

Shift in determinants of remote care use from sociodemographic characteristics to health need factors during the course of the COVID-19 pandemic. A follow-up study

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Research Article

Keywords: COVID-19, remote care, socioeconomic status, access, general practitioner, general practice, chronic disease

Posted Date: August 18th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-10269884/v1>

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Additional Declarations: No competing interests reported.

Abstract

Background: Specialized disease centers require nurses with interdisciplinary core competencies; however, standardized systems for evaluating these competencies are lacking. Based on the Iceberg Model, we aimed to construct an evaluation index system for interdisciplinary core competencies of nurses in a digestive disease center using the Delphi method. We sought to provide a scientific basis for the training, evaluation, and management of nursing talent in specialty centers.

Methods: Grounded in the Iceberg Model and the Chinese Registered Nurse Competency Framework, preliminary competency dimensions and an item pool were developed through literature review and semi-structured interviews. Two rounds of Delphi expert consultation were conducted to screen and finalize indicators at all levels. The mean normalization method was used to calculate the weight of each indicator.

Results: The questionnaire response rates for the two rounds of Delphi expert consultation were 93.75% and 100%, respectively. The expert authority coefficients were 0.850 and 0.847. Kendall's W coefficients were 0.281 and 0.258, respectively ($P < 0.01$). The final evaluation index system for the interdisciplinary core competencies of nurses in digestive specialty centers comprised eight primary, 26 secondary, and 88 tertiary indicators.

Conclusions: The evaluation index system for interdisciplinary core competencies of nurses in digestive disease specialty centers constructed in this study is scientifically sound and reliable, with strong specialty-specific characteristics and clinical applicability. It provides a scientific and quantitative basis for the access, training, assessment, and evaluation of nursing talent in specialty centers.

Introduction

The start of the COVID-19 pandemic ushered in a new era regarding the mass introduction of remote access to GP care. Prior to the COVID-19 pandemic, remote care as an alternative for face-to-face contact with caregivers was already on the rise due to the rapid advancement of technologies and the growing demand for personalised care.¹ The imposition of stringent measures to contain the spread of the coronavirus during the first lockdown phase resulted in limited physical access to and changes in the organisation of primary health care.² Remote health care, defined as health care provision replacing direct face-to-face contact with consultations by telephone, email, video calls, and eHealth applications, has become the most important route of access to the GP.^{3,4} In the months after the first lockdown, when the stringent measures were relieved, the provision of remote care persisted to a greater extent than it did in the period before the lockdown.⁵

Inhabitants from deprived neighbourhoods with a low socioeconomic position (SEP) had relatively more chronic diseases⁶ and greater primary care utilisation during the COVID-19 crisis.⁷ They were more vulnerable and faced difficulties accessing remote care technologies.⁴ A low income, migrant

background, or lack of digital skills, combined with cultural and linguistic barriers, may have hindered the use of remote care technologies. However, research has also shown that patients are satisfied with the use of remote care when they receive reassurance from their general practitioner⁸. This finding showed that the active engagement of the GP, considering patients' needs and perceived barriers, increased patients' motivation to make the most out of remote care despite the physical distance.⁹

It is important to address and reduce the digital exclusion of vulnerable groups of patients to ensure their access to GP care. Andersen and Newman's behavioural model of health service¹⁰ use defines several factors determining the use of care in general and can also be applicable to the use of remote care in particular. They distinguished patients' background or predisposing characteristics, such as financial problems or ethnic background, enabling factors such as the removal of barriers to care and health needs such as having a chronic disease.

In a previous study, we showed that patients in low-income neighborhoods were able to consult a GP during the first lockdown period after the outbreak of COVID-19, which was due to the provision of remote care,¹¹ however, it was dependent on their perceived health, sex and age.

It is important to understand how vulnerable patients experienced the use of remote care in the longer run, when pandemic-related restrictive measures gradually eased. This study aims to gain insight into vulnerable patients' use of offered remote GP care and their attitudes regarding remote care during the course of the COVID-19 pandemic. We compared remote care use and attitudes at the onset of the pandemic and one year later and explored their associations with predisposing, enabling and need factors.

Methods

We conducted a follow-up study of GP patients in disadvantaged neighbourhoods at two time points. The study was part of the GP-COVERAGE study, which aimed to gain insight into the access to GPs and help-seeking behaviour of patients during the COVID-19 pandemic. Research methods and results at the time of the COVID-19 outbreak were previously reported (Sana et al, 2022). The study was reviewed and approved by the Ethics Review Committee of the Department of Psychology, Education, and Child Studies of Erasmus University Rotterdam (file number 20–042, 18 April 2020).

