0.006	2.286 (1.148-4.554)	0.019
	North America and Oceania	0.472 (0.238-0.935)	0.031	0.641 (0.287-1.434)	0.279
	South and Central America	0.529 (0.373-0.749)	<0.001	0.624 (0.407-0.956)	0.030
University degree	Yes (*Reference*)	1		-	
	No	1.483 (1.073-2.050)	0.017		
Employment status	Employed (*Reference*)	1		-	
	Unemployed/ Retired/ housewife	1,276 (0.930-1.751)	0.131		
Marital status	Married/ Living together (*Reference*)	1		1	
	Single/ Divorced/ Widow	1.872 (1.375-2.547)	<0.001	2.746 (1.869-4.034)	<0.001
Difficulties in paying rent/bills	Yes	1.740 (1.255-2.412)	<0.001	-	
	No (*Reference*)	1			
Difficulties in paying food	Yes	2.244 (1.531-3.289)	<0.001	-	
	No (*Reference*)	1			
Religion	Religious (*Reference*)	1		-	
	Atheist/Agnostic	0.945 (0.66-1.354)	0.759		
Having Children	Yes (*Reference*)	1		1	
	No	0.763 (0.553-1.052)	0.098	0.643 (0.434-0.952)	0.028
Migration related variables					
Length of stay in Portugal	≤5 years	0.759 (0.553-1.042)	0.088	0.632 (0.423-956)	0.025
	>5 years (*Reference*)	1		1	
	Yes (reference)	1		NA	

Portuguese nationality	No	1.246 (0.822-1.888)	0.300		
Current migrant situation	Documented (*Reference*)	1		-	
	Undocumented	1.755 (1.132-2.722)	0.012		
Ability to understand Portuguese	Yes, without difficulty (*Reference*)	1		-	
	Yes, with some difficulties	0.990 (0.639-1.533)	0.963		
	Unable to understand Portuguese	1.251 (0.725-2.160)	0.421		
Health related variables					
Family history of cervical Disease	Yes	0.844 (0.581-1.227)	0.374	-	
	No (*Reference*)	1			
HPV vaccine	Yes	0.519 (0.320-0.842)	0.008	0.490 (0.278-0.864)	0.014
	No (*Reference*)	1		1	
Ever had a GP appointment in Portugal	Yes (reference)	1		1	
	No	1.468 (1.046-2.060)	0.026	1.557 (1.020-1.020)	0.040
Last Gynecology appointment	<5 years ago (*Reference*)	1		1	
	≥5 years ago	10.423 (7.332-14.817)	<0.001	11.529 (7.903-16.820)	<0.001
Family doctor	Yes (*Reference*)	1		-	
	No	1.492 (1.109-2.007)	0.008		
Discrimination in healthcare services	Yes	1.380 (1.011-1.885)	0.043	-	
	No (*Reference*)	1			

Notes: Model 1 shows the results of all study variables adjusted for age and continent of birth; Model 2 shows the statistically significant variables resulting from the logistic regression model (Method – backward selection: LR) that included variables of model 1 with p<0.200

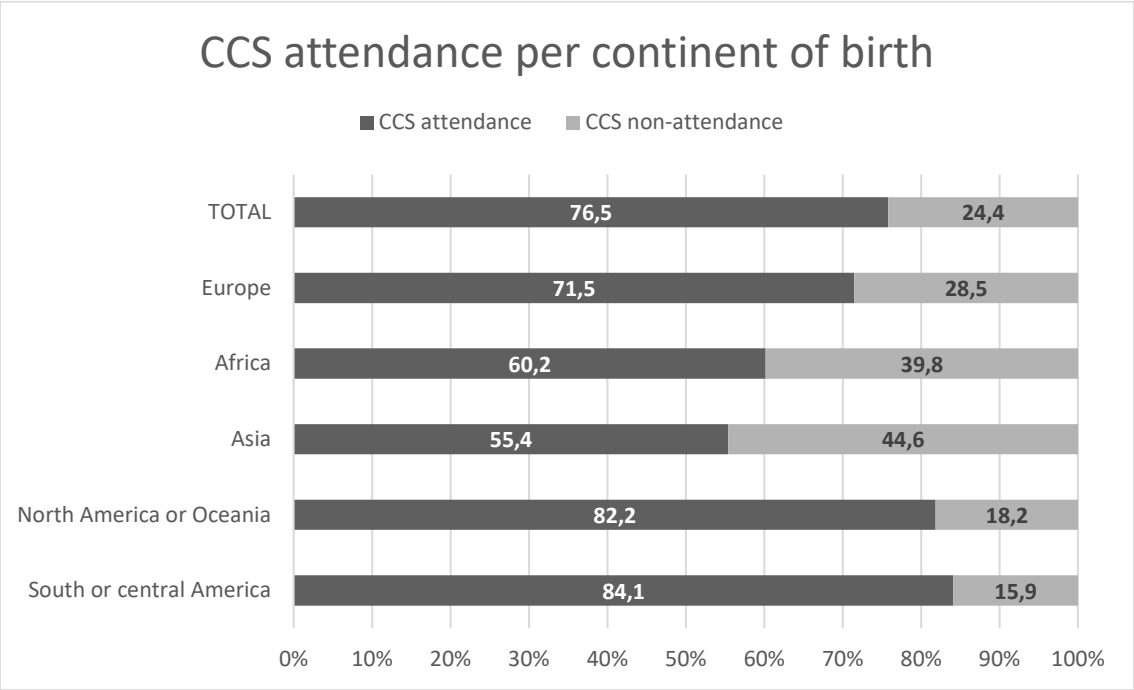

Figure 4 - *Distribution of reported CCS attendance among migrant women by continent of birth (Study 2).*

4.3. STUDY 3: What is the role of attitudinal barriers on cervical cancer screening non-attendance? Findings from a cross-sectional study with migrant women in Portugal

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Abstract

Background: Cervical cancer is a common disease which can be effectively and timely detected by cervical cancer screening. However, access to cervical cancer screening is unequal, and it is known that migrant women have a lower attendance to cervical cancer screening. These inequalities are associated with several factors, including attitudes and beliefs of the women regarding screening practices, which prevents them from participating. This study aims to explore the attitudinal barriers to cervical cancer screening among migrant women in Portugal.

Methods: A web-based cross-sectional survey was conducted with 1100 migrant women residing in Portugal. Women were recruited through social media platforms. The survey included items on socioeconomic characteristics, cervical cancer screening history and an 11-item attitudinal questionnaire to assess attitudinal barriers. Logistic regression models were used for statistical analysis.

Results: The attitudinal barriers to CCS most often reported by participants are fear of the test result (25.3%), worry about seeing a male health professional (23.8%), perceiving the test as painful (23.1%), embarrassment (18.5%), difficulties scheduling the test (14.3%), and having a negative experience in screening (12.4%). Low perceived need in absence of symptoms and lack of motivation to be screened were reported by less than 5% of the women. However, the results suggest that most of the attitudinal barriers with higher agreement percentage have no association with cervical cancer screening attendance. Among all the attitudinal barriers, low perceived need of screening and lack of motivation were associated with CCS non-attendance.

Conclusions: Based on the findings, out of all the factors analyzed, low perceived need of screening and lack of motivation are the only factors associated with non-attendance among migrants in Portugal. Promoting health literacy and empowering women with

knowledge about benefits of screening may help overcoming these barriers. Therefore, this study provides a foundation for stakeholders on which areas should be prioritized when developing strategies aiming to reduced cervical cancer screening non-attendance among migrant women.

Keywords: early detection of cancer; emigrants and immigrants; reproductive health; uterine cervical neoplasms; women's health

Introduction

Cervical cancer is a common and preventable disease. HPV infection of the cervix may originate pre-cancerous lesions that, if left untreated, can develop into cancer (3,6,11). Cervical cancer screening (CCS) is a health intervention that helps to identify HPV infection and treat pre-cancerous lesions to avoid cervical cancer development (16,90). Evidence suggests that population-based CCS programs are effective to reduce mortality from cervical cancer (16,90,192). However, even in countries with organized cancer screening inequities persist, namely low screening participation of migrant women (16,192,236) In Portugal, CCS is performed opportunistically and within the population-based program. This CCS program is available to all women aged between 25-65 years who are registered in a healthcare unit. CCS is performed every 3 or 5 years (depending on the geographic location of the healthcare unit), usually by a general practitioner (GP) (77,79).

Portugal has been traditionally a host country for migrants from Portuguese-speaking African Countries and Brazil, and more recently from Eastern Europe, China, and South Asia (235,242). In these countries, the prevalence of high-risk HPV infection, and the incidence and mortality of cervical cancer are high (232). Results from the Portuguese National Health Survey (2014 NHS) suggest a higher non-attendance of CCS among women with a foreign country of birth (85).

Factors associated with CCS non-attendance among migrant women have been explored. Several studies have consistently reporting lack of knowledge about screening, language difficulties, migration-related factors and difficulties in accessing healthcare services as barriers to CCS (96,109,187,192,207,236,243). Other factors such as attitudes, beliefs and perspectives on CCS, namely perceived risk of cervical cancer, negative past experiences, having other life priorities or having to see a male doctor, may have additional effects on CCS attendance. Nevertheless, these factors have been explored mainly by qualitative studies (117,190,191,193,240,244). To develop effective strategies to increase CCS participation it is key to quantify the most prevalent barriers

to CCS and measure their association with non-attendance. To the author's knowledge, there is only one study aiming to explore the association between attitudinal barriers and CCS non-attendance. This study was developed by Marlow at al. and consisted of a survey conducted in England with women of different ethnic groups (i.e. from Indian, Pakistani, Bangladeshi, Caribbean, African and White British backgrounds), that explored sociodemographic and attitudinal correlates of CCS non-attendance (207).

Summarily, this study showed that a lower CCS attendance was associated with a low perceived risk of cervical cancer and the belief that screening is unnecessary in the absence of symptoms, with significant ethnic differences regarding most of the attitudinal barriers assessed. Other quantitative studies are needed to further understand the role of attitudinal barriers on CCS non-attendance in other countries where evidence is scarce, as Portugal, to develop strategies targeting these women and their specific needs.

This study aimed to assess attitudinal barriers to CCS and examine its association with CCS non-attendance among migrant women in Portugal.

Methods

Study design and sample

This cross-sectional study consisted of a web-based survey. The inclusion criteria were being a woman, migrant, currently living in Portugal and aged 20 years or older. For this study, a migrant is defined as "any person who is moving or has moved across an international border or within a State away from his/her country of origin" (155).

Participants' recruitment was made through online campaigns in social media platforms, including informal online migrant groups and official pages of organizations that support migrant communities in Portugal. After asking permission to the moderators of the social media pages and groups, a link to the survey was disseminated. Visitors interested in taking part of the survey could access the survey page by clicking in the link provided.

