Research Article

Use of Cervical Cancer Screening among Patients of Primary Healthcare Services: Northeast Portugal

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Abstract
Background: Understanding the overuse and underuse of cervical cancer (CC) screening plays a role in preventing such behaviours, allowing to maximize the CC screening uptake. **Aim:** To assess the predictors of being over-screened and never/under-screened in CC screening in Northeast Portugal. **Methods:** This is a part of a larger cross-sectional survey carried out in two public health centres in Northeast Portugal (October 2017 to June 2018). Data collection was based on a face-to-face interview. This analysis included 764 women (aged 25–60 years) classified according to the use of CC screening into guideline-consistent screened, over-screened and unscreened/under-screened. Multivariate logistic regression models were conducted to assess predictors of being over-screened and never/under-screened. Adjusted odds ratio (OR) and respective 95% confidence interval (95% CI) were obtained. **Results:** One-fourth (n = 197) of participants were unscreened/under-screened and 50.0% (n = 382) of them were classified as over-screened. Regular visits with primary care physicians (OR = 0.44; 95% CI: 0.26–0.76) and higher age (OR = 0.98; 95% CI: 0.96–1.00) reduced the odds of being unscreened/under-screened. Women who received prescription/recommendation for CC screening from primary care physician (OR = 1.89; 95% CI: 1.09–3.29) or both primary care physician and nurse (OR = 2.62; 95% CI: 1.10–6.22) were more likely to be over-screened. Higher level of CC health literacy decreases the odds of being over-screened (OR = 0.95; 95% CI: 0.90–1.00) and unscreened/under-screened (OR = 0.87; 95% CI: 0.82–0.92). The majority of over-screened (52.2%) and of under-screened (44.2%) women reported that their screening frequency was based on healthcare provider prescription. Among never-screened women, 60.2% reported that no one prescribed screening. **Conclusion:** The increase in CC health literacy can maximize CC screening uptake. Primary healthcare providers could play a role in preventing the overuse and underuse of CC screening.

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Utilização do rastreio de cancro do colo do útero em utentes dos cuidados de saúde primários: Nordeste de Portugal

Palavras Chave

Cancro do colo do útero · Rastreio oncológico · Prevenção secundária · Diagnóstico precoce · Saúde da mulher · Literacia em saúde

Resumo

Introdução: É importante compreender a sobreutilização e a subutilização do rastreio do cancro do colo do útero (CCU) para prevenir estes comportamentos e otimizar a utilização do rastreios. *Objetivo:* Avaliar os fatores associados à sobreutilização e à não-utilização/subutilização do rastreio do CCU na região Nordeste de Portugal. *Métodos:* Esta análise é parte de um estudo transversal conduzido em dois centros de saúde localizados no Nordeste de Portugal (Outubro/2017–Junho/2018). Os dados foram obtidos através de uma entrevista. Esta análise incluiu 764 mulheres (idade entre 25 e 60 anos) classificadas de acordo com a utilização de rastreio do CCU em: utilização segundo o recomendado, sobreutilização e não utilização/subutilização. Foram utilizados modelos de regressão logística multivariada para avaliar quais os fatores associados à sobreutilização e à não utilização/subutilização do rastreio do CCU. Obtiveram-se as estimativas de odds ratio ajustado (OR) e respetivo intervalo de confiança a 95% (IC 95%). *Resultados:* Um quarto (*n* = 197) das participantes nunca utilizaram ou subutilizaram e 50.0% (*n* = 382) sobreutilizaram o rastreio do CCU. As consultas regulares com o médico de família (OR = 0.44; IC 95%: 0.26–0.76) e o aumento da idade (OR = 0.98; IC 95%: 0.96–1.00) reduziram o risco de não utilização/subutilização do rastreio. As participantes que receberam recomendação/prescrição de rastreio de CCU do médico de família (OR = 1.89; IC 95%: 1.09–3.29) ou do médico e enfermeiro de família (OR = 2.62; IC 95%: 1.10–6.22) apresentaram maior probabilidade de sobreutilização. O aumento do nível de literacia sobre CCU leva a redução do risco de sobreutilização (OR = 0.95; IC 95%: 0.90–1.00) e de não utilização/subutilização (OR = 0.87; IC 95%: 0.82–0.92) do rastreio do CCU. A maioria de participantes que sobreutilizam (52.2%) e que subutilizam (44.2%) o rastreio do CCU reportaram que a frequência de utilização se baseia na prescrição do profissional de saúde. Das participantes que nunca utilizaram o rastreio do CCU, 60.2% reportaram que nenhum profissional de saúde prescreveu rastreio. *Conclusão:* O aumento da literacia sobre CCU pode otimizar a utilização de rastreio do CCU. Os profissionais de saúde dos cuidados de saúde primários podem desempenhar um papel importante na prevenção da sobreutilização e de não-utilização/subutilização do rastreio do CCU.

