

The association between immigration status and ineligible stool samples for colorectal cancer screening

Ulrik Deding^{a,*}, Christian Torp-Pedersen^{a,b}, Henrik Bøggild^{a,b}

^a Department of Health Science and Technology, Public Health and Epidemiology Group, Aalborg University, Niels Jernes Vej 14, DK-9220 Aalborg Øst, Denmark

^b Unit of Epidemiology and Biostatistics, Aalborg University Hospital, Sdr. Skovvej 15, DK-9000 Aalborg, Denmark

ARTICLE INFO

Keywords:

Colorectal cancer
Cancer screening
Colon cancer
Immigrants
Demographics
Screening uptake
Language barrier

ABSTRACT

Background: Barriers such as language and literacy might complicate the participation procedure for immigrants in screening programs. We investigated the delivery of a suitable stool sample for participation in the Danish colorectal cancer screening by immigration background.

Methods: National administrative registers were used to link results of faecal blood screening with immigrant status, age, sex, education, income, and marital status. Univariate and multivariate logistic regression models were used to estimate the odds of submitting an ineligible sample.

Results: 558,104 individuals submitted a sample during 2014 and 2015. A total of 2,164 (0.4%) samples were ineligible for faecal analysis. The lowest proportions of ineligible samples were found in the highest educational level (0.2%) and highest income level (0.2%). The highest proportion of ineligible samples was seen in non-Western immigrants (1.6%). After adjustment for age, gender, educational level, income and marital status non-Western immigrants had an increased odds ratio (OR 3.64 CI95% 2.86;4.64) of submitting an ineligible sample, compared to native Danes. Western immigrants did not have an increased odds ratio.

Conclusion: Non-Western immigrants have more than three times the risk of submitting an ineligible faeces sample for colorectal cancer screening than native Danes. Translation of invitation, information leaflet, and manual into other languages or targeted information for subgroups may help decrease the risk.

1. Introduction

Screening for colorectal cancer has been implemented in Denmark as well as in several other European countries. Immigrants, both Western and non-Western, make up a part of the population in Denmark that are targeted with the systematic screening program. As the colorectal cancer screening in Denmark relies on citizens completing a faeces sample in their own home, it is important that the procedure is understandable and feasible to the invited citizens. Immigrants, both Western and non-Western, have previously been reported to have a lower participation than natives [1–6] and this may be explained partially by low literacy and language barriers [7]. Immigrants and individuals for whom the native language of the country conducting the screening program is not a first language have been shown to have a lower awareness of colorectal cancer screening [3,8,9]. Increased awareness increases the intention to participate in colorectal cancer screening [9]. Whether immigrants are able to carry out the procedure and complete the faeces sample to the same degree as natives are unknown. As the risk of non-participation in colorectal cancer screening

can be affected by sociodemographic factors [2], these variables may also affect the risk of submitting ineligible samples. Therefore, we investigated the number of eligible and ineligible samples submitted to the program, divided by immigration status, in a large sample of citizens in the Danish colorectal cancer screening program, while adjusting for sociodemographic factors.

2. Methods

In Denmark, invitations for colorectal cancer screening were distributed to all citizens aged 50 to 74 by the Danish Regions. All citizens in the target population were enrolled during the first four years of screening (2014–2017). Individuals born in June, April and September were invited in 2014. Individuals born in November, August and January in 2015, May, July and October in 2016 and individuals born in March, February and December in 2017. The invitations consisted of an invitation letter, an information leaflet from the Danish National Health Authority, a kit for obtaining a sample of faeces, a prepaid return envelope and a manual on the completion of a stool sample. The

* Corresponding author.

E-mail address: ulrikdeding@hotmail.com (U. Deding).