Data collection

The survey was conducted between February and July of 2021 using Google Forms. A Portuguese and an English version of the survey was provided. A pre-test of the survey was conducted with 10 voluntary participants. This ensured that the survey platform was working properly, and the questions were clear. When accessing the survey's link, participants were directed to an informative page with the description of the

study, the contacts of the research team and ethical considerations including anonymity and confidentiality. Participation was voluntary, and participants were free to skip questions or leave the survey at any moment. Only after participants filled the informed consent form, they were able to access the survey questions. No incentives were offered to the participants in exchange to their participation in the study.

The survey included items on participants socioeconomic characteristics (age, continent of birth, education, employment status, marital status, having children), migration-related characteristics (current migration situation, length of stay in Portugal), healthcare-related characteristics (lifetime GP appointment in Portugal, last gynecological appointment, having a family doctor in Portugal, HPV vaccine) , as well as items on CCS history and attitudinal barriers experienced by the participants.

To explore CCS history of the participants, women were asked “Before participating in this study, have you ever heard of cervical cancer screening (Pap smear)?” and “Have you ever participated in cervical cancer screening (Pap smear)?”, with Yes/No response options. Women who reported to have been screened before were asked “When was the last time you had cervical cancer screening (Pap smear)?” with four options of answer: “I did it last year”, “I did it between 1 and 5 years ago”, “I did it over 5 years ago”, and “I don’t know”. A new variable “Having ever been screened” was created with the response options “No”, “Yes, ≤5 years ago” and “Yes, >5 years ago”.

Attitudinal barriers were explored using 11 attitudinal statements, based on Marlow *et al*. (2015) work (207). These attitudinal statements were related to four themes: perceived need for screening, fear of cancer, concerns about the test and practical considerations. Women were asked to position themselves in relation to each statement using a 5-point Likert scale (strongly agree to strongly disagree).

Data Analysis

Data collected was stored in Google Forms platform and transferred to an Excel file. Statistical analysis was conducted with IBM SPSS – 27 version IBM SPSS Statistics for Windows (Armonk, NY: IBM Corp.).

Women were excluded from data analysis if they did not provide information on their continent of birth or CCS participation. Women who did not participate in CCS in their lifetime or whose last CCS was over 5 years ago were considered non-attenders, as 5 years is the recommended upper limit of screening intervals in Portugal (77).

A descriptive analysis of the sample characteristics and the attitudinal barriers to CCS was conducted. Bivariable and multivariable logistic regression models were performed to explore the associations between the attitudinal barriers and CCS non-

attendance. Further analyses using Chi square tests were performed to explore differences in endorsing attitudinal statements associated with CCS non-attendance, according to sociodemographic, migration-related, and healthcare-related characteristics. Exact Fisher's test was used when appropriate.

Results

Characteristics of the participants

A total of 1157 migrant women completed the survey; 57 were excluded for missing information on country of birth or CCS attendance. Hence, the study sample included n=1100 migrant women. The characteristics of the participants are presented in **Table 10**. In brief, most women were ≤45 years old (61%). About 41% were originated from Central and South America (mainly Brazil) and 39.5% from Europe, with a smaller percentage of women from Africa (7.1%), Asia (5.9%) and North America and Oceania (6.6%). It was observed that 73.2% had a university degree and 24.7% high school education, 48.7% were non-employed, 68.9% were married or were living with a partner, and 56.9% had children. Out of all the participants, 12.3% were undocumented and 19.5% were living in Portugal for >10 years.

Most women stated having already had at least one GP appointment in Portugal (77.2%), even though only 54% had a family doctor attributed. Almost three quarters had their last gynecology appointment less than 5 years ago, while 24.4% had their last screening over 5 years ago or were never screened. Nearly all women have heard about CCS (95.7%) and 14.8% were vaccinated against HPV.

Attitudinal barriers to CCS

Table 11 presents the 11 attitudinal barriers organized in four categories: "Perceived need for screening", "Fear of Cancer", "Concerns about the test" and "Practical considerations.

Out of the 11 attitude items analyzed in the study, the most commonly endorsed were those under the categories "Fear of Cancer" and "Concerns about the test": women agreed the most with the item "I'm scared of what the test might find" (25.3% of agreement), followed by "Smear tests are painful" and "I am worried I have to see a male doctor or nurse", endorsed by over 23% respectively. The category "Perceived need for screening" was the one with the lowest overall agreement percentage (1.8-6.6%).

Attitudinal barriers associated with CCS non-attendance

The results of the crude and adjusted logistic regression analyses of the attitudinal barriers associated with CCS non-attendance are detailed in **Table 11**.

In the Crude Model, CCS non-attendance was more likely among women who agreed with the following attitudinal item: “I’m not sexually active so I don’t need to go for a smear test” (OR: 6.315; CI95%: 2.645-15.076), “I do not need a smear test if I do not have any symptoms” (OR: 4.531; CI95%: 1.802-11.391), “I don’t want to know if I have cancer” (OR: 3.674; CI95%: 1.654-8.160), and “I intend to go for a smear test but I don’t get around to it” (OR: 2.572; CI95%: 1.344-4.925). On the other hand, CSS non-attendance was less likely among those agreeing with “Smear tests are painful” (OR: 0.679; CI95%: 0.475-0.970), and “I’ve had a bad experience of a smear test in the past” (OR: 0.506; CI95%: 0.304-0.841).

In the Adjusted Model, non-attendance to CCS remained more likely among women agreeing with: “I’m not sexually active so I don’t need to go for a smear test” (OR: 2.919; CI95%: 1.024-8.316), “I do not need a smear test if I do not have any symptoms” (OR: 5.521; CI95%: 1.731-17.613), “I don’t want to know if I have cancer” (OR: 2.999; CI95%: 1.135-7.920), and “I intend to go for a smear test but I don’t get around to it” (OR: 2.943; CI95%: 1.327-6.527). Non-attendance to CCS is lower among women who agree with “I’ve had a bad experience of a smear test in the past” (OR: 0,391; CI95%: 0.214-0.715), mainly because it is necessary that women went through screening to agree with this statement.

Further analyses explored the sociodemographic, migration-related, and healthcare-related characteristics associated with the statistically significant attitudinal barriers associated with CCS non-attendance (**Table 12**). The percentage of agreement with the attitudinal item “I do not need a smear test if I do not have any symptoms” did not significantly differ across any sociodemographic, migration and healthcare groups. Endorsement with “I’m not sexually active so I don’t need to go for a smear test” was found significantly associated with being Asian (6.3%) and African (5.3%), non-employed (3.3%), and never having had a gynecology appointment or the last appointment was 5 or more years ago (4.9%). The statement “I don’t want to know if I have cancer” was most frequently endorsed by women who reported never having had a GP appointment in Portugal (4.1%), and never having had a gynecology appointment or the last appointment was 5 or more years ago (4.0%). The attitudinal item “I intend to go for a smear test, but I don’t get around to it” was more frequently endorsed by women who never had a GP appointment in Portugal (7.4%), and those who do not have a family

doctor (4.9%). Concerning “I’ve had a bad experience of a smear test in the past”, significant differences were observed regarding age, country of birth, and having children. Women who agree with the statement were mainly ≥45 years old (16.5%), from Europe (17.8%) or North America or Oceania (21.9%), and do not have children (15.2%).

Discussion

The findings of this study show that fear of the test result, worry about seeing a male health professional, perceiving the test as painful, embarrassment, difficulties scheduling the test, and having a negative experience in screening are the most reported attitudinal barriers among migrant women, with an agreement percentage ranging from 12.4% to 25.3%. On the other hand, the lowest percentage of agreement were observed in the items of “perceived need of screening” (agreement percentage of 6.6% or below). In contrast, CCS non-attendance was found significantly associated with low perceived need in the absence of symptoms and lack of motivation to be screened.

Attitudinal barriers may have impact on CCS non-attendance (96,117,190,191,193,240). In our study, the most often endorsed attitudinal barriers were related to “concerns about the test”, similarly to what Marlow *et al*. found in the study conducted in England (207). However, the percentages are lower in the present study. For instance, the percentage of women stating that screening was embarrassing was 18.5% which is considerably lower than the 59.1% reported for Black, Asian, and Minority Ethnic women in England. However, contrary to the Marlow *et al*. study (207), endorsement of items related to the “perceived need for screening” was low. The discrepancies in findings may be due to differences in characteristics of the samples, such as the countries of birth. The English study included women from the Caribbean region, Africa, Pakistan, India, or Bangladesh, while this study sample was mostly from Europe and South America. Alternative explanations for discrepancies between the studies’ findings are the higher average educational level and the lower rate of CCS non-attendance in our study sample.

Despite the higher endorsement of these factors among participants, neither of them seems to stop these women from attending CCS, as no significant associations were found between these items and CCS non-attendance. However, some studies point out embarrassment, pain, negative past experiences and the role of male healthcare professionals as barriers to CCS (96,192,236). It is important to note that these results suggest a dissociation between “feeling the barrier or agreeing with it” and “actual influence of the barrier in preventing screening”. The reasoning why a woman decides

whether to attend CCS is complex. Beliefs, perceptions, knowledge, and cultural values also take part on how a woman perceives the need to attend CCS. Johnson *et al*. (192) states that cultural background plays a role on women's perceptions and attitudes towards CCS, and it can vary with their geographic location and country of birth. In the present study, a large portion of migrant women came from countries with established CCS programs (e.g., Brazil and several Western European Countries). Possibly, women from these countries may be more aware and open to preventive health measures and, therefore, they attend the test regardless of how they feel about the procedure (109,187,243).

Overall, even though our findings suggest that the attitudinal barriers associated with CCS non-attendance are mainly related to "perceived need of screening", other attitudinal barriers, such as "fear of cancer" and "practical considerations", were also stated. Particularly, the idea of low perceived need, lack of interest in knowing if they have cancer and not prioritizing doing the screening were associated with CCS non-attendance. The same trend is observed elsewhere (96,192,236), including in the Marlow *et al.* study (207). These results suggest that future interventions to increase women's awareness of the benefits of CCS and its importance could contribute to promote their participation.

In this study, migrant women who reported having had a bad experience in CCS in the past were less likely to be CCS non-attenders. This seems contrary to evidence suggesting that negative experiences during screening are more likely to increase non-attendance among women (199,236,244,245). Considering that this is a cross-sectional study, this finding may be explained by reverse causality. Women who had a bad experience in CCS necessarily have done the screening at least once in their lifetime. The fact that, even so, these women report being CCS attenders may be due to two reasons: (1) the bad experience in CCS they had in the past occurred less than 5 years ago (meaning that they are still within the normal screening interval and not considered non-attenders), and (2) the bad experience these women had was not enough reason to stop them from doing the screening. It would be important to further explore why women considered their experiences negative to better improve the quality of CCS delivered to them. Women who reported having had a negative experience in screening were younger, from high income countries and did not have children. To have a negative experience, a woman needs to have been through screening, and therefore reverse causality may occur in this situation. Also, evidence shows that these socioeconomic characteristics may be facilitators to CCS as described elsewhere (96,236). This may

explain why endorsement of this statement was found to be inversely associated with CCS non-attendance.