Introduction

Cervical cancer (CC) is the third most common neoplasia and is one of the main causes of death due to cancer among European women of reproductive age (15–49 years old) [1]. In Portugal, the age-standardized mortality rate due to CC was 3.2/100,000 women in 2020 and, although there has been a decrease among young women, there is no evidence of decreasing mortality due to CC among women aged 50 years or more [2].

The main determinant of CC is the infection with oncogenic types of human papillomavirus (HPV) [3]. Although a large proportion of HPV infections are transient, the persistent infection will result in cervical intraepithelial neoplasia and, if left untreated, these lesions will progress to invasive CC [3]. Advanced stages of CC and their treatment are related to low survival rate [4], severe outcomes that compromise the quality of life among survivors [5] and high economic burden related to medical care costs [6].

Screening can detect low-grade cervical intraepithelial neoplasia that can be monitored or even easily treated a long time before the development of invasive CC [7], playing a valuable role in the field of public health. The available evidence supports the effectiveness of cervical screening in reducing the incidence of advanced CC [8] and the mortality due to CC, having been estimated that 83% of deaths could be prevented if everyone attended screening regularly [9]. Therefore, the access and the adherence to regular cervical screening have a relevant impact in reducing the incidence of and mortality due to CC.

Population-based CC screening programmes have been implemented in Portugal covering 70% of eligible women in 2016 [10]. Between 2014 and 2016, CC screening adherence rates observed in Portugal increased from 50% to almost 90%. However, such rates present large variability between geographic regions, with the lowest rate in Northeast Portugal (61%) [10]. Low rates of adherence to population-based CC screening programmes suggests that there is a proportion of under-screened or even unscreened women.

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According to the new European Guidelines for Quality Assurance in Cervical Cancer Screening, women should be screened with cervical cytology every 3–5 years or every 5 years by HPV testing up to age 60 or 65 years [11, 12]. In Portugal, population-based CC screening programmes have been carried out following these new recommendations [10].

As regular attendance to CC screening is the main factor in preventing CC [8, 9], no use or underuse of CC screening is a matter of concern and should be prevented. On the other hand, the overuse of screening increases healthcare costs without improving patient outcomes and it should also be avoided [13].

Beyond sociodemographic characteristics, such as age [14], parity [14–16], marital status [14–16] or education level [14], the women's knowledge about risk factors and prevention of CC has been considered an important issue in increasing the rate of adherence to CC screening [15–18]. However, women's behaviour towards CC screening has also been related to the access to healthcare services and to the attitude of primary care providers with regard to screening uptake [19–21]. Furthermore, invitation and reminder letters from primary healthcare services have been effective in increasing CC screening adherence [19, 21]. Understanding how such factors affect the underuse and the overuse of CC screening is an important issue in improving the effectiveness of CC screening where there is low adherence to guideline-consistent CC screening.

Therefore, we aimed to come to know the predictors of being never/under-screened and over-screened in CC screening among patients of two primary healthcare services in Northeast Portugal.

Materials and Methods

Study Setting and Sampling Procedures
This is a part of a larger cross-sectional descriptive survey carried out in two public health centres in Northeast Portugal, serving a population of 35,341 inhabitants from which 52% ($n = 18,375$) are women, 43% of them ($n = 7,856$) being at reproductive age [22]. Similar to other Portuguese regions, there is a population-based screening programme [10]. However, there is also a private healthcare market, with services mainly offered by gynaecologists.

The study took place between October 2017 and June 2018. Nursing students on duty were previously trained as focal points and they were responsible for sampling procedures and data collection.

For this survey, a convenience sample was assembled. All women aged between 18 and 70 years with an appointment as a patient or as the companion of a patient, in each one of the public health centres, were eligible for the study. Women were invited to participate, they received an explanation about the protocol of the study, and those who signed the informed consent ($n = 1,093$) were enrolled in the study. According to the Portuguese Ministry of Health, the target population for organized CC screening are women aged between 25 and 60 years [10]. Therefore, 764 women were included in this analysis, after excluding participants aged less than 25 years ($n = 266$) or more than 60 years ($n = 43$) and those with data missing for age ($n = 20$).