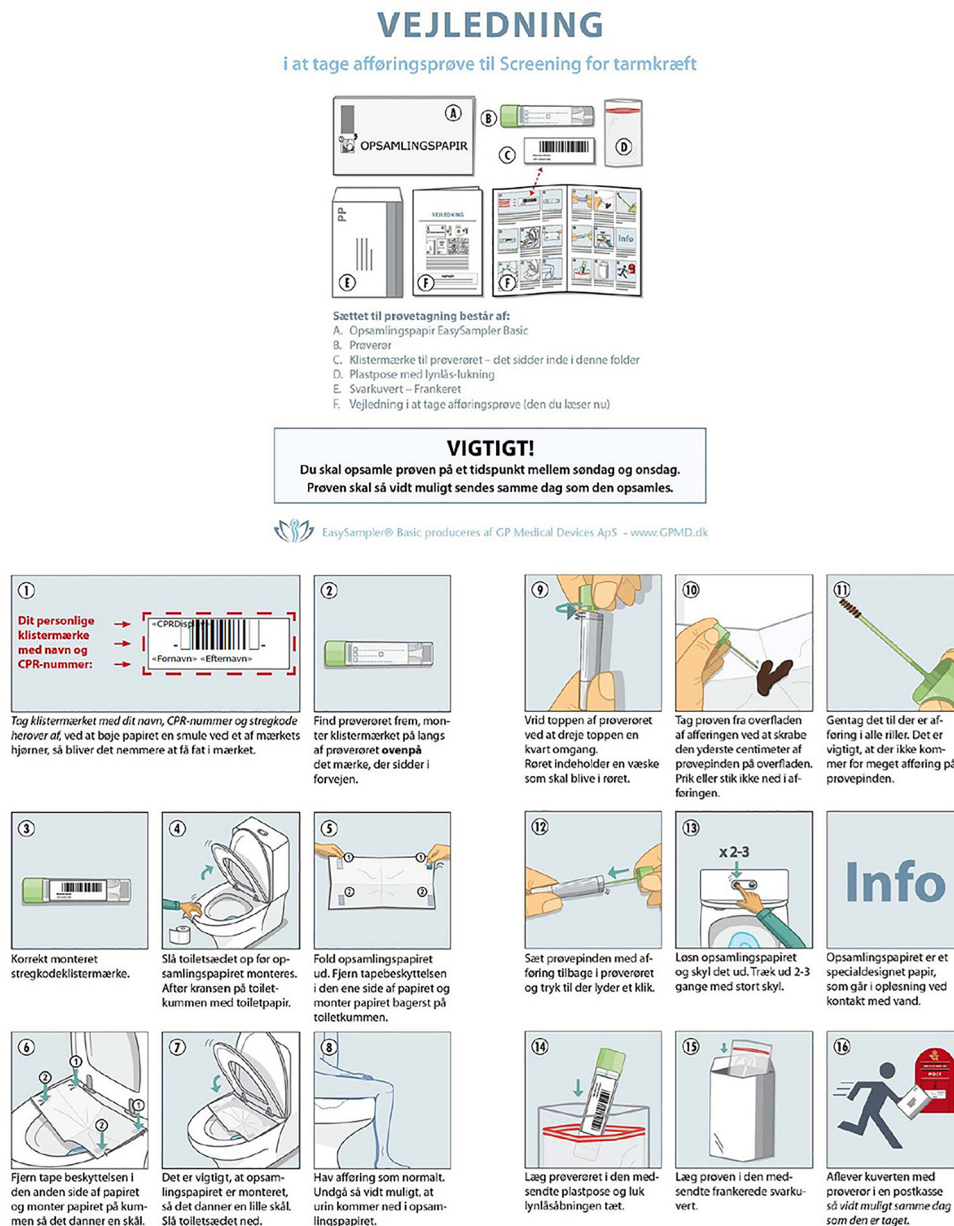


Fig. 1. Manual on the completion of a stool sample included in the invitation for citizens to participate in colorectal cancer screening, Denmark 2014–15.

manual with instructions for the completion of a sample was in Danish and included both an illustration of contents and a written list of contents, followed by a series of 17 drawn pictographs with a description in text underneath each illustration. 16 of the illustrations referred to an action to be carried out to complete the sample, while one was an information box regarding the disposal of a paper remedy used when collecting the sample (Fig. 1). Online information administered by the Danish Health Authority [10] was also in Danish with no option for translation. Citizens participated by mailing a stool sample in the pre-paid and pre-addressed envelope to a hospital laboratory in their region. Immunochemical faecal occult blood test (iFOBT) was used at hospital laboratories to test the amount of blood in the samples. Individuals submitting a sample ineligible for testing would automatically receive a new invitation, including a return kit shortly after the reception of ineligible sample at the hospital laboratory. After the first four years of screening (2014–2017), all individuals are to be re-invited for next round of screening every second year. Information on invitation date, participation registration by date of reception of the sample at the laboratory, and eligibility of the samples, were linked with

existing administrative registers. These registers held information on immigration status, gender, age, educational level, income and marital status. Linkage was made using encrypted personal identification numbers at Statistics Denmark. All citizens invited during 2014 and 2015 and who submitted a sample, were included in the study.

2.1. Registers

The Danish Colorectal Cancer Screening Database holds information on dates of invitations for screening, dates of reminders, dates of faecal sample reception at laboratories and results of the stool analyses. The data in the Danish Colorectal Cancer Screening Database was derived from the National Patient Register, the National Pathology Registry and the Invitation and Administration Module for the national colorectal cancer screening [11].

The Population's Education Register hold individual information on the highest achieved level of education for each citizen living in Denmark [12]. The Income Statistics Register has information on annual personal and household income as well as the registered personal

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