Lack of regular contact with healthcare services (GP and/or Gynecologist) seems to have a negative effect on CCS attendance. This highlights the importance of having a close relationship with a medical doctor, who not only provides medical care but also informs about preventive measures and helps improve health literacy (96,192,236).

This study's findings may be useful for policy makers and stakeholders' practice. By quantifying which barriers are associated with CCS non-attendance, this study provides insights of which areas should be targeted to increase participation in screening among these groups. On the other hand, there are also barriers about which women agree with (e.g., pain and embarrassment, seeing a male doctor) that do not seem to influence CCS attendance and therefore may be of lower priority when creating an intervention with limited resources. This study provides insights for potential interventions to increase screening participation in migrant women. Overall, having regular contact with a trusting healthcare provider seems to be a key factor for CCS participation. The misconception that "I do not need a smear test if I do not have any symptoms" may be addressed by individual counselling by clinicians, by targeted health campaigns, or both. Not prioritizing screening ("I intend to go for a smear test, but I don't get around to it") may require combination of education, positive peer modelling, and enablement (i.e. increase opportunity for screening) interventions. These educational interventions could also be performed in partnership with community workers that may help providing culturally and linguistically adapted information, increasing the effectiveness of the strategies (240,246). These strategies may increase health literacy among migrant women and provide them with knowledge to make informed decisions regarding cervical cancer screening.

Strengths and limitations

This study includes a large and diverse sample. The use of an online survey helped to reach a high number of participants, particularly during the COVID-19 pandemic outbreak. This online data collection method reduces human error on data insertion as this process is made automatically in the survey platform. The use of measures previously used in another country (attitudinal barriers statements) allows to compare results between studies.

This study has some limitations that should be considered. This is a cross-sectional study; hence it is not possible to assess the causality between variables. Also, being a web-based survey, only women with access to the internet could participate,

which can lead to sample bias. The online nature of the survey and the fact that the survey was provided only in Portuguese and English may also justify the high percentage of women with higher education in the sample. The results of the sample cannot be generalized to the whole migrant population in Portugal because, even though the sample is large and diverse, it is not representative of the migrant population.

Conclusions

Attitudinal barriers play a role on CCS attendance among migrant women. Factors such as fear, embarrassment, or even modesty associated with seeing a male doctor have been reported by several women. However, experiencing an attitudinal barrier does not necessarily lead women to decide not to screen. This is clear if considering that the most reported barriers in this study are not associated with CCS non-attendance. CCS non-attendance was associated with lower perceived need of screening in the absence of symptoms and lack of motivation to attend screening. By understanding what are the barriers that seem to compromise the CCS attendance, stakeholders may use that information to develop interventions addressing those sensitive areas. This offers a window of opportunity to work these potential barriers a priori, developing more effective strategies aiming to increase CCS attendance among migrant women. Strategies and interventions aiming to increase CCS participation among migrant women should target these barriers. Strategies aiming to increase health literacy and empower female migrants may be key to increase screening attendance among these populations.

Table 10 - *Socioeconomic, migration-related, health-related, and CCS related characteristics of the study participants (Study 3).*

		Study Participants (n=1100)	
Socioeconomic characteristics		**N**	**%**
Age	<45 years	651	61.2
	≥45 years	412	38.8
Continent of birth	Europe	435	39.5
	Africa	78	7.1
	Asia	65	5.9
	North America and Oceania	73	6.6
	Central and South America	449	40.8
Education	Elementary or middle school (≤9 years of school)	23	2.1
	High school (10-12 years of school)	271	24.7
	Higher education (university)	803	73.2
Employment status	Employed	561	51.3
	Non-employed	532	48.7
Marital status	Married/living with a partner	756	68.9
	Single/separated/divorced/widow	341	31.1
Having children	Yes	624	56.9
	No	473	43.1
Migration-related characteristics			
Current migration situation	Documented	959	87.7
	Undocumented	134	12.3
Length of stay in Portugal	≤10 years	886	80.5
	>10 years	214	19.5
Health-related characteristics			
Lifetime GP appointment in Portugal	Yes	849	77.2
	No	251	22.8
Last gynaecological appointment	<5 years	806	73.3
	≥5 years	294	26.7
Having a family doctor in Portugal	Yes	593	54.0
	No	505	46.0
HPV vaccine	Yes	163	14.8
	No	937	85.2
CCS-related characteristics			
Have you ever heard of CCS?	Yes	1053	95.7
	No	47	4.3
Have you ever been screened?	Yes, ≤5 years ago	831	75.6
	Yes, >5 years ago	145	13.2
	No	123	11.2

Table 11 - *Percentage of agreement with the attitudinal barriers, and logistic regression models (crude and adjusted) of the attitudinal barriers and CCS non-attendance among migrant women (Study 3).*

	Agreement with the items	Crude Model		Adjusted Model [1]	
	n (%)	OR (CI95%)	p	OR (CI95%)	p
Perceived need for screening					
I am not at risk of cervical cancer, so I don't need a smear test	70 (6.6)	1.039 (0.590-1.829)	0.895	1.223 (0.606-2.471)	0.574
I'm not sexually active so I don't need to go for a smear test	23 (2.2)	6.315 (2.645-15.076)	<0.001	2.919 (1.024-8.316)	0.045
I do not need a smear test if I do not have any symptoms	19 (1.8)	4.531 (1.802-11.391)	0.001	5.521 (1.731-17.613)	0.004
Fear of Cancer					
I'm scared of what a smear test might find	269 (25.3)	0.932 (0.671-1.295)	0.676	0.870 (0.583-1.298)	0.484
I don't want to know if I have cancer	25 (2.4)	3.674 (1.654-8.160)	0.001	2.999 (1.135-7.920)	0.027
Concerns about the test					
Smear tests are embarrassing	198 (18.5)	0.951 (0.661-1.369)	0.787	0.654 (0.415-1.032)	0.068
Smear tests are painful	247 (23.1)	0.679 (0.475-0.970)	0.033	0.660 (0.430-1.013)	0.057
I've had a bad experience of a smear test in the past	132 (12.4)	0.506 (0.304-0.841)	0.009	0.391 (0.214-0.715)	0.002
I am worried I will have to see a male doctor or nurse	253 (23.8)	0.849 (0.603-1.194)	0.346	0.820 (0.540-1.246)	0.353
Practical considerations					
I intend to go for a smear test, but I don't get around to it	39 (3.7)	2.572 (1.344-4.925)	0.004	2.943 (1.327-6.527)	0.008
It is difficult to get an appointment that fits with commitments	152 (14.3)	1.076 (0.723-1.601)	0.719	1.232 (0.759-2.000)	0.398

[1]Adjusted to age, continent of birth, education, employment status, marital status, having children, , lifetime GP appointment in Portugal, last gynecological appointment, having a family doctor in Portugal, and HPV vaccine

Table 12 - *Characteristics of the participants who endorsed attitudinal barriers associated with CCS non-attendance attendance (Study 3).*

		I'm not sexually active so I don't need to go for a smear test			I do not need a smear test if I do not have any symptoms			I don't want to know if I have cancer			I've had a bad experience of a smear test in the past			I intend to go for a smear test, but I don't get around to ir		
Socioeconomic characteristics		Agree (%)	Disagree (%)	p	Agree (%)	Disagree (%)	p	Agree (%)	Disagree (%)	p	Agree (%)	Disagree (%)	p	Agree (%)	Disagree (%)	p
Age	**<45 years**	97.8	98.0	0.820	1.7	98.3	0.773	2.1	97.9	0.465	16.5	83.5	0.002	3.6	96.4	0.756
	≥45 years	2.3	2.0		1.5	98.5		2.8	97.2		9.9	90.1		4.0	96.0	
Continent of birth	**Europe**	2.3	97.7	0.017	1.4	98.6	0.200	2.9	97.1	0.236	17.8	82.2	<0.001	3.5	96.5	0.448
	Africa	5.3	94.7		4.0	96.0		2.7	97.3		5.4	94.6		2.7	97.3	
	Asia	6.3	93.8		4.7	95.3		4.7	95.3		3.1	96.9		0	100	
	North America and Oceania	1.4	98.6		1.4	98.6		4.1	95.9		21.9	78.1		5.5	94.5	
	Central and South America	0.9	99.1		1.4	98.6		1.2	98.8		7.9	92.1		4.2	95.8	
Education	**Elementary or middle school (≤9 years of school)**	0	100	0.409	0	100	0.161	5.6	94.4	0.667	0	100	0.230	5.6	94.4	0.874
	High school (10-12 years of school)	3.1	96.9		3.1	96.9		2.4	97.6		13.7	86.3		3.9	96.1	
	Higher education (university)	1.9	98.1		1.4	98.6		2.3	97.7		12.3	87.7		3.5	96.5	
Employment status	**Employed**	1.1	98.9	0.013	2.0	98.0	0.602	2.6	97.4	0.678	11.1	88.9	0.174	4.5	95.5	0.120
	Non-employed	3.3	96.7		1.6	98.4		2.2	97.8		13.9	86.1		2.7	97.3	
Marital status	**Married/living with a partner**	1.6	3.4	0.068	1.5	98.5	0.276	2.2	97.8	0.530	12.6	87.4	0.689	3.8	96.2	0.756
	Single/separated/divorced/widow	98.4	96.6		2.4	97.6		2.8	97.2		11.7	88.3		3.4	96.6	
Having children	**Yes**	1.5	98.5	0.100	1.5	98.5	0.441	2.7	97.3	0.400	84.8	89.8	0.014	3.7	96.3	0.936
	No	3.0	97.0		2.1	97.9		1.9	98.1		15.2	10.2		3.6	96.4	
Migration-related characteristics																
Current migration situation	**Documented**	2.0	98.0	0.428	1.5	96.2	0.072	2.3	97.7	0.531	12.6	87.4	0.602	3.3	96.7	0.105
	Undocumented	3.1	96.9		3.8	98.5		3.1	96.9		10.9	89.1		6.2	93.8	
Length of stay in Portugal	**≤10 years**	2.0	98.0	0.367	1.6	98.4	0.379	2.0	98.0	0.114	12.9	87.1	0.259	4.2	95.8	0.071
	>10 years	3.0	97.0		2.5	97.5		4.0	96.0		10.0	90.0		1.5	98.5	