The study was approved on 25th October 2017 by the Ethics Committee of the Unidade Local de Saúde do Nordeste, Bragança, Portugal, where the study was conducted (number 006485).

Data Collection
Data collection was based on a face-to-face interview to fill a structured questionnaire prepared for this proposal. The questionnaire covered the following topics: (1) sociodemographics, (2) use of health services, (3) frequency of CC screening and reasons underlying such frequency, (4) assessment of CC health literacy, and (5) satisfaction with organized CC screening. The analysis reported here was based on topics 1–4. The CC health literacy was assessed by using the Cervical Cancer Literacy Assessment Tool (CCLAT), which is a 24-items instrument [23]. The answers to each one of the items were classified as a correct or incorrect response. The participant received one point for each correct answer and zero points for incorrect answers. Therefore, the total score ranged from 0 to 24 with higher scores indicating higher CC health literacy. Permission to use the CCLAT was approved by the author of the questionnaire.

Variables
The outcome of interest is the frequency of CC screening. Women were classified according to the frequency of CC screening into 5 groups: never having CC screening, irregular/sporadic CC screening, regular screening interval of 3 or more years, regular screening interval less than 3 years with no previous suspicious screening and regular screening interval less than 3 years with previous suspicious screening. Reasons underlying the frequency of CC screening were obtained. Following guidelines [10–12], for statistical analysis, women were regrouped by frequency of CC screening into 3 groups: guideline-consistent screened (regular screening interval of 3 or more years and those with regular screening interval less than 3 years but with previous suspicious screening), over-screened (regular screening interval less than 3 years with no previous suspicious screening) and unscreened/under-screened women (which includes those never having CC screening as well as women who reported sporadic/irregular screening).

The following factors were used as possible explanatory variables of the frequency of CC screening: age, marital status (with and without a companion), education level (<10, 10–12 and >12 schooling years), previous pregnancies (none and at least 1), frequency of consulting primary care physician (never/irregular and regular visits), family planning attendance (yes or no), being beneficiary of health subsystem other than national health system (yes or no), who recommended/prescribed CC screening (primary healthcare physician, primary healthcare nurse, primary healthcare physician and nurse, gynaecologist, or primary healthcare and gynaecologist), screening through health centre invitation (yes or no) and level of CC health literacy assessed by CCLAT (score ranges between 0 and 24).

Table 1. Demographic characteristics and the pattern of healthcare services usage (*n* = 764)

Age, years		41.4±9.90
CCLAT score	Range: 0–24	14.4±4.12
Marital status	Without companion	275 (36.0)
	With companion	489 (64.0)
Schooling	<10 years	230 (30.1)
	10–12 years	226 (29.6)
	>12 years	308 (40.3)
Previous pregnancies	No	169 (22.1)
	Yes	595 (77.9)
Frequency of consulting primary care physician	Never/irregular/sporadic	118 (15.4)
	Regular	645 (84.5)
	Missing	1 (0.1)
Family planning	No	121 (15.8)
	Yes	643 (84.2)
Subsystem beneficiary	No	586 (76.7)
	Yes	178 (23.3)
Who recommended/prescribed	Primary care physician	436 (57.1)
	Primary care nurse	37 (4.8)
	Primary care physician and nurse	51 (6.7)
	Gynaecologist	74 (9.6)
	Primary care providers and gynaecologist	51 (6.7)
	Never screened	93 (12.2)
	Missing	22 (2.9)
Screening through health centre invitation	Yes	324 (42.4)
	No	347 (45.4)
	Never screened	93 (12.2)
CC screening frequency	Screening interval ≥3 years	120 (15.7)
	Screening interval <3 years (no previous suspicious screening)	382 (50.0)
	Screening interval <3 years (previous suspicious screening)	65 (8.5)
	Irregular/sporadic screening	104 (13.6)
	Never screened	93 (12.2)

Values are means ± standard deviation or *n* (%).