All methods in this study were performed in accordance with the relevant guidelines and regulations.

Procedure

We conducted this study in the area of Rotterdam city, the Netherlands, at the time of the outbreak of COVID-19 (T1, May to September 2020) and during the period with less stringent COVID-19 measures (T2, April to September 2021). Patients of GP practices in low-income neighbourhoods were recruited at T1 to participate in the survey and gave consent to be approached for the second measurement at T2. In total, fourteen GPs and nineteen general practitioners from our professional network participated in the

study. At T1, the GP practices recruited patients to fill out surveys via convenience sampling. The patients lived in low-income neighbourhoods defined by the Central Bureau of Statistics Netherlands as areas with relatively high numbers of households at risk of poverty.¹² We aimed at a balanced inclusion of patients in the following strata: (1) a migration background (Turkish, Moroccan or other) or non-migration background (Dutch). (2) Low or medium health literacy as judged by the GP during regular interactions with the patient. (3) Presence of a chronic disease or no chronic disease.

We included 210 patients at T1, allowing for loss to follow-up, with an equal number of patients per category in all strata, except for migration background, for which we included two-thirds of respondents with a migrant background. At T1, 96 patients completed paper and pencil surveys, and 117 patients were interviewed by phone via the same questionnaire. To increase the response rate at T2, the respondents in the first round were given the opportunity to be interviewed again by phone or by completing the questionnaire online or in handwritten form. The response rates were 97 (73%) and 36 (27%) patients, respectively. The interviews were conducted in the native language of the patient by a bureau specialised in interviewing people with low proficiency in the Dutch language.

Materials

The questionnaire was based on the survey used in our previous study (T1) published in Sana et al. 2022¹¹ and included previously validated items on GP care utilisation, attitudes towards remote GP care, health needs, and predisposing and enabling factors for remote care. For the present study, the questionnaire was extended with additional item assessing digital literacy. Table 1 provides a summary of the questionnaire scales and items.

Table 1
Survey scales and items

Survey scales	Number of items	Examples of items and answer categories
Attitude toward remote care	1	Self-constructed "How do you feel about the fact that the GP offers the option of email consultation or a videocall instead of contact at the GP's practice?" Answer categories 'Very negative; Negative; Neutral; Positive; Very positive'
Mental health (MHI-5)	2	"During the past 4 weeks, did you feel very nervous?" (Cronbach's $\alpha = .85$) [Ref] Answer categories 'Often; Sometimes; Rarely or never'
Perceived concern about COVID-19	3	Concern about the consequences of the COVID-19 crisis; concern about contracting COVID-19; concern about infecting others with COVID-19. Answers categories 'Not at all concerned; Slightly concerned; Somewhat concerned; Concerned; Very concerned'
Perceived health	1 1	"How do you rate your health in general?" Answer categories 'Very poor; Poor; Average; Good; Very good'
Chronic disease	1	"Do you have one or more chronic diseases (lasting longer than 6 months)?" Answer categories 'Yes; No; Diabetes; COPD/Asthma; Cardiovascular disease; Other, namely...'
Enabling factors – barriers to GP care access	15	"Which barriers to consulting your GP do you currently experience when you were to have health issues or problems?" (multiple answers possible), e.g. "There is a long wait when I try to make an appointment by phone." Answer categories
Health literacy	2	"How much effort does it cost you to fill in a survey about your own health?" Answer categories 'Very much; Much; Some; Little; Very little'
Digital literacy	3	"I know how I can find information about health on the internet." Answer categories 'Strongly disagree; Disagree; Agree; Strongly agree'

GP service utilisation was measured with 13 items about the ways in which patients had reached out to their GP during the COVID-19 pandemic. Each item was classified as remote care contact, face-to-face contact or contact with the GP assistant. The items classified as remote care included having a telephone consultation, a video consultation, a consultation via e-mail or chat, calling the GP practice to ask for a result of medical examinations or with another question, and whether the GP practice referred them to information on a website. The item on face-to-face contact with the GP comprised a visit to the GP's consultation hours. The items that were classified as contact with the GP assistant included scheduling an appointment for consultation hours or contacting a repeat prescription, whether by phone or by visiting the GP practice. The final thirteenth item was an open-ended question in which patients could indicate any other contact that was not included in the previous 12 items. The responses to this item were consequently recoded as either remote, face-to-face or GP assistant contact.

We investigated patients' attitudes toward remote care through a self-constructed question: "How do you feel about the fact that the GP offers the option of email consultation or a videocall instead of contact at the GP's practice?" Answer categories were 'very negative; negative; neutral; positive; very positive'.