Health-related characteristics																
Lifetime GP appointment in Portugal	**Yes**	1.9	98.1	0.374	1.6	98.4	0.404	1.8	98.2	0.038	11.9	88.1	0.383	2.6	97.4	<0.001
	No	2.9	97.1		2.5	97.5		4.1	95.9		14.0	86.0		7.4	92.6	
Last gynaecological appointment	**<5 years**	1.1	98.9	<0.001	1.7	98.3	0.620	1.8	98.2	0.042	12.0	88.0	0.529	3.2	96.8	0.173
	≥5 years	4.9	95.1		2.1	97.9		4.0	96.0		13.4	86.6		5.0	95.0	
Having a family doctor in Portugal	**Yes**	2.6	97.4	0.281	1.6	98.4	0.551	2.3	97.7	0.833	12.0	88.0	0.672	2.6	97.4	0.048
	No	1.6	98.4		2.0	98.0		2.5	97.5		12.9	87.1		4.9	95.1	
HPV vaccine	**Yes**	1.2	98.8	0.387	0.6	99.4	0.339	0.6	99.4	0.114	8.1	91.9	0.072	1.9	98.1	0.188
	No	2.3	97.7		2.0	98.0		2.7	97.3		13.1	86.9		4.0	96.0	

4.4. STUDY 4: Understanding cervical cancer screening barriers among migrant women: A qualitative study with healthcare and community workers in Portugal

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Abstract

Cervical cancer screening (CCS) has been proven to reducing mortality of cervical cancer; yet migrant women show a lower participation in screening compared to non-migrants. This study explores the perspectives of healthcare workers and community workers on the factors influencing CCS participation of migrant women living in Portugal. A qualitative study with online focus groups was conducted. Healthcare workers experienced in CCS and community workers working with migrant communities were purposively sampled. A semi-structured guide was used covering participation of migrant women in CCS, barriers, and strategies to overcome them. Data was analyzed using content analysis. Participants considered that migrant women have low participation in CCS related to insufficient knowledge, low risk perception, and lack of interest on preventive care. Other barriers such as difficulties in accessing the healthcare services, relationship with healthcare workers, language, and cultural differences were highlighted. Promoting continuity of care, disseminating culturally tailored information and use of self-sampling methods were suggested to improve participation in CCS. Inequalities in access to CCS among migrant women are mostly caused by information gaps and healthcare system-related barriers. Building a migrant-friendly healthcare system that creates opportunities for healthcare workers to establish relationships with their patients and delivering culturally and linguistically adapted information may contribute to overcome those barriers and increase participation of migrant women in screening.

Keywords: sexual health, cervical cancer screening, migrant women, healthcare workers, community workers

Introduction

Cervical cancer remains one of the most common cancers among women worldwide, with estimates for 2020 indicating an incidence rate of 17.6 and a mortality rate of 8.5 per 100.000 women aged 15-64 years (3). In Portugal, incidence and mortality rates of the disease were 15.4 and 4.6, respectively, per 100.000 women aged 15-64, in 2020 (3).

Nearly all cervical cancers result from an infection by oncogenic genotypes of the Human Papilloma Virus (HPV). The disease is highly preventable through HPV vaccination among young adolescents but also through regular screening among women given its long latency period (6,11)

Through cervical cancer screening (CCS), precancerous lesions are detected; treatment of these lesions can stop further progression to cervical cancer (16). CCS involves the collection of cervical cells usually performed by a clinician during a gynecological examination at a health facility, but self-sampling has been explored as an alternative (16,247). Evidence shows that CCS reduces morbidity and mortality (64,86). Therefore, CCS should be easily accessible to all eligible women according to the respective national guidelines (16,86,248).

Despite the efforts to implement screening strategies, inequalities persist. This is particularly true among migrant women, who often have a lower participation in CCS when compared to non-migrant women (151,165). As evidenced by research in Europe, migrant women present a higher risk of being diagnosed with cervical cancer at a later stage, resulting in increased morbidity and mortality (16,151).

Several factors influencing migrant women's participation in CCS have been documented in European countries, such as language and communication difficulties, lack of knowledge on screening, negative perceptions and feelings, cultural differences, as well as barriers related to healthcare services and provider-patient relationship (236).

In Portugal, the foreign-born population in 2019 represented 10.8% of the total population residing in the country, and nearly half of these individuals were women, mostly from Brazil, Portuguese-speaking African countries, Eastern Europe, and China, which are countries with a high incidence of cervical cancer (3,235,242).

Portugal has a population-based CCS program that is organized by regional authorities (78). All women registered at a primary healthcare center are invited to participate in CCS through a letter (written in Portuguese or English), which usually is performed by a general practitioner, every 3 to 5 years, depending on the region (77). Additionally, CCS tests can be done opportunistically (30). There are several examples

of CCS programs in other countries, such as the United Kingdom, Finland, and the Netherlands, where population-based CCS programs are implemented nationwide, women are invited regularly for screening, and the programs are intensely disseminated through the population (30,90). Data from the Portuguese National Health Survey, in 2014, indicate that migrant women have a lower participation in CCS than women born in Portugal (85).

Overall, it is important to ensure that migrant women access CCS programs in the host countries. According to a recent scoping review, most studies on factors associated with CCS participation among migrant women in Europe focus on women's perspectives, while a small number of studies have explored the perspectives of healthcare workers, and up to the authors' knowledge only an article has included the perspective of a single community worker from a migrant support association (236). These key stakeholders have privileged inside knowledge on the barriers faced by migrants from a health and social perspective, which can help in the development of strategies to increase CCS participation among migrant women.

This study aims to explore the perspectives of healthcare workers and community workers on the participation of migrant women in CCS in Portugal, by (i) assessing their experiences and opinions about CCS participation of migrant women, (ii) exploring the barriers faced by these women to participate in CCS, and (iii) identifying strategies to overcome these barriers. The findings will contribute to advance knowledge on factors influencing CCS participation among migrant women and can help producing meaningful and culturally competent recommendations to an international audience.

Materials and Methods

A qualitative study was conducted with healthcare and community workers in Lisbon and Tagus Valley Region using focus groups (FGs), a valuable technique by which participants share their opinions on a certain theme interacting with each other in small groups (200).

General practitioners and public health doctors with experience in CCS from healthcare units in areas with larger migrant communities were invited through e-mail to take part of FGs. Community workers were also invited through contact with associations targeting different migrant populations, to include perspectives about different communities.

FGs were organized according to the availability of the participants and were planned to include 4 to 8 participants each, with healthcare workers and community

workers separately. Discussions were moderated by a member of the research team, experienced in qualitative research.

A semi-structured guide was developed, based on literature (96,165,236), containing open-ended questions followed by probing questions on topics that covered the participants' perceptions about migrant women's participation in CCS, barriers faced by these women, and strategies to overcome them. The semi-structured guide is available on **Table 13.**

FGs were planned to be conducted face to face. However, due to the COVID-19 pandemic outbreak, FGs were conducted through Zoom, an online videoconference platform.

Data was analyzed using a content analysis approach (200). A codebook with themes, subthemes, and main codes was constructed based on the existing evidence (96,240). All FG were recorded, transcribed verbatim, and anonymized. Each transcript was analyzed separately, and segments of the text were categorized into codes defined in the codebook, using a word processor. New codes that emerged during the codification process were added to the codebook. Codes were organized in themes using the Ecological Model as framework (116). Illustrative quotes for each code were selected and translated into English.

All participants signed a written informed consent form and gave oral permission to audio record the sessions. Before each FG, participants were ensured of their anonymity, the confidentiality of the data collected and were informed that they could withdrawal at any stage of the study. Approval was obtained from the Ethics Committee for Health of the Regional Health Administration of Lisbon and Tagus Valley (ARSLVT) (Reference: 8431/CES/2019).

Results

Four FGs were conducted between June and November 2020. Three FGs were carried out with twelve healthcare workers, including general practitioners (GP) and public health doctors (PH) (one FG with six participants and two FGs with three), as well as one FG with five community workers. FGs and lasted for about one hour and half each.

Characteristics of the participants are presented in **Table 14**. Most participants had extensive experience working with migrant women from different communities. Each community worker represented a different organization.

Migrant women's participation in CCS

Most healthcare workers confirmed that migrant women have lower participation in CCS when compared to non-migrant women. Some healthcare workers observed that migrant women rarely schedule an appointment specifically for CCS; usually the opportunity arises in the context of family planning or maternal health consultations:

> ***HW6 (GP):*** *I feel that many of them [Asian and African migrants] only realize that screening exists when they try to get pregnant or when they are pregnant. That is, they only find out about screening when they have a maternal health consultation, and someone asks them about it.*

Participants discussed that women participate differently in CCS according to their country of birth. Several participants stated, as an example, that migrants from Brazil frequently seek out CCS, as they seem to be more open to preventive care:

> ***HW4 (GP):*** *Among migrant women, the only ones I remember actively seeking to be screened are some of the Brazilian women, among whom the culture of preventive medicine is deeply rooted.*

Healthcare workers stated that most migrant women are unaware of CCS or its benefits, and therefore they do not seek this preventive care. However, participants feel that even those who seem more reluctant to be screened, such as Asian and African women, are open to CCS when they are informed about it. This opinion was shared by community workers:

> ***HW1 (GP)****: I noticed that the African populations are very different [among each other]. (...) But generally they are women who access [healthcare] more when they have complaints, and then they accept and do the screening, but they do not do it spontaneously (…).*
>
> ***CW2****: I would say that [migrant] women who are followed up in health services, as in primary health care centers in general medicine, (…) if they are asked and offered cervical screening, they do not refuse.*

Participants agree that migrant women who have regular contact with healthcare services are likely to accept CCS when it is offered by their doctor.

Barriers to CCS among migrant women

Barriers to CCS were grouped in three subthemes: individual, sociocultural, and health system-related barriers (**Table 15**).