Statistical Analyses

A descriptive analysis of the sample was performed. Two multivariate logistic regression models were conducted to assess the effect of the explanatory variables on the outcome of interest. One model assessed determinants of being unscreened/under-screened and the other model assessed determinants of being over-screened. In both models, the comparison group included women with guideline-consistent CC screening. All possible explanatory variables were entered into the logistic regression model assessing determinants of being over-screened, but the variables "who recommended/prescribed CC screening" and "screening through health centre invitation" were not considered when assessing determinants of being unscreened/under-screened because such information was not ap-

plicable to unscreened women. A backward deletion procedure was carried out to retain those variables that were significant. The significance level was set at 0.05. Adjusted odds ratio (OR) and respective 95% confidence interval (95% CI) were obtained.

Results

Table 1 shows the demographic characteristics and the pattern of healthcare services usage among the participants included in the present analysis. Out of all 764 women included in the present analysis, 93 (12.2%) re-

ported that they had never undergone a CC screening during their lifetime, 104 (13.6%) reported underuse and 382 (50.0%) reported regular screening interval less than 3 years with no previous suspicious screening. The mean age of the participants was 41.4 (±9.90) years and the mean score of CCLAT was 14.4 (±4.12). The majority of women reported to have a partner (*n* = 489; 64.0%), a previous pregnancy (*n* = 595; 77.9%), regular frequency of consulting a primary care physician (*n* = 645; 84.5%), family planning attendance (*n* = 643; 84.2%) and CC screening recommendation/prescription by a primary care physician (*n* = 436; 57.1%).

With regard to the reasons underlying attitudes towards CC screening (Fig. 1), 52.2% of over-screened women and 44.2% of under-screened women reported that their screening frequency was based on healthcare provider prescription. Women with previous suspicious screening corresponded to only 15% of women with regular screening intervals less than 3 years. Moreover, 60.2% of unscreened women reported that no one prescribed the CC screening.

The results of multivariate regression models are presented in Table 2. Regular visits with primary care physicians (OR = 0.44; 95% CI: 0.26–0.76) and higher age (OR = 0.98; 95% CI: 0.96–1.00) reduced the odds of being unscreened/under-screened. On the other hand, women who reported to have a partner (OR = 1.82; 95% CI: 1.23–2.69) and those who received prescription/recommendation for CC screening from primary care physicians (OR = 1.89; 95% CI: 1.09–3.29) or both primary care physicians and nurse (OR = 2.62; 95% CI: 1.10–6.22) were more likely to be over-screened than those who received prescription/recommendation from the gynaecologist. The increase in CCLAT score has a protective effect for being unscreened/under-screened (OR = 0.87; 95% CI: 0.82–0.92) and for being over-screened (OR = 0.95; 95% CI: 0.90–1.00).