The questions in the survey about health need factors included standard items on perceived health, health complaints and chronic diseases from the National Health Monitor Survey.¹³ Mental health was measured via the Mental Health Inventory (MHI-5) scale (Cronbach's alpha = .85).¹⁴ Perceived concern about COVID-19 was measured via three items: (1) concern about the consequences of the COVID-19 crisis, (2) concern about contracting COVID-19 and (3) concern about infecting others with COVID-19 ($\alpha = .66$).¹⁵

For the measurement of enabling factors, we included 15 items on perceived barriers to access to GP care on the basis of the categories from the 'barriers to treatment' scale.^{16,17} The respondents could select multiple answers from the list of 15 items indicating whether they perceived the existence of barriers and, if applicable, which specific barriers they identified. Predisposing factors of the respondents, such as gender, age, migration background, educational level and financial difficulties, were asked by using questions from the National Health Monitor Survey. Health literacy was measured via two items adapted from Twickler et al.¹⁸ and Wallace et al.¹⁹ on problems with understanding information about one's own health and completing a questionnaire about one's health ($r = -.61$). Digital literacy was assessed with three items adapted from Kayser et al. (2018).²⁰

Data analysis

Dependent variables assessing the use of remote care at least once or not at T1 and at T2 were constructed. Additionally, the use of remote care at both T1 and T2 was assessed. For this purpose, the thirteen GP service utilisation items were recoded into two dichotomous variables (remote care at T1 and remote care at T2) with the following categories: remote care, when at least one item for remote care was positive, and other care (when patients received face-to-face care or had contact with the GP assistant instead). On the basis of these two variables, we constructed a third dichotomous remote care variable to assess stable remote care use, with the categories stable remote care use (when remote care at T1 and T2 were both positive) or no stable remote care use (at either time point or at only one of the two time points). Attitude toward remote care was our secondary dependent variable. We dichotomised attitudes into neutral attitudes to positive attitudes and negative attitudes.

The answer categories of the independent variables were dichotomised around the 50th percentile or with a theoretically based boundary category. Descriptive statistics were calculated for all independent variables, and frequencies were given for the T1 and T2 response groups.

Bivariate logistic regression analyses were conducted separately for the three remote care use variables T1, T2 and T1 and T2 combined (stable remote care), with the attitude variable at T2 as the dependent

variable and background characteristics and health need variables as independent variables.

Confounding and interaction effects for stable remote care use at T1 and T2 were examined via multivariate logistic regression analyses. Independent variables were first screened via bivariate analyses, and those showing significant associations were considered for inclusion in the multivariate models. Variables with low cell counts or highly skewed distributions were excluded from further analyses.

Owing to the limited sample size and sparse data, a full multivariate model including all the predictors was not feasible. Therefore, a series of two-step logistic regression models were constructed for pairs of predictors. In the first step, the main effect was entered, followed by the inclusion of an interaction term in the second step. In addition, a separate logistic regression model was constructed with attitudes towards remote care at T2 as the dependent variable, adjusting for attitudes at T1 and bivariate significant predictors. Missing data were recorded as systems missing and excluded from the analyses. All analyses of the survey data were conducted via IBM SPSS Statistics version 27.0 (IBM Corp., 2021).

Results

Sample characteristics

The total number of responses decreased from 213 respondents at T1 to 133 at T2. Dropouts at T2 did not significantly differ in terms of any background or health need characteristic, except for chronic disease. Dropouts were less likely to have a chronic disease than respondents who participated at both T1 and T2 (31.6% of dropouts compared with 56.5% of T2 respondents).

The respondents' background characteristics were fairly equally distributed over time (see Table 2). At T1, the respondents were more often female (56.8%), above 50 years of age (61.1%) and had a migration background (66.5%). Approximately half of the respondents had low health literacy, and one-third had low digital skills. Compared with the Dutch general population (26%)²¹, the proportion of respondents with a low educational level was greater at both time points (T1: 50.7%; T2: 50.4%). The percentage of respondents who had financial difficulties was 23.2% at T1 and 18.9% at T2. Compared with the respondents at T1, the respondents at T2 had more financial problems and greater health literacy. Additionally, more respondents at T2 than at T1 had a chronic disease and a negative attitude toward remote care, but they were overall less worried about COVID-19.