- *Individual barriers*

1. Lack of information about CCS

Nearly all participants stated that most migrant women do not know what cervical cancer is, and do not know what CCS is for, nor where it can be done:

> ***CW3**: I think that among [migrant] women there is a lack of literacy in knowing what cervical cancer is, when can it [screening] be done, from what age, for what…*

Healthcare workers mentioned that migrant women are largely unaware of CCS, which is reflected in low uptake. Some participants mentioned that CCS is a sensitive topic and misinformation about where and how to do it exists. Also, CCS information is scarce and may not be sufficient for migrant women to understand the invitation for screening, negatively affecting their participation:

> ***HW5 (GP)**: If I, as a migrant woman, don't know what I'm going to do [in screening] and why should I do it, what are the benefits [of screening], I'm not doing it.*

2. Perceptions about CCS

Women's perception of low risk for cervical cancer and low impact in their life was another reason mentioned in FGs for not participating in CCS. In addition, according to some community workers, migrant women often do not consider CCS relevant and have lack of interest in preventive care:

> ***CW4**: (…) the world of an immigrant is so busy most of the times that people don't even care about it [screening] (…). It is important for people to know that they may not have much time, but they must find the time to take care of their own health (…)*

3. Older Age

Participants mentioned that older migrant women usually are not so open to participate in CCS. During the discussions, they stated that, as women get older, they tend to talk less about their sexual and reproductive health and avoid gynecological exams, such as CCS. Community workers referred that older women believe they no longer need to be screened as they are over their reproductive period:

> ***CW3**: (…) considering the experience I have with [migrant] people, older women, those who already have children, who have already "closed the*

store", so to speak, don't want to do the cervical test, they don't care about it.

- Sociocultural barriers

1. Language and communication difficulties

Language barriers affect effective communication, and this was one of the main barriers discussed in all FG. Participants said that explaining the purpose of CCS may be challenging, as it is an intimate exam. Despite the effort to provide information in English, healthcare workers stressed that many women coming from non-Portuguese speaking countries do not speak English either:

> ***HW1 (GP)**: I think the language barrier is a very, very important barrier among migrant populations. Although we use English, not all migrant populations use that language well or know the language.*

2. Religion and culture-related barriers

In all FG, participants reported that culture influences attitudes regarding preventive health, and helps explaining prejudice, fear, or discomfort towards gynecological examination:

> ***HW3 (GP)**: I think that the cultural part turns out to be essential, and while we have already started to have some notion of prevention, there are many cultures dealing with the "now", and everything that is prevention does not exist.*
>
> ***HW1 (GP)**: I feel that some [migrant] women are afraid of doing the exam (…)*

Religion also influences women access to CCS. According to the experience of healthcare workers, Muslim women seem to have greater difficulty in up-taking CCS, as they tend to be more reserved and less autonomous:

> ***HW10 (GP)**: The religious part [of our migrant communities], (…), the Muslim part, the part that is more influenced by Islam ends up diminishing the autonomy of women.*

Indeed, religious and cultural background also influences gender roles and relations, affecting uptake of CCS. Participants reported that some aspects of women's health are managed by their husbands, who usually have a better understanding of the language and are often present in their wives' appointment, deciding if CCS is performed. This can raise problems in terms of privacy and self-determination and can hamper

women from sharing their concerns with the practitioner. Additionally, some participants reported situations where the husband did not allow his wife to have a gynecological exam or to be seen by a male doctor, even if she feels comfortable doing so, particularly among Muslim communities:

> ***HW6 (GP):*** *it is obvious that there are men, because of this language barrier, who do not even let their wife be observed by a man, right? And it is not the wife herself who says she doesn't want it, it's the husband who doesn't allow it. And since he has the power to manage the access [of his wife] to the consultation because he is the one who usually speaks the language, it ends up being an indirect barrier here.*

Some community workers stated that the migrant women's family can also influence their participation by inducing myths and prejudices about the gynecological exam. On the other hand, a healthcare worker pointed out that a migrant woman who has never been screened may want, in the consultation, the company of a trusted family member who has experienced CCS:

> ***HW2 (GP)****: (…) many of the migrant women, or those who have never been screened, will want to be screened when they are accompanied in consultation by a female friend or family member, who has already done it and who they trust.*

Participants also identified that women coming from countries with poorer healthcare access may avoid attending healthcare services in the host country, which in turn negatively impacts their CCS participation:

> ***HW12 (PH)****: If we are talking about a migrant community coming from countries where access to healthcare is poorer, (…) we will eventually be talking about people who are, in fact, ideologically difficult to access, in terms of healthcare and specifically of screening.*

3. Female genital mutilation

Some healthcare workers reported that practices of female genital mutilation frequently result in shame and pain, leading these migrant women to avoid CCS:

> ***HW3 (GP)****: I would say that female genital mutilation and screening is something that doesn't connect well, right? Therefore, these women try at all costs to hide from the gynecological exam, and everything that has to do with it. And sometimes it's even impossible as they are sutured...*

- *Health system-related barriers*

1. Procedural difficulties in accessing the healthcare services

Healthcare workers stated that in general migrant women have greater difficulties in accessing health services compared to non-migrant women, which negatively affects the access to CCS:

> ***HW4 (GP)**: [A barrier is] Access to health care, regardless of everything else (…) Because to be able to access the screening program one must navigate a series of bureaucratic procedures until being able to access the National Health Service (NHS), in terms of some groups of migrants (…).*

It was also specified that not having an NHS user number nor having an assigned family doctor, can negatively influence access to health services and participation in CCS:

> ***HW1 (GP):** I have already had situations in which patients did not [do the screening] because, as the prescription is handwritten and there is no NHS user number, the test requisition doesn't come out of the program.*
>
> ***CW2**: In [city] the problem is that many [migrant women] do not have a family doctor, so they are not followed, at least regularly, in health centers [therefore screening is not proposed].*

Healthcare workers acknowledged that the information made available, mainly through invitation letters and leaflets in healthcare facilities, is not informative enough nor adapted to the cultural and linguistic diversity of migrant populations. Thus, migrant women often are unable to understand the importance and benefits of CCS through the letter they receive:

> ***HW10 (GP)**: Even so, there are many [migrants] who do not understand, they receive the letter [invitation for screening], they realize that it may be to go [to the healthcare center] or what they have to do, but it is not enough for them to be aware, for example, of the risk.*

2. Healthcare workers characteristics and relationship with patients

Participants in all FG pointed out that some women, particularly Muslim women, are frequently uncomfortable or refuse to be examined by male doctors. Community workers also pointed out that some characteristics of healthcare workers, such as the age and country of origin, can influence participation in CCS:

> ***HW2 (GP)****: I think women who are Muslim tend to be more reserved and I assume that I will not be able to do the screening myself, as a male doctor. So, when I propose the screening, I'm aware that probably there will be this cultural barrier, and I often say that it is possible to have the exam done by a woman, if she wishes so. And only then something [screening] can be achieved. Sometimes Muslim women do not mind being screened by a man, but it is very rare. Very rare.*
>
> ***CW1****: It is not only the gender, but also the origin of the doctor, and the age, because for older women it is very difficult to be observed by younger women. It has an enormous cultural weight to expose your femininity to a doctor of a younger age.*

Healthcare workers assumed that there is a lack of representativeness of the migrant community in the health sector, which hinders the doctor-patient relationship and often negatively influences the acceptability of CCS when proposed:

> **HW2** ***(GP)***: I think that in terms of healthcare teams there is a huge gap. Teams do not represent their own community, that is, we do not have nurses or doctors from that community, so sometimes there is no cultural connection or cultural empathy that patients could often feel if, for example, the health professional who proposed the test or talked about the test was from the same culture or background.

Some healthcare workers emphasized that the doctor-patient relationship influences CCS participation in that, if a migrant woman does not trust the doctor, she will not be willing to undergo CCS. Healthcare workers also mentioned that the time allocated for the consultation is seldom enough to establish a relationship with the patient, and often they meet the patient only once, which hampers the establishment of a trusting bond. Participants found this issue to be relevant for CCS because it is an intimate test, and women may feel uncomfortable exposing themselves to someone they do not know, which reduces participation:

> ***HW1 (GP)****: But here, where we see a patient sometimes only once, and we don't see her again, introducing this concept [of screening] ... there is no time to establish trust, or time to establish the relationship, and people don't want to expose an intimate part .... they don't want to do it and, therefore, it's also a difficulty.*

3. Irregular status

The irregular status of migrant women was a barrier discussed in all groups, but particularly among community workers. They pointed out that undocumented women face additional obstacles in accessing healthcare services and are not covered by the CCS program:

> ***CW3****: For migrant women, there are several issues [for not being tested]. The fact that they are not legalized and therefore do not have access to the NHS for free.*

4. Outdated patient information

Participants mentioned that migrant women often change their address or their telephone number, mostly due to economic difficulties:

> ***CW2****: Another issue with the phone that we encounter frequently is that the people we work with are also people with severe economic needs; people change their phone number every month (…) because they buy that card that is cheaper and at the end of the month that card no longer has calls available, and they buy another one.*

For this reason, some healthcare workers reported that the databases with patients' information and contacts are constantly outdated, which precludes migrant women from receiving invitation calls or letters for CCS.

Improving migrant women's participation in CCS

Strategies to overcome the barriers identified were gathered in 3 groups – Continuity of care, culturally tailored information, and self-sampling methods.

- *Continuity of care*

Health professionals suggested investing in continuity of care and building a strong doctor-patient relationship as one of the possible strategies to increase participation in CCS among migrant women. This close relationship would allow healthcare workers to help promote the health literacy of these women, and consequently, they would be more willing to participate in health-related interventions, including CCS:

> ***HW5 (GP)****: In other words, from my point of view, one of the solutions [to increase adherence] is (…) continuity of care.*
>
> ***HW10 (GP)****: (…) And if she has some kind of relationship with healthcare services, she is also much more receptive to be targeted by health*

education and to improve her own health literacy, and thereby change her risk perception or, as someone here also said, change the reason why she will want to do the screening.

However, as healthcare workers mentioned, to establish these relationships it is necessary that health services are prepared to receive migrant women, considering their culture, language, and specific needs. The time allocated to consultations should be increased, and women should always have the possibility of choosing a doctor they feel comfortable with:

> ***HW12 (PH)**: [Health services] must be prepared to receive these populations, not only in terms of language, but also in specificities of their cultures, their traditions.*
>
> ***HW11 (GP)**: And then the question of the time that is allocated, or the availability of the professional, or the question of whether or not you are a family doctor, so here too the attention that is given to details is important and it is the best occasion [to pass on information].*

Participants generally agreed that having an assigned family doctor for each migrant woman would help improve their access to CCS:

> ***HW10 (GP)**: if we manage to have (…) for example, family doctors for everyone in national terms, 100% coverage, I think, not all, but an important number of barriers would disappear.*
>
> ***CW2**: It is in the consultation itself that it [CCS] can be done or that it can be scheduled, but with the same doctor. So here it can facilitate [access to CCS] if we have a good relationship with our family doctor; it can be a facilitator, because [the doctor] is the one who will do it.*

- <u>*Culturally tailored information*</u>

Some participants reported that, to increase participation in CCS, migrant women need to have access to appropriate and culturally adapted information about the benefits of CCS. Participants mentioned that information campaigns targeting specific migrant communities, taking different cultural, educational, and linguistic contexts into account, would be the best strategy to deliver information. The support of community associations or community leaders to deliver information about CCS was discussed by the participants and generally accepted as a good approach:

> ***CW3**: It is necessary that we go to the field and make connections with entities that deal with this population. We are talking perhaps about the*

National Immigrant Support Centers, the immigrants' associations, for example, but at the core - I mean in the neighborhoods - where people live, to adapt and direct communication to this audience.