Discussion

This study aimed to understand the factors underlying the underuse/no use and the overuse of CC screening among women aged between 25 and 60 years. A noteworthy finding is that 25% of women reported never having or having sporadic/irregular CC screening. The majority of women never having CC screening reported that no one prescribed the test. Furthermore, a large proportion of under-screened or over-screened women reported that their CC screening frequency was based on healthcare provider prescription. A regular visit with a primary care
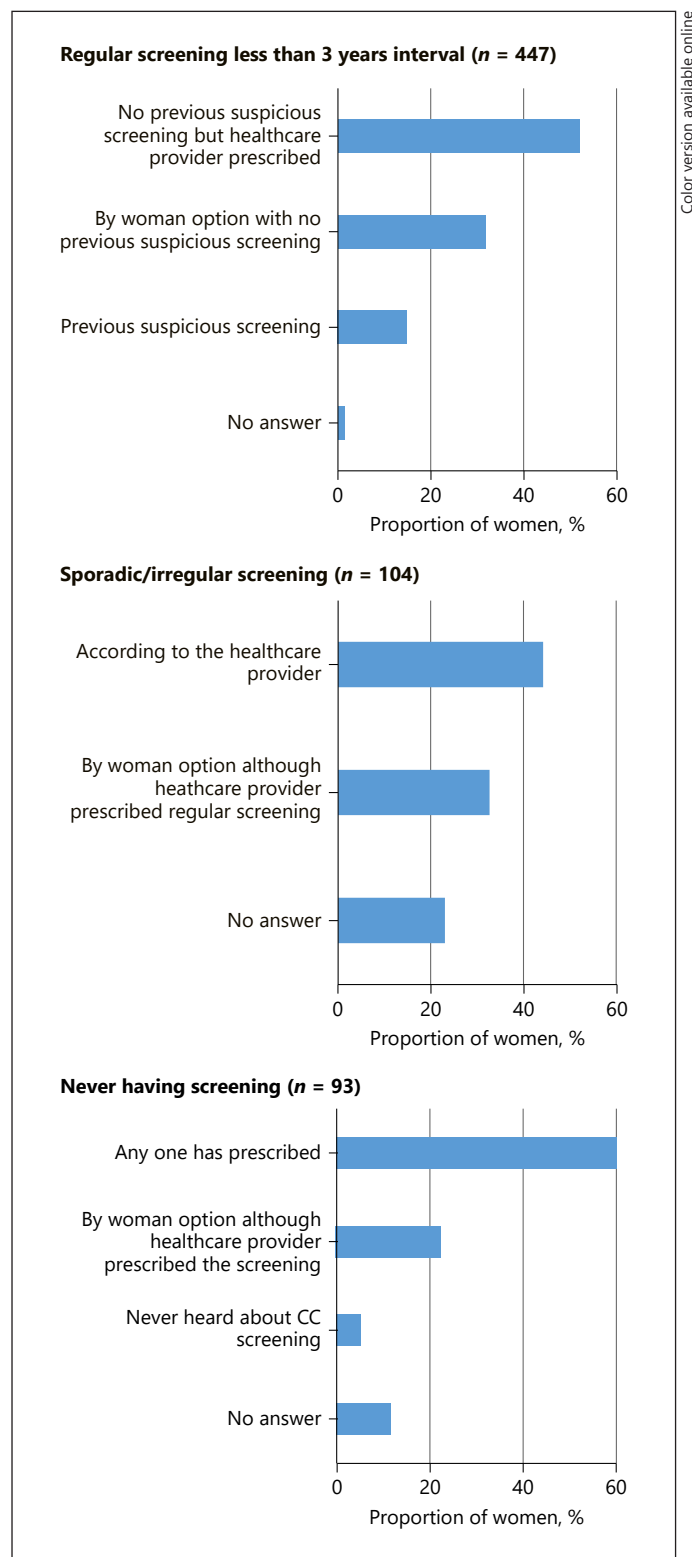

Fig. 1. Distribution of women according to the reasons underlying their attitudes towards CC screening.

Table 2. Bivariate and multivariate logistic regression models for assessment of predictors of being over-screened and unscreened/under-screened

		Over-screened		Unscreened/under-screened	
		OR (95% CI)*	*p* value	OR (95% CI)*	*p* value
Age (years)				0.98 (0.96–1.00)	0.033
CCLAT Score		0.95 (0.90–1.00)	0.048	0.87 (0.82–0.92)	<0.001
Marital status	Without companion	1			
	With companion	1.82 (1.23–2.69)	0.003		
Frequency of consulting primary care physician	Never/irregular			1	
	Regular			0.44 (0.26–0.76)	0.003
Who recommended/prescribed	Gynaecologist	1			
	Primary care physician	1.89 (1.09–3.29)	0.023		
	Primary care nurse	0.57 (0.25–1.35)	0.202		
	Primary care physician and nurse	2.62 (1.10–6.22)	0.030		
	Primary healthcare provider/gynaecologist	0.74 (0.34–1.62)	0.454		

* Adjusted for all other variables that remain in the model based on the backward selection procedure.

physician appeared as a protective factor against never/under-screening. On the other hand, women who reported prescription/recommendation of CC screening by primary care physicians were more likely to be over-screened. A higher level of CC health literacy appeared as a protective factor for being unscreened/under-screened and over-screened in CC screening.

Primary healthcare is crucial to improving the level of care in the community, based on equitable distribution of healthcare along the continuum, from health promotion and disease prevention to treatment and rehabilitation [24]. The skill mix profile of primary care is based on multidisciplinary teams where the primary healthcare physician plays an essential role in addressing generalized whole-person care based on patient-centred care models [25]. Previous research has reported that women's CC screening adherence is influenced by primary healthcare providers [19–21]. Women invited by their general practitioner are more likely to undergo screening [20, 21], and women who have no access to primary care physicians are more likely not to have recently been screened [14]. Following previous research, our findings highlight the protective role of regular visits to family physicians against being unscreened or under-screened.