Table 2
Respondents' background and health needs characteristics at T1 and T2

		Respondents on T1 (N = 213)		Respondents on T2 (N = 133)	
		n	%	n	%
Sex	Male	92	43.2	52	39.1
	Female	121	56.8	81	60.9
Age	<=49	82	38.9	47	35.3
	50+	129	61.1	86	64.7
Educational level	Middle-high ¹	104	49.3	66	49.6
	Low ²	107	50.7	67	50.4
Migration background	No	71	33.5	42	31.8
	Yes	141	66.5	90	68.2
Financial difficulties	No	162	76.8	107	81.1
	Some to many difficulties	49	23.2	25	18.9
Health literacy	High	110	51.9	63	47.4
	Low	102	48.1	70	52.6
Digital literacy (T2)	Low			38	29.2
	High			92	70.8
Attitude towards remote care	Neutral – Positive	149	70.6	77	58.3
	Negative	62	29.4	55	41.7
Perceived barriers to care	No	159	75	92	71.3
	Yes	53	25	37	28.7
Perceived health	Very good – good	124	58.5	74	55.6
	Very poor – average	88	41.5	59	44.4
Mental health	Average – good	149	71.3	111	84.1
	Poor	60	28.7	21	15.9
Chronic disease	No	111	52.9	61	46.2

		Respondents on T1 (N = 213)		Respondents on T2 (N = 133)	
		n	%	n	%
Concerns about COVID-19	Yes	99	47.1	71	53.8
	Yes	128	60.1	64	48.1
	No	85	39.9	69	51.9

¹Vocational education or higher, ²Primary or prevocational education

*Use of GP care was known for 133 of 213 respondents at T1 and 115 of 133 patients at T2

Type of GP care use

The proportion of patients who received remote or other care, i.e., face-to-face care or contact with a GP assistant, at T2 (56% and 44%, respectively) was similar to that at T1 (see Fig. 1). Bivariate associations of patient characteristics with type of care use are given in Table 3. The use of remote care at T1 was at the bivariate level associated with sex and age, with more females using significantly more remote care than males did (OR = 3.22, 95% CI 1.57–6.59) and fewer respondents 50 years and over using remote care than younger respondents did (OR = 0.46, 95% CI 0.22–0.97). A significant bivariate association with these background characteristics was lacking at T2. Instead, at T2, remote care was less often used by those with financial difficulties (OR = 0.30, 95% CI 0.11–0.81) and a chronic disease (OR = 0.40, 95% CI 0.19–0.87) and more often by those with a migration background (OR = 2.18, 95% CI 1.00–4.74) and digital skills (OR = 2.73, 95% CI 1.19–6.26).

Next, we explored which independent variables were related to stable remote care use (patients who received remote care at both time points T1 and T2) (Table 3). Age, financial difficulties, chronic disease, and digital skills were significantly associated with stable remote care use. Patients younger than 50 years (OR = 3.18, 95% CI 1.24–8.17), patients with little to no financial difficulties (OR = 14, 95% CI 1.74–112.48), patients without a chronic disease (OR = 3.56, 95% CI 1.40–9.05), and patients with greater digital skills (OR = 3.60, 95% CI 1.18–11.00) were more likely to receive remote care at both T1 and T2.

At the multivariate level, the exploration of confounding effects revealed that the associations with age and digital skills were no longer significant and were confounded by chronic disease (age: OR = 0.39, 95% CI 0.14–1.03; digital skills OR = 2.56, 95% CI 0.78–8.37) (not in table). Chronic disease remained significantly associated (OR = 0.33, 95% CI 0.13–0.87) with remote care use, adjusting for age as a covariate in the multivariate logistic regression model. The same confounding effect of chronic disease was also found when adjusting for digital skills in the model. In addition, no significant interaction effects were found between the three independent variables.

Attitudes toward remote care use

In contrast to the stable proportion of patients who used remote care, the attitude toward remote care changed at T2, with a decline in patients with a positive attitude from 71% to 58% (Fig. 1). Attitudes were not significantly associated with remote care use at any time point (T1 or T2). At the bivariate level (Table 3), the respondents' attitudes toward remote care use in the second COVID-19 wave at T2 were positively associated with educational level, migration background, financial situation, health literacy, and health need characteristics, i.e., perceived health and chronic disease, and negatively associated with digital skills. We explored confounding and interaction effects with multivariate regression analysis of these characteristics with attitude at T2, corrected for the attitude at T1 and a third significant variable at T1. We found an interaction effect of migration background with chronic disease ($p < 0,05$). For T1, the association between having a chronic disease and having a negative attitude toward remote care use was significant in the migrant group (OR = 0.14, 95% CI 0.06–0.36) but not in the non-migrant group (OR = 1.91, 95% CI 0.45–8.04).