- *Self-testing methods*

For some participants, the use of self-sampling CCS tests is a good alternative to minimize some barriers related to the discomfort, fear and shame associated with the test:

> ***HW5 (GP)**: a solution could be a self-sampling test (…). Such as the ones done for the fecal occult blood test, or even in some countries when screening for chlamydia. If I send someone a bottle to self-collect, it is much more likely that the person will participate.*
>
> ***CW4**: I believe that the advantage of self-sampling is important and if this possibility is put in place, I believe that [it may help overcoming barriers], in the practical sense of analysis and examination and of people's own safety, because many women are still afraid and have prejudice of consulting gynecologist doctors, right?*

Discussion

This qualitative study explored the perspectives of healthcare workers and community workers regarding the experiences, barriers, and strategies to increase participation in CCS among migrant women in Portugal.

Participants agreed that migrant women have a lower participation in CCS comparing to non-migrant women, confirming other studies (85,110,148,207). Previous experiences with preventive healthcare may increase CCS participation (96,193,236). Healthcare workers commented that women coming from countries where preventive healthcare is promoted, such as Brazil, seem to be more proactive when it comes to CCS. Migrant women with lower knowledge and awareness about preventive measures tend to only participate in CCS opportunistically when seeking for healthcare services for other reasons (96,236). Some participants, mainly community workers, highlighted that if a healthcare worker takes the initiative to explain what CCS is and why it is important, migrant women are open to participate.

Among the barriers identified, lack of information, language and communication difficulties, and structural obstacles in access to healthcare services were the most discussed factors among healthcare and community workers. These barriers are in line

with those found in other studies (96,236). When discussing barriers, healthcare workers focused more on the organization of health services, while community workers highlighted sociocultural and legal issues faced by migrant women when accessing CCS.

Overall, it was highlighted that several of the barriers that migrant women face to access CCS are related to difficulties in accessing healthcare services in general, which has also been observed in other countries (151,165). Healthcare services often lack cultural diversity within their staff and skills to deal with cultural and linguistic differences, and frequently display complex bureaucratic processes for access, which can be challenging for migrants (117,193,236). Participants also noted that certain characteristics of the healthcare worker, such as sex, age, or cultural background, may lead some migrant women to refuse CCS. On the other hand, the irregular migration status also emerged in FGs as a barrier to CCS. Community workers referred that women in irregular situation still face barriers to access healthcare services and, consequently, to CCS. Healthcare workers also mentioned that migrant women frequently change their address and phone number due to economic constraints, and this unstable living situation becomes a major challenge given that, in Portugal, invitations for CCS are made by post mail or phone call (77).

Some cultural aspects were identified during the discussion to a lesser extent, with the role of the husband or partner being the most discussed. As documented elsewhere (117,193), men generally act as translators in consultations, and often they have the power to decide if their wife participates in CCS. Healthcare workers expressed some frustration as they felt that they had to persuade the husband to let his wife be screened for cervical cancer, which raised the issue of the lack of autonomy of some women in managing their own health.

Although most of the migrants residing in Portugal are from Portuguese-speaking countries (242), communication and language issues were considered relevant. Information transmission is an important issue (145,193,194,249); participants felt that the written information available was too complex, which comprises a major challenge for women who are not fluent in Portuguese and who have low health literacy. Also, participants stated that if women are unable to understand the benefits of CCS, they are less willing to participate. Knowledge acquisition is strongly related to how the message is transmitted (117,145,250), and based on the participants experience, the way information is provided may not be adapted to the cultural and linguistic context of these communities, resulting in a lack of knowledge about CCS.

Within an ecological perspective, efforts to increase individuals' awareness and up-take of CCS can only be effective if they address changes in the social environment structure and processes (116). The perspectives of healthcare and community workers, which have not been much explored in research, are helpful to design better strategies to increase CCS participation among migrant women, especially those groups who are not being reached by CCS programs. These professionals work closely with migrant communities, have deep knowledge of these women's difficulties when accessing healthcare services, and the barriers related to preventive care and women's health. These professionals can provide valuable insights on who are the groups with low participation in CCS, which factors influence their participation, and how to better reach them and improve their uptake of CCS.

At system-level, strategies must be developed to reach migrant women who are not participating in CCS program, particularly women living in unstable conditions due to economic constraints and undocumented women. This may be achieved by using different invitation methods other than letters, providing opportunities for these women to seek CCS in proximity healthcare units, and creating information campaigns aimed at these specific groups. For example, in the United Kingdom, the National Health System promotes events and uses the media, namely national TV and social media, to increase awareness about CCS program (30,90).

Building a trusting doctor-patient relationship in a migrant-friendly healthcare system that takes into consideration migrant women's specific cultural needs seems to be key to improve their participation in CCS (117,193,236), as explored in the FGs. Strengthening the skills and cultural competences of healthcare workers to deal with populations from different sociocultural backgrounds and increasing the duration of medical appointments may be relevant to build a trusting bond between these professionals and the patients, and to provide information about CCS more effectively. Establishing partnerships with community associations, as suggested by the participants, may also help delivering culturally and linguistically adapted information targeting these populations (96,117,193,194). Community workers who work closely with migrant communities have a deeper knowledge on the difficulties faced by these women, often share language and cultural backgrounds with them, and can help to reach those who are not being screened making them key actors to improve CCS uptake among migrant women.

A strategy suggested by the participants to help reduce barriers to CCS is offering the possibility of using self-sampling tests. This has been explored as a potentially good alternative to conventional CCS that can increase participation among migrants (247).

This study has some limitations. Data reports the views of a small number of participants, due to the pandemic outbreak and the consequent difficulty in recruiting healthcare workers and community workers whose services have been overwhelmed in this crisis situation. Nevertheless, information saturation was reached in FGs with healthcare workers. Participants worked only in the Lisbon and Tagus Valley Region; notwithstanding, the largest migrant communities are located in this region (235). Also, there is an imbalance in sex distribution, with most participants being female. Nevertheless, this reflects the features of the healthcare and community workers reported worldwide and in Portugal as well (251–253). Furthermore, the virtual setting partially limited the group dynamics, making it challenging to assess non-verbal cues.

Conclusions

The findings of this study bring to light some of the possible factors acting as barriers to participation of migrant women in CCS initiatives that can be meaningful for an international audience, particularly in the European context. The inclusion of healthcare and community workers gave a broader social perspective on inequities in access to CCS and offers a new, experience-based view on who is not being included in the CCS program, how to reduce the barriers, and increase the participation of these migrant groups. Participants pointed out that the inequalities in accessing CCS among some migrant women are most likely caused by lack of information, language, and communication difficulties, and obstacles in accessing healthcare services. Developing a migrant-friendly healthcare system with culturally tailored information and creating opportunities for healthcare workers to establish trusting relationships with patients seems to be crucial to improve migrant women's participation in CCS. Specific attention should be given to women living in unstable conditions due to economic constraints, undocumented women, and those without family doctor, to include them in CCS program. Also, establishing partnerships with community associations that are close to migrant communities to deliver information and improve awareness of CCS may contribute to overcome some of the identified barriers.

Table 13 - *Semi-structured guide for the focus groups (Study 4).*

Perceptions about migrant women's participation in CCS
• What are your opinions about migrant women's participation in cervical cancer screening? What about their participation compared with the general population? • How would you describe the women who have a lower participation in CCS?
Barriers to CCS participation among migrant women
• What do you think are the main factors influencing migrant women's participation in CCS? • From your experience, what are the barriers faced by migrant women to CCS? • What about individual barriers to CCS faced by migrant women? And sociocultural barriers? What can you tell about health system-related barriers?
Strategies to overcome barriers to CCS among migrant women
• How could these barriers be addressed? • In your opinion, what kind of strategies could help reduce the barriers?

Table 14 - *Characteristics of the participants (Study 4).*

	Healthcare workers (n=12)	**Community workers (n=5)**
Age		
<35 years	5	3
≥35 years	7	2
Sex		
Male	3	1
Female	9	4
Migration background		
Migrant	1	4
Non-migrant	11	1
Medical speciality		
General Practitioner	10	-
Public Health Doctor	2	-
Years of medical practice		
≤5 years	3	-
>5 years	9	-
Experience working with CCS		
≤5 years	4	-
>5 years	8	-

Table 15 - *Barriers to CCS described in FGs (Study 4).*

Barriers to CCS		
Individual	Sociocultural	Health system-related
Lack of information about CCS Perceptions about CCS Older age	Language and communication difficulties Religion and culture-related barriers Female genital mutilation	Procedural difficulties in accessing the healthcare services Healthcare workers characteristics and relationship with patients Irregular status Outdated patient information

CHAPTER 5: Discussion

Low cervical cancer screening is a global public health issue, leading to a high number of preventable deaths worldwide. Migrant women are among the underscreened and most vulnerable groups This problem demands quick responses from research teams, healthcare services and policy makers. It is necessary to develop strategies and interventions targeting these women and the major barriers faced by them. To do so, it is necessary to identify these barriers, which differ across countries and across migrant groups. To the author's knowledge, this thesis represents the first study on factors associated with cervical cancer screening attendance among migrant women conducted in Portugal. This work gives foundations to help make informed decisions and develop effective strategies to provide better care in terms of cervical cancer prevention to these women. Also, considering the growing international interest on this topic that has been highlighted by WHO (16,151), the knowledge provided by this thesis may be relevant for both national and international audiences.

Migrant women in Europe have lower participation in cervical screening than native women (236). In our survey of migrant women living in Portugal, the proportion of screening non-attendance is around 25% which is higher than in native women in Portugal (13%) (85). Nevertheless, it is lower than the non-attendance rates of migrant women in other European countries, that ranged between 48% in Germany and 72% in Italy (109,147,150,187). This lower non-attendance may be explained by our sample characteristics: higher education and different distribution of countries of origin, with a high proportion being from Brazil. Indeed, our qualitative study with healthcare workers and community workers suggested that Brazilian women – the largest migrant community in Portugal – are more aware of the need of cervical cancer screening than other migrants. Taken together all studies in this thesis, it is suggested that there is still a low screening attendance among migrant women living in Portugal and they face barriers when accessing cervical cancer screening

Overall, several factors faced by migrant women when accessing the screening were identified and explored in this thesis. However, the way these factors influence cervical cancer screening is complex, and each factor may have independent, synergic or antagonist effects on screening participation- This may explain some of the conflicting results observed not only in the scoping review but also in the quantitative studies.