However, our findings also showed that the majority of unscreened women did not undergo screening because no one prescribed it and a large proportion of under-screened women stated that their screening frequency was based on healthcare provider prescription. According to these findings, there is room for improvement of adherence to regular CC screening through primary care providers. Indeed, out of all unscreened or under-screened participants, 70% reported regular visits with primary care physicians and family planning attendance. Therefore, primary healthcare providers should increase awareness for prompting women regarding regular screening.

Current guidelines recommend screening at every 3 or every 5 years, depending on the type of test (cervical cytology or HPV testing). The decrease in screening interval did not improve the protection against CC but increased the demands for screening, the risk of anxiety and overtreatment due to the false-positive results, also increasing health costs [13]. However, our findings showed a high proportion (50%) of participants having regular screening intervals less than 3 years with no previous suspicious screening (over-screened women). Previous research has reported that defensive medical practice is one of the main reasons underlying the overuse of medical procedures, therapeutic approaches and diagnostic tests, and it has a strong impact on health costs [26]. It has also been reported that physicians tend to overestimate the benefits and underestimate the harms of medical interventions, including cancer screening, leading to an increase in such procedures [27]. Fear of missing an invasive CC, patient concerns, as well as the limited time to explain the risk and benefits of increasing the time interval between screenings are barriers to following CC screening guidelines [28, 29]. Further research is important to know whether such factors could explain the high rates of being over-screened that we observed, as one-half of these participants reported that their screening frequency was according to the healthcare provider prescription.

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According to our results, the women reporting recommendation/prescription of CC screening by primary healthcare physicians were more likely to be overscreened. Previous research conducted in other settings has reported that general practitioners could have concerns with regard to patient preferences to reassure the patient [30], and sometimes they could feel pressured because of an increasing request from patients for medical examinations [31]. Such circumstances drive clinical options [30, 31] and they could be possible reasons underlying our results.

Our results showed that the increase in CC health literacy prevents women from being under-screened as well as from being over-screened. These findings are in line with previous research where the level of knowledge on CC risk factors and CC prevention procedures appeared as a driver of women's adherence to CC screening, with important implications for public health [15–18]. The role of health literacy in increasing people's involvement to make more informed decisions about their health has been highlighted [32]. A preventive strategy focused on increasing women's knowledge seems to be a key issue to improve the use of CC screening. Primary healthcare providers could play a valuable role in this task.

Our study has some limitations. First, our analysis was based on a convenience sample. The sample was obtained by asking women who went to the health centre due to an appointment for them or their relatives, rather than by randomly drawing them from all women registered in each health centre. As younger women are more likely to take care of children, parents, or other relatives, the mean age we observed in our sample was lower than we would expect in the whole population. Second, the rate of regular screening reported by the participants was higher (75%) than the rate reported by the official data for the region (51%) [33]. This is a usual problem in studies of attendance, probably because more conscientious women and those who participate in screening programmes are also more prone to participate in a survey [16]. However, this could also be explained based on the convenience sample we used. Third, our data relies on self-reported information that could be inaccurate and sometimes could vary according to women's literacy. Fourth, our sampling procedure makes the inclusion of women who are not patients of primary healthcare services unfeasible. Therefore, the representativeness of our sample was compromised. In spite of these limitations, to the best of our knowledge, this is the first study assessing the underuse and overuse of CC screening in our setting and may give insights into factors underlying such attitudes.

Conclusion

In summary, we observed concerning rates of overscreened and unscreened/under-screened women in our setting where a population-based CC screening programme has been implemented according to the European guidelines. Public health campaigns focused on increasing CC health literacy are needed to maximize the use of CC screening. Primary healthcare providers should be available to give information and to motivate patients with regard to a guideline-consistent use of CC screening.

Statement of Ethics

This study protocol was reviewed and approved on 25th October 2017 by the Ethics Committee of the Unidade Local de Saúde do Nordeste, Bragança, Portugal, where the study was conducted (number 006485). Written informed consent to participate in this study was obtained from all participants.

Conflict of Interest Statement

The authors declare that they have no competing interests.

Author Contributions

C. Teixeira and C. Tomé conceived the study. C. Teixeira, C.A., E.A., M.J.G. and C. Tomé contributed to the design of the questionnaire. C.A., E.A., C. Tomé and A.V. prepared the focal points and they coordinated the data collection. C. Teixeira performed the statistical analyses and drafted the manuscript. All authors revised the manuscript and approved the final version of it.

Data Availability Statement

All data analysed during this study is available on request directed to the corresponding author.

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