Table 3

Bivariate associations of background and health need characteristics with type of care use (remote vs. other care) at T1, T2, and both T1 and T2 and attitudes toward remote care (neutral–positive vs. negative) at T2.

Total group (N = 213 ^a)	Remote care use T1 (n=133 ^b)		Remote care use T2 (n=115 ^b)		Remote care use (n=81 ^b) T1 and T2		Neutral–Positive attitude T2 (n=132 ^b)	
	Yes		Yes		Yes		Yes	
	n ^b (%)	OR (95% CI)	n ^b (%)	OR (95% CI)	n ^b (%)	OR (95% CI)	n (%)	OR (95% CI)
Sex								
Male	22 (39.3)	1.00	21 (50)	1.00	9 (29)	1.00	28 (54.9)	1.00
Female	52 (67.5)	3.22 (1.57– 6.59)**	43 (58.9)	1.43 (0.67– 3.08)	26 (50)	2.44 (0.95– 6.30)	49 (60.5)	1.26 (0.62– 2.56)
Age								
<=49	32 (68.1)	1.00	24 (63.2)	1.00	17 (60.7)	1.00	45 (52.3)	1.00
50+	42 (49.4)	0.46 (0.22– 0.97)*	40 (51.9)	0.63 (0.28– 1.40)	18 (32.7)	0.32 (0.12– 0.81)*	32 (69.6)	0.48 (0.23– 1.02)
Educational level								
Middle–high	34 (59.6)	1.00	33 (58.9)	1.00	18 (50)	1.00	51 (77.3)	1.00
Low	38 (51.4)	0.71 (0.36– 1.44)	31 (52.5)	0.77 (0.37– 1.61)	17 (36.2)	0.57 (0.23– 1.37)	26 (39.4)	0.19 (0.09– 0.41)***
Migration background								
No	20 (48.8)	1.00	18 (43.9)	1.00	8 (29.6)	1.00	32 (76.2)	1.00
Yes	53 (58.2)	1.46 (0.70– 3.07)	46 (63)	2.18 (1.00– 4.74)*	27 (49.1)	2.29 (0.86– 6.11)	44 (49.4)	0.31 (0.13– 0.70)**
Financial difficulties								

Total group (N = 213 ^a)	Remote care use T1 (n=133 ^b)		Remote care use T2 (n=115 ^b)		Remote care use (n=81 ^b) T1 and T2		Neutral–Positive attitude T2 (n=132 ^b)	
	Yes		Yes		Yes		Yes	
No	51 (52.6)	1.00	56 (60.9)	1.00	34 (50)	1.00	67 (63.2)	1.00
Some to many	22 (62.9)	1.53 (0.69–3.37)	7 (31.8)	0.30 (0.11–0.81)*	1 (6.7)	0.07 (0.01–0.57)*	9 (36)	0.33 (0.13–0.81)*
Health literacy								
High	36 (55.4)	1.00	35 (55.6)	1.00	18 (50)	1.00	51 (82.3)	1.00
Low	37 (55.2)	0.99 (0.50–1.97)	29 (55.8)	0.99 (0.47–2.08)	17 (36.2)	0.57 (0.23–1.37)	26 (37.1)	0.13 (0.06–0.29)***
Digital skills								
Low ^d			13 (38.2)	1.00	5 (21.7)	1.00	8 (21.1)	1.00
High			49 (62.8)	2.73 (1.19–6.26)*	29 (50)	3.60 (1.18–11.00)*	67 (73.6)	10.47 (4.22–25.97)***
Attitude towards remote care option								
Neutral–Positive	54 (57.4)	1.00	38 (55.9)	1.00	23 (46.9)	1.00	–	–
Negative	20 (52.6)	0.82 (0.39–1.75)	25 (54.3)	0.94 (0.44–1.99)	11 (33.3)	0.57 (0.23–1.41)	–	–
Perceived barriers								
No	54 (52.4)	1.00	43 (55.1)	1.00	23 (40.4)	1.00	51 (56)	1.00
Yes	20 (66.7)	1.82 (0.77–4.25)	19 (55.9)	1.03 (0.46–2.32)	11 (47.8)	1.36 (0.51–3.59)	23 (62.2)	1.29 (0.59–2.82)
Perceived health								