The most frequently reported barriers to cervical cancer screening participation among migrant women found in the Scoping review are like those in the focus group discussions. They are related to the access to healthcare services and lack of knowledge, but emotional factors and language difficulties were also mentioned in a large extent (117,139,144–146,190,191,194,216). In the focus group discussions, healthcare workers focused more on the organizational level barriers described in the Ecological Model (116), while community workers mentioned intra- and interpersonal level barriers. A more nuanced interpretation of the barriers faced by migrant women will be detailed below, structured according to each level of the Ecological Model.

At an intrapersonal level, lack of knowledge and awareness about cervical cancer screening was the barrier most referred within the scoping review and among focus groups discussions. Knowing what cervical cancer screening is and why is important to take this screening test is one of the main motivators for women to take the screening test (223). However, knowledge is also influenced by culture, which partially explains misconceptions about cervical cancer and the test, embarrassment, or fear of suffering social consequences among communities who are less open about women's health (219,224,225). On the other hand, language is essential in knowledge acquisition. Migrant women who are unable to speak the idiom of the host country are unable to access and/or understand information that usually is easily accessible for natives (117,145,250). In fact, several professionals in the focus groups affirmed that the information provided by healthcare services about cervical cancer screening is complex and often untranslated. These factors discourage and compromise migrant women participation in cervical cancer screening. Some professionals also stated that when migrant women are provided with adequate information, mainly from their healthcare provider, they are more open to accept participating in screening.

Yet, according to the quantitative results, no association between fluency in Portuguese and CCS non-attendance was found. These results must be interpreted with caution because most of the women who participated in the survey are from Portuguese-speaking countries and present a higher level of literacy. This implies that they are better prepared to read and understand delivered information, which may explain the lack of association between language and screening non-attendance in this sample of migrants. The knowledge about cervical cancer screening of migrant women was not directly measured in the quantitative studies, yet the perceived need of knowledge was assessed through the attitudinal barriers tested in the survey. Women need to see the benefit of doing the screening test to be willing to take part of it, and this depends on how aware they are of the benefits of screening (192). In fact, it was observed a lower attendance

in cervical cancer screening was associated with low perceived need of screening in the absence of symptoms and with not prioritizing screening over other activities, similarly to other studies (96,192). This reinforces the importance of awareness and knowledge among migrant women.

Socioeconomic and demographic characteristics of some migrant women may put them also in a more vulnerable position, increasing their risk to not attend cervical cancer screening. However, some of the characteristics that have been associated with screening non-attendance are not consensual in the literature (96). In fact, according to the results of the scoping review, factors such as age (younger or older), parity (having or not having children) or marital status (being married or not), show different associations with cervical cancer screening non-attendance. Other studies also show the same inconsistencies (96,110,139,149). The most consensual socioeconomic characteristics are country of birth, education, and socioeconomic status: women who come from LMIC and/or have lower education and/or have a lower socioeconomic position are at higher risk of being screening non-attenders. Socioeconomic position in terms of income was the only socioeconomic characteristic highlighted by professionals in the focus groups discussions, which mentioned that women with less resources do not seek cervical cancer. Also, these factors, except for income, were tested in the quantitative study. In this study, extreme age groups ($\leqslant$34 years and $\geqslant$55 years) have a lower participation. In fact, evidence have been showing inconsistent relation between age and screening attendance among migrants (96). Possible explanations for lower attendance among younger women may be related to the fact that screening in Portugal is recommended to be started at the age of 25 or 30, depending on the region (79) and therefore many of the women included in this age group may not meet the criteria to be screened. On the other hand attendance decreases with older age as women stop seeking for healthcare services for fertility reasons, as stated in some other studies (96,110,147), but may also related to a low risk perception. Lower parity and being single are also associated with higher non-attendance, which may also be related to a lower use of healthcare services for fertility reasons, but also lack of support from a partner (110,149,186,215). Women from Asia and Africa are more likely to be non-attenders, as expected since women from LMIC countries have lower attendances in cervical cancer screening (64,108), but women from South America, particularly Brazilian, seem to seek screening more. An explanation is cultural influences and high divulgation of screening, which encourages women's participation. Yet, unlike expected, no association was found between education and employment status and cervical cancer non-attendance, which

may be caused by the higher percentage of women with university degrees (over 70%) in the sample.

Attitudes and emotional responses have also a role on screening attendance. Cervical cancer screening is an invasive exam in which women must expose their genital area for the doctor to collect a cervical sample. The way women feel and perceive this intimate exposition also influences how receptive they are to perform screening. Feelings of embarrassment, shame, or fear of pain are among the most reported barriers to cervical cancer screening retrieved in the scoping review. In certain situations, mainly among women coming from countries in which women have less autonomy, emotional barriers, such as shame, may even prevent women from seeking information (219,224,225). This opinion is shared by migrant women and healthcare workers in the studies included in the scoping review. It was also referred by healthcare workers and community workers in the focus groups discussions; however, healthcare workers also added that emotional responses are barriers not only faced by migrant women but by women in general. Some interesting results about the effect of these emotional responses rose from the survey. Participants showed a high percentage of agreement with embarrassment and pain associated with the test (compared to the agreement percentage with other items), proving that these beliefs do exist among migrant women. Yet, none of these factors were associated with cervical cancer screening non-attendance. This may suggest that other factors may have influence in the association between “perceiving a barrier” and “having that barrier to stop the women from attending screening”. Cultural background may be one of these factors as it influences people’s perception and behaviors, and varies between countries of birth (192).

Another aspect that is also associated with attitudinal and emotional barriers is having previous negative experiences in screening. Even though it is known that having past experiences with preventive care is a facilitator of cervical cancer screening participation (96,193), results from the scoping review show that a negative past experience in screening stops women from attending screening again. As cervical cancer screening is an exam that should be performed periodically, this is concerning. These bad experiences may be related to the test itself or related to healthcare performing it (e.g.: pain during the test or lack of trust in the professional doing it). Also, it does not have necessarily to be experienced by the women, but may be told to her by someone else (117,145,194,216). The results of the survey were once again surprising as women who stated to have had a negative screening experience in the past were more likely to be cervical cancer screening attenders. Despite the apparent contradiction of this result, reverse causality may be the explanation for these results, meaning that women do have

to attend screening to report a previous bad experience. Therefore, either their bad experience was within the 5 years interval in which a woman is considered an “attender”, or the negative experience does not affect the women perceives the need of being screened. It is therefore important to further explore this issue to better understand how a negative experience in cervical cancer screening influences further experiences among these women.

Even though interpersonal level factors were addressed in a lesser extent than intrapersonal and organizational level factors, a specific aspect was considered relevant in both scoping review and in the focus group discussions: the role of the husband. Depending on the cultural roles of the husband, this family figure may be a barrier to cervical cancer. In fact, the effect of the husband on his wife’s participation in cervical cancer screening depends on how he perceives the exam himself. This perception depends on the cultural norms of the country of birth, the gender roles, and the generational effect, with variations across studies (96,110,139,192,215,218,254). Nevertheless, in the results of the survey, it was evident that having a partner was positively associated with cervical cancer screening attendance: women who did not have a partner (single, divorced, or widowed) were 2.7 times more likely to be non-attenders than those who had a partner at the time of the survey. Yet, it is important to consider that most of these women have high educational levels and come from countries with a higher cervical cancer awareness, namely in Brazil, which may empower them to make choices regarding their own health (96,186,192).

In some situations, the husband has the control to decide whether his wife may attend to the exam, especially when they have the role of interpreters in the appointments. Healthcare workers in the focus group discussions expressed that sometimes they had to convince the male figure to allow his wife to be screened, instead of talking directly to her. This was a source of frustration for healthcare workers. On the other hand, having the presence of the husband within the appointment may prevent women from opening up and express their doubts and fears, as described elsewhere (96,192). Overall, the lack of autonomy in managing their own health to the fullest is a major barrier to cervical cancer screening attendance among these women.

In terms of organizational level factors, two main categories stood out in this thesis: factors associated with healthcare services and factors associated with migration status. When it comes to healthcare services, the major conclusion from our findings is that most of the barriers identified in attending cervical cancer screening are the same as those identified in accessing healthcare services in general.

Access to healthcare services was addressed in the survey, and it was found that women who do not access healthcare services, namely those who never had a GP appointment in Portugal or whose gynecological appointment was 5 or more years ago are more likely to be CCS non-attenders. In Portugal, organized screening programs are performed by general practitioners, whereas opportunistic screening can be performed both by GPs or gynecologists (31,77,85). Therefore, if women do not attend these health services, they will not be able to be screened.

Several reasons for the lack of access to healthcare services were pointed out in the scoping review and focus groups discussions. Healthcare services' insufficient preparedness to address different cultures and languages, and migrants' struggling in accessing services that are substantially different from those in their home countries, difficult their access to the health services they need, including cervical cancer screening (154,166). The lack of cultural representativeness and skills to deliver culturally and linguistically adapted information to migrant women patients was discussed deeply in the focus group discussions, highlighting its importance. Barriers such as difficulties navigating in healthcare services, bureaucratic procedures needed to access these services, or difficulties establishing a trusting relationship with their healthcare provider are among the most important barriers highlighted.

There are some barriers specifically associated with cervical cancer screening, the major being the gender of the healthcare provider doing the test. Migrant women, particularly those who come from countries with strong culture of modesty, may feel uncomfortable having a male healthcare provider doing a gynecological exam. Healthcare workers in the focus group discussions also brought this topic into the discussion. A male healthcare worker stated that he often provides the option of the exam being performed by a female doctor when bringing the issue with migrant women, especially those who are Muslim.

Migration status was also one of the major factors influencing cervical cancer non-attendance and it was extensively discussed in the focus groups discussions with community workers. One of the major issues raised was the situation of undocumented migrants. Women who are in an irregular migrant situation are unable to access healthcare services and therefore are out of scope of preventive interventions including cervical cancer screening, as stated by the community workers and some healthcare workers as well. Several limitations to healthcare services exists for undocumented migrant women, namely complex bureaucracies, high costs and, often, the risk of being reported to the immigration authorities when accessing health services (183). In

Portugal, undocumented migrants have the right to access healthcare services only when they are residing in the country for over 90 days (255).

In the quantitative study, being undocumented was associated with cervical cancer screening non-attendance but after adjusting the model to all relevant variables, it lost its significance. Interestingly, no studies reporting the association between irregular migrant situation and cervical cancer screening attendance were found in the scoping review, being this one topic that must be further explored.

Longer length of stay in the host country was found to be associated with lower screening attendance in the results of the survey. According to the scoping review, most studies show an association between a shorter length of stay and lower cervical cancer screening attendance. Considering that the survey participants included migrants from several countries and different contexts, it was expected that the results are not as consistent. However, there is a study. However, the study of Møen *et al*. (2017) also showed that lower attendance is associated with longer length of stay for all groups except women from Eastern Europe (148).