Total group (N = 213 ^a)	Remote care use T1 (n=133 ^b)		Remote care use T2 (n=115 ^b)		Remote care use (n=81 ^b) T1 and T2		Neutral–Positive attitude T2 (n=132 ^b)	
	Yes		Yes		Yes		Yes	
Well	34 (50.7)	1.00	34 (55.7)	1.00	20 (48.8)	1.00	50 (68.5)	1.00
Poor–average	40 (60.6)	1.49 (0.75– 2.97)	30 (55.6)	0.99 (0.48– 2.08)	15 (35.7)	0.58 (0.24– 1.41)	27 (45.8)	0.39 (0.19– 0.79)**
Mental health								
Well	52 (58.4)	1.00	53 (54.6)	1.00	29 (42)	1.00	67 (60.9)	1.00
Poor	22 (52.4)	0.78 (0.37– 1.64)	11 (64.7)	1.52 (0.52– 4.45)	6 (46.2)	1.18 (0.36– 3.89)	10 (47.6)	0.58 (0.23– 1.49)
Chronic disease								
No	27 (50)	1.00	34 (68)	1.00	19 (61.3)	1.00	43 (71.7)	1.00
Yes	44 (57.9)	1.38 (0.68– 2.77)	30 (46.2)	0.40 (0.19– 0.87)*	16 (30.8)	0.28 (0.11– 0.71)**	34 (47.9)	0.36 (0.18– 0.75)**
Worries regarding COVID–19								
No	27 (51.9)	1.00	30 (50)	1.00	16 (36.4)	1.00	42 (61.8)	1.00
Yes	47 (58)	1.28 (0.64– 2.58)	34 (61.8)	1.62 (0.77– 3.40)	19 (48.7)	1.66 (0.69– 4.00)	35 (54.7)	0.75 (0.37– 1.50)
*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$ ^a total number of participants ^b n varies because of missing data ^c Unadjusted bivariate ^d Measured in T2 only								

Discussion

In this follow-up study, the course of GP remote care use and attitudes towards remote care among GP patients from low-income neighbourhoods during the COVID-19 pandemic were studied. We compared remote care use and attitudes at the start of the pandemic (T1) and one year later (T2) with less stringent measures. The use of remote care appeared to be stable at both time points. However, the relatively positive attitude towards remote care at the start of the pandemic declined in the second year of the pandemic, when access to GP care changed. At T1 but not at T2, patient sex and age were significantly related to remote care use. After one year of the COVID-19 pandemic at T2, no associations with predisposing characteristics were found, and patients' financial situation, migrant status, digital skills and chronic health needs were associated with remote care use.

During the first year of the COVID-19 pandemic, with stringent lockdown measures and limited physical access to GP practices, remote care was the main option for contact with the GPs. At that time, female patients may have had more contact with the GP practice because of their role in informal care²² and, in part, because of consultations for issues related to reproductive health and children.²³ An explanation for the lower rate of people aged 50 years and older may be their lower willingness and experience in using remote care²⁴. The findings of those with financial difficulties, fewer digital skills and chronic diseases who more often have face-to-face contact with the GP and frequent contact with the GP assistants, instead of remote contact, can also be explained from the literature. People with low income or financial problems in general make greater use of GP care.^{25,26} The financial situation of these individuals may even have aggravated due to COVID-19. The greater use of remote care by patients with a migrant background than non-migrant patients during the COVID-19 pandemic may be explained by their greater primary care use in general²⁷ and before the pandemic. The mastery of digital skills for the use of telemedicine is associated with increased remote care use.²⁸ Moreover, previous research has shown that high-frequency users of remote consultation services often have complex healthcare needs, including chronic physical and mental health conditions, which may contribute to increased consultation rates.²⁹ Finally, having a chronic disease may have explained the greater use of other forms than remote care, such as face-to-face contact with the GP and frequent contact with the GP assistants.

In the second year of the COVID-19 pandemic, owing to less stringent measures and higher COVID-19 vaccination rates, the accessibility of GP practices changed. This may explain why the selective use of remote care was no longer dependent on general demographic factors but rather on sociodemographic factors, such as financial difficulties, migration and digital skills, and chronic disease as a healthcare need factor from the model of Andersons and Newman's behavioural model of health service use¹⁰. From the perspective of care provision, GPs may have used more general criteria to allow face-to-face contact with patients at the beginning of the pandemic, whereas one year later, they predominantly may have considered the provision of remote care via indicators of patients' skills and needs. However, the relationships of age and digital skills with stable remote care at the start of COVID-19 and after one year were no longer significant when corrected for the presence of a chronic disease. This means that not age or digital skills but the presence of a chronic disease is more important for less use of remote care during the COVID-19 pandemic. This may also be explained by an accumulation of predisposing factors

in patients with chronic diseases in low-income neighborhoods, such as older age, fewer digital skills and financial problems. This should be investigated with greater numbers of research subjects.

Although a UK study revealed that patients generally had good experiences with remote care³⁰, we found a rather negative attitude towards remote care in our study, with mainly patients from deprived neighbourhoods. This phenomenon was particularly common in patients with chronic conditions and a migration background, although this result must be treated carefully because of the low sample size. In another study, we found a preference for face-to-face contact with the GP above remote care in certain migrant groups³¹. This may be explained by the socioeconomic determinants of greater need for care in this group of patients⁶, in which disparities in health and digital literacy and less access to appropriate digital means accumulate.

Strengths and limitations

A strength of our study is the participation of respondents from a generally underrepresented group from deprived neighbourhoods. Extensive efforts to engage the professional network of the GPs and deployment of a professional bureau to conduct the survey in the native language helped as a recruitment strategy. Moreover, the longitudinal design of our study provides unique insight into the perspective of patients on the use of remote care from deprived neighbourhoods during the two successive and challenging COVID-19 pandemic years.

A limitation of our longitudinal study is the dropout rate of participants in the second round of the survey, leading to limited numbers of subjects in our study. To minimise the degree of dropout, we targeted the method of data collection to the capacities of the respondents, either via interviews or hand-written or online questionnaires. The reasons for dropping out were not being available for a telephone call, a lack of time for an interview or being unaware of having consented to participate in the second round of interviews. Nevertheless, the number of dropouts did not significantly differ from the respondents' background characteristics. More chronic patients participated in the second round; therefore, the remote care use reported at T2 may have been an underestimation, and the decreased attitudes may have been an overestimation. On the other hand, the relatively low loss to follow-up among chronic patients can also be seen as a study strength. Owing to low cell counts, fully adjusted multivariable modelling was not feasible, and the findings should therefore be interpreted as exploratory. To address this limitation, a series of two-step logistic regression models were constructed for pairs of predictors. This approach enabled the exploration of potential confounding and interaction effects while reducing model instability. The questionnaire consisted of a limited number of adapted questions tailored to respondents who were not used to completing questionnaires regularly. Validation of the questionnaire items will be required for application in future studies. Another limitation may be the setting of the COVID-19 pandemic with its own specific context. Therefore, the results cannot be generalised to the present situation without the COVID-19 pandemic; however, the less strict admissibility of GP practices

in the second year of COVID-19 may indicate a trend toward a society with a less invasive infectious disease.

Implications for practice

Although the stringent restrictive measures were relieved in the second year of the COVID-19 pandemic, the accessibility and availability of GP care continued to rely on remote care. Our findings indicate that remote care utilisation was not only positively associated with digital skills, the absence of chronic conditions, and less financial difficulties but also negatively associated with migration background. These factors may interact with and reinforce existing inequalities in access to care. Therefore, it is crucial for GPs to consider these determinants influencing the type of care used, such as remote care.

To ensure equitable access, specific policy measures should focus on empowering patients' self-efficacy in managing their health and navigating through primary care, whether through digital means or consultations in person. Tailored interventions are particularly needed for patients with chronic diseases, who are often more reliant on protocol-based disease management. Addressing differences in digital literacy, attitudes towards remote care, and socioeconomic barriers can help prevent widening disparities in access to GP care. This is particularly relevant not only for future public health crises but also during the ongoing transition towards increasingly digitally enabled primary care models. As remote care becomes increasingly embedded in routine practice, ensuring equitable access should remain a key priority for healthcare providers and policymakers.

Implications for research

Future research should explore in greater depth the specific determinants related to patients' attitudes towards remote care and their chronic conditions, as these factors may influence the use of remote consultations more strongly than, for example, age or digital skills. We could not disentangle all the determinants explaining care use due to the limited sample size. We recommend further longitudinal research into types of care use, including digital forms, in underrepresented populations with larger study groups; now, the COVID-19 pandemic has stopped. As the digitalisation of health care continues to expand, qualitative studies focusing on patients with chronic illness and differing sociodemographic backgrounds will provide valuable insight into their perspectives on remote care. Such research may help prevent the widening of the digital divide and ensure equitable access to primary care for all patients.

Conclusion

The COVID-19 pandemic accelerated at the beginning of the use of remote care in Dutch general practices. Patients used GP care remotely depending on the demographic characteristics sex and age. After one year, patients' remote care use seemed much more selective on the basis of other sociodemographic background characteristics and chronic diseases. The relatively positive attitudes toward remote care decreased during the course of the COVID-19 pandemic. In general, this study shows

that GP remote care should be selectively advised for patients with socioeconomic vulnerability, such as those with financial difficulties, low digital skills and chronic diseases.

Declarations

Funding

This study was funded by ZonMW under registration number 10430022010021.

Note

The following free AI editing tools were used in the text editing process: Curie and ChatGPT.