Even though the results of this thesis focus on the barriers to cervical cancer screening, some facilitators were also addressed in the studies. These facilitators were mainly at the intrapersonal and organizational level, according to the Ecological Model (116).

At the intrapersonal level, similarly to what was observed in the barriers, knowledge stood out as one important factor. In this sense, according to the literature analyzed for the scoping review, women who have a higher knowledge and awareness of cervical cancer screening are more likely to attend cervical cancer screening. This also touches the topic of the husband, at a more interpersonal level: when the husband has a higher knowledge of the importance of screening, he incentives his wife to attend the screening test (139).

At an organizational level, as discussed below, having a close relationship with a healthcare worker is a facilitator of cervical cancer screening attendance. This statement is transversal to all the studies included in this thesis. Also, having the encouragement of a healthcare provider to take the screening test motivates women to do so. Healthcare workers included in the focus groups affirmed that when they take some time to explain the exam and its benefits to migrant women, they are often open to take the test. Appropriate knowledge about the benefits of cervical cancer screening and a close relationship with healthcare providers seem to be essential to promote cervical cancer screening among migrant women.

Strengths and limitations of this thesis must be acknowledged. Its main strength is the use of different methodological approaches. The scoping review provided a solid ground for the thesis. It allowed not only to map existing knowledge and gaps in current evidence, but also helped to have an overview of the research methods used in this field. Using a qualitative approach with healthcare and community workers provided a deep and comprehensive view of how these professionals perceive migrant women's participation in cervical cancer screening in Portugal. These professionals also provided insights on how to overcome some of the identified barriers., Such insights are helpful to design strategies to increase migrant women's screening participation. Finally, using a quantitative approach allowed to establish associations between barriers and cervical cancer screening participation among migrant women. Using a web-based survey was useful to overcome most of the COVID-19 pandemic restrictions which limited presential data collection activities and reach a high number of participants.

One of the main limitations of this work stems from the constraints caused by the COVID-19 outbreak and the impossibility of conducting presential activities. This limited the number of participants in focus groups and may have led to selection bias. Also because of the COVID-19 limitations, focus groups with migrant women were not conducted, despite being initially planned, which could have provided valuable insights on the barriers from their perspectives. Focus groups included only professionals from Lisbon and Tagus valley region, and since the cervical cancer screening programs are different between regions in Portugal (79), it would be interesting to explore the perspectives of professionals in other regions. Also, regarding the focus group discussions, it is important to note that online discussions also limited group dynamics and non-verbal cues, which may have led to some information to be missing.

The quantitative studies, due to the cross-sectional design, do not allow to explore causality between barriers and screening attendance. Finally, the sample used in the studies does not allow the generalization of the results to the migrant population in Portugal. On the other hand, the information that exists on the migrant population in Portugal does not yet allow the creation of representative samples of this population that include hard-to-reach and most vulnerable groups.

The knowledge resulting from this thesis may be used by stakeholders and policy makers to promote cervical cancer screening interventions, especially targeting migrant women. By identifying the factors associated with cervical cancer screening attendance

among migrant women, this thesis can contribute to develop interventions that reduce some of the major barriers identified and promote cervical cancer screening among migrant women.

Overall, considering the Ecological Model (116), it is necessary to change the social environment, structure and processes in order to see an improvement in cervical cancer screening attendance among women. These changes must target the main obstacles identified, at an intrapersonal and organizational level. Areas that should be targeted also relate to intrapersonal level and include lack of knowledge and/or low perceived need of screening, cultural and individual barriers and difficulties in accessing healthcare services.

Considering the intrapersonal barriers, several interventions can be considered. Lack of knowledge is one of the most reported barriers in the results of this thesis, being also mentioned as an area that should be targeted on strategies to increase cervical cancer screening. According to the WHO and IOM (151,218), it is essential to provide these women with knowledge to be able to make informed decisions regarding their health and disease prevention, as well as give them the necessary skills to navigate through the healthcare system of the host country. In other words, it is important to increase health literacy in these communities. The concept of Health literacy has been defined in several ways (256). Overall, it means having the knowledge and competences to manage own's health, including which factors affect it and act upon them to improve the individual's health (256). Increasing health literacy is therefore key to improve cervical cancer screening attendance.

Specific strategies to increase knowledge and health literacy, which may result in increasing cervical cancer screening participation include individual or group counseling, workshops, or information session in collaboration with community workers, informal community leaders or even other migrant women who have experienced, cervical cancer screening, for instance, in the host country. These interventions have been explored in other contexts with positive results (257). The implementation of these strategies may require previous knowledge on the characteristics of the target population, as some socioeconomic (e.g. age, education) influence the way information is perceived and interpreted by the patient (257). Information may also be delivered through leaflets or digital tools written in a simple and clear manner and translated into multiple languages and not only the language of the host country and English (258,259). It is also important to keep in mind that women with lower resources may not be able to reach online tools, highlighting the importance of adapting the strategies to the characteristics of the target populations (260). Nevertheless, these tools seem to be effective in increasing health

literacy (260). Considering the participation level in this thesis' online survey, online tools may be a good way to reach and engage women in activities to increase knowledge on cervical cancer screening.

A multi-disciplinary participatory approach can be valuable when designing strategies to reduce barriers associated with lack of knowledge, low risk perception, social stigma or other cultural or religious characteristics. Community workers often work closely and easily establish trusting relationships with migrant communities, as they often share similar cultural background and language. Establishing partnerships between healthcare services and community-based associations may be helpful to deliver culturally and linguistically adapted information, and help migrant women seek for medical care, namely cervical cancer screening. In fact, there is already some evidence showing positive outcomes in cervical cancer screening attendance of the partnerships with community workers (194,228,229).

Healthcare workers are key actors in terms of increasing knowledge, reducing individual and cultural barriers and promote cervical cancer screening. Promoting a trusting relationship with a healthcare provider can make migrant women feel more comfortable to discuss their health and more receptive to information and participate in preventive interventions. In fact, a study showed that Asian women in United States of America who received information from their healthcare provider and discussed with them about screening practices were more likely to attend screening (261). Educational support via phone with a healthcare professional can also be a strategy to provide information for those who do not frequently go to healthcare services, and may be helpful to improve cervical cancer screening participation (262).

Healthcare workers may have a role in delivering information and encouraging women to take part in screening activities. Regarding migrant patients, it is crucial that medical staff are skilled to intervene with women with different sociocultural and linguistic characteristics to reduce the myths and constraints surrounding gender and sexuality, social stigma, religious or cultural beliefs, past negative experiences, or other traumatic experiences. A study conducted by Musa *et al*., (2017) (258) showed a positive outcome in cervical cancer screening attendance when healthcare providers promoted culturally and linguistically adapted theory-based educational interventions, adjusted to each community. To do so, it is necessary also that the healthcare providers have enough time to discuss these issues with the patients. When language barriers exist, the use of interpreters may have a positive impact on how the message is delivered, resulting in a higher acceptance to the screening (263).

At an organizational level, changes in the structure and organization of healthcare systems may be needed not only to improve cervical cancer screening among migrant women, but to improve their access to healthcare in general. Data resulting from this thesis show that migrant women face several difficulties in accessing healthcare services, which directly or indirectly influences their access to screening.

Implementing a culturally sensitive migrant friendly healthcare system, or improving the existing one in this direction, may be key to reduce most of the barriers associated with low attendance to cervical cancer screening. Reducing bureaucratic processes when accessing healthcare services and developing ways to help women understanding how to navigate the healthcare system (eventually with the help of community workers to work as a "bridge" between community and healthcare services) must be done to improve the quality of care offered to migrant women. A scoping review conducted by Handke *et al.* (2019) (264) identified 5 components that are essential for a culturally competent healthcare facility. These include "cultural competent training for the healthcare providers", "human resources development" (e.g.: recruitment of bilingual staff, capacity building of community workers), "integration of interpreter services", "adaption of the facility's healthcare features" (e.g.: providing cultural foods, including migrant-related posters in information boards, etc.), and "patient data collection and management" (to provide better care and have information about the migration background of the patients).

Giving the women the possibility of doing the screening test with a female healthcare worker should be available for all women, but particularly for migrant women from cultures where women's health is still a taboo. This measure may reduce feelings of embarrassment or social stigma and may help women to be more receptive to take the screening test. Even though this point was highlighted throughout this thesis, a systematic review suggests that the evidence available is not robust enough to prove that having a female provider increases screening attendance (262). Therefore, this point needs to be further explored in future research.

Another alternative that arises in the focus groups discussions was using self-sampling cervical cancer screening tests, and even though this topic was not explored in this thesis, it is something that could further be investigated. In fact, even though it is not the recommended screening practice, there is growing evidence on how self-sampling testing may increase cervical cancer screening attendance among underscreened groups, namely migrants (247,259).

It is important to consider that these organizational changes may require allocation of resources, human and/or financial, which may turn these interventions more expensive, time consuming and harder to implement.

During the development of this thesis, new research ideas and topics for further investigation have arisen:

- Conducting focus groups discussions with migrant women could provide an in-depth knowledge on how these women perceive the screening practices. This study would supplement the data collected from the focus group with healthcare workers and community workers and the survey to migrant women. This knowledge is valuable to develop interventions that meet their specific needs.
- Exploring migrant women knowledge about cervical cancer screening and its benefits, how to access cervical cancer screening in Portugal, and why and when they need to do that may help identify the knowledge gaps. These gaps may then be targeted by stakeholders when developing strategies to increase migrant women's participation on cervical cancer screening.
- Investigating barriers to cervical cancer screening on both migrant and native women would provide interesting insights on which barriers exist across women. This would allow to develop strategies and interventions that could benefit all women and improve screening access.
- Developing longitudinal studies with migrant women from the moment they arrived at Portugal and follow then up through time would allow to explore not only cervical cancer screening barriers over time, but also their overall access to healthcare services and health indicators through the period of the study. This would offer some hints on how to improve healthcare services to deliver better care to these women.

In summary, this thesis provides valuable insight on barriers to participation in cervical cancer screening among migrant women in Portugal. The results suggest that, even though several barriers have been identified, lack of knowledge and low health literacy, and difficulties in accessing healthcare services are the barriers which have a stronger association with low screening participation. Therefore, they should be prioritized when developing strategies to increase screening participation among migrant women in Portugal. Strategies to improve and promote cervical cancer screening among migrant women should be considered, such as improving the healthcare system to be

more culturally sensitive and migrant friendly, skill healthcare workers with competences to deliver better care to these vulnerable groups or establishing partnerships with community workers to implement interventions aiming to increase health literacy and promote screening.

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