Availability of data and materials

We are not able to make data underlying the findings described in our manuscript available without restriction, because of ongoing PhD project of some of the authors. Researchers interested in our dataset can contact the project leader Dr. PL Kocken (one of the authors) with reasonable request via email kocken@essb.eur.nl.

Declarations Ethics approval and consent to participate

The study was reviewed and approved by the Ethics Review Committee of the Department of Psychology, Education, and Child Studies of Erasmus University Rotterdam (file number 20–042, 18 April 2020). Respondents who completed the survey on paper at home and returned the survey by post gave consent on an informed consent form; for respondents who were called for a short interview their verbal consent was registered. The participating GP's also gave their written consent for this study. This procedure was confirmed by the Ethics Review Committee of the Department of Psychology, Education, and Child Studies of Erasmus University Rotterdam (file number 20–042, 18 April 2020).

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Figures

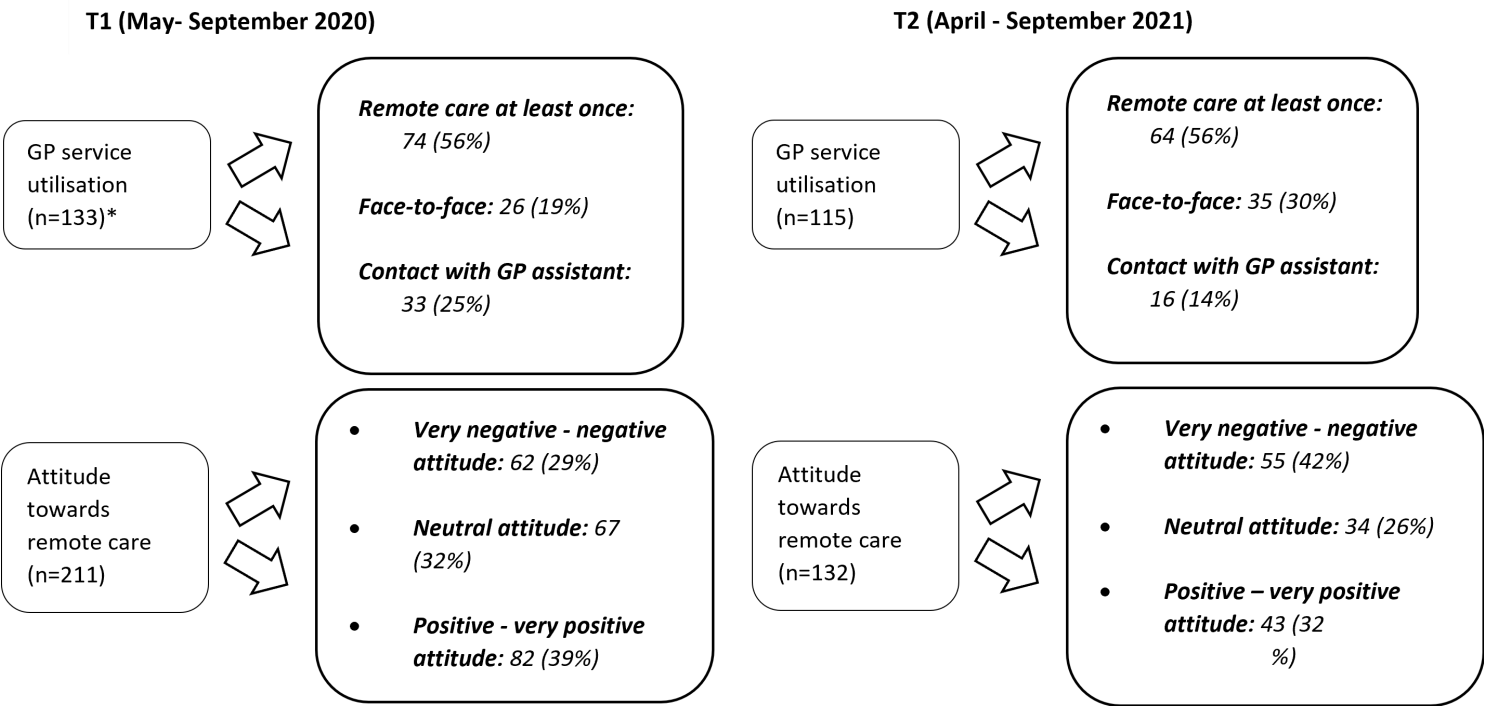


Figure 1

Types of care use by respondents at T1 and T2

*Use of GP care was known for 133 of 213 respondents at T1 and 115 of 133 patients at T2