BJGP OPEN

General practitioner phone calls to improve COVID-19 vaccine uptake among patients at increased risk of severe COVID-19: A randomised trial

Tuv, Marit; Elgersma, Ingeborg Hess; Furuseth, Ellen; Holst, Christine; Helleve, Arnfinn; Fretheim, Atle

DOI: https://doi.org/10.3399/BJGPO.2022.0175

To access the most recent version of this article, please click the DOI URL in the line above.

Received 06 December 2022
Revised 01 Febuary 2023
Accepted 03 Febuary 2023

© 2023 The Author(s). This is an Open Access article distributed under the terms of the Creative Commons Attribution 4.0 License (http://creativecommons.org/licenses/by/4.0/). Published by BJGP Open. For editorial process and policies, see: https://bjgpopen.org/authors/bjgp-open-editorial-process-and-policies

When citing this article please include the DOI provided above.

Author Accepted Manuscript
This is an 'author accepted manuscript': a manuscript that has been accepted for publication in BJGP Open, but which has not yet undergone subediting, typesetting, or correction. Errors discovered and corrected during this process may materially alter the content of this manuscript, and the latest published version (the Version of Record) should be used in preference to any preceding versions

General practitioner phone calls to improve COVID-19 vaccine uptake among patients at increased risk of severe COVID-19: A randomised trial.

Marit Tuv (0000-0002-1074-7680), Ingeborg Hess Elgersma (0000-0002-3402-4049), Ellen Furuseth (0000-0003-4312-5017), Christine Holst (0000-0002-6084-0701), Arnfinn Helleve (0000-0003-0650-6531, Atle Fretheim (0000-0002-6268-7966)

Norwegian Institute of Public Health, N-0213 Oslo, Norway and Vang legekontor, N-2975 Vang i Valdres, Norway Marit Tuv general practitioner and municipal chief physician

Centre for Epidemic Interventions Research, Norwegian Institute of Public Health, N-0213 Oslo, Norway Ingeborg Hess Elgersma researcher

Division for Infection Control, Norwegian Institute of Public Health, N-0213 Oslo, Norway Ellen Furuseth consultant physician

Centre for Epidemic Interventions Research, Norwegian Institute of Public Health, N-0213 Oslo, Norway Christine Holst researcher

Centre for Evaluation of Public Health Measures, Norwegian Institute of Public Health, N-0213 Oslo, Norway Arnfinn Helleve researcher

Centre for Epidemic Interventions Research, Norwegian Institute of Public Health, N-0213 Oslo, Norway and Faculty of Health Sciences, Oslo Metropolitan University, N-0130 Oslo, Norway Atle Fretheim head of centre and adj. professor.

Correspondence to: Marit Tuv (marit.tuv@vang.kommune.no)

Word count: 2443

Accepted Manuscript - BJGP Open - BJGPO.2022.0175

Abstract

Background English media have reported that many unvaccinated individuals took the COVID-19 vaccine after receiving a phone call from their general practitioner (GP).

Aim To determine whether a phone call from GPs to unvaccinated patients at increased risk of severe COVID-19 improves uptake of the COVID-19 vaccine.

Design and setting Randomised trial where 202 participants were allocated to receive a phone call from their GP, and 452 participants were allocated to not get the call. 25 GPs at 11 medical centres in Norway took part. Post-trial focus group discussion with 5 GPs.

Methods Participants were sourced from the GPs electronic medical record system, which communicates with the Norwegian Immunisation Registry and can generate a list of the GPs' unvaccinated patients at increased risk of severe COVID-19.

Results The GPs managed to get in touch with 154 (76%) patients allocated to receiving a phone call. At follow-up (average 7.5 weeks), 8.9% in the intervention group and 5.3% in the control group had been vaccinated (OR 1.72; 95% CI 0.90 to 3.28). Findings from the focus group discussion suggested the timing of the intervention as a likely key reason for its limited success.

Conclusion We observed an increase in the proportion of patients who took the COVID-19 vaccine in the intervention group, but the difference was smaller than anticipated, and may be a chance finding. The effect of this type of intervention will likely vary across contexts and may have proved more effective if a larger proportion of the population were unvaccinated.

Trial registration: ClinicalTrials.gov Identifier NCT05207137

Accepted Manuscript - BJGP Open - BJGPO.2022.0175

Introduction

Wide uptake of COVID-19 vaccination among groups at increased risk of severe COVID-19 is likely to reduce the incidence of severe disease and death.[1] Although 94% of Norwegians at moderate or high risk of severe COVID-19 disease had taken at least one dose one year after the roll-out of the COVID-19 vaccines, a small but significant proportion of the Norwegian population had not accepted the offer to be vaccinated.[2] Important factors may include vaccine hesitancy, government distrust, practical barriers, and lack of information.[3]

All Norwegian inhabitants have the right to register with a GP of their choosing. This places GPs in a position as a source of information with potential influence on attitudes towards vaccination, both through leading by example and by conveying clear recommendations about taking the vaccine to their patients.[4-8]

According to media reports of an English pilot scheme, a phone call from their GP led many unvaccinated individuals to take the COVID-19 vaccine.[9] We are not aware of any controlled studies of GPs contacting their patients to increase COVID-19 vaccine coverage, but a systematic review of randomised trials identified several effective measures for improving uptake of influenza vaccines, including postcards, personalised phone calls and home visits.[10] To inform decision making around this issue, we conducted a randomised trial among unvaccinated patients at increased risk of severe COVID-19 to see if a phone call from their GP improved vaccination uptake.

Methods

Trial design

The trial was set up as a two-arm parallel trial, where participants were retrieved from the medical record systems of the GPs who agreed to take part in the study. Patients were individually randomised to one of two parallel groups. The original study protocol (in Norwegian) is available online (DOI:10.5281/zenodo.6381858) as is our data analysis plan (DOI:10.5281/zenodo.6412805). An English translation of the study protocol is included in the Supplementary file.

Participants and setting

Unvaccinated individuals at increased risk of a severe clinical course of COVID-19 and over 18 years old were eligible. This is in accordance with vaccine eligibility as defined by the Norwegian Institute of Public Health.[11]

The trial commenced in December 2021, approximately one year after the first roll-out of COVID-19 vaccines. At this time, all adults living in Norway had been offered at least two doses of a COVID-19 vaccine, and those defined as at increased risk of severe COVID-19 had been offered three doses. Vaccination was provided conveniently and for free at community vaccination centres, pharmacists, GP offices, and home care services. Although vaccination is voluntary in Norway, there was a high degree of social pressure to be vaccinated, and the vast majority took the first COVID-19 vaccine. Additionally, the authorities launched several campaigns targeted at hard-to-reach groups, e.g. certain migrant communities.

We recruited a convenience sample of 25 GPs in South-East Norway to take part in the project. We primarily contacted GPs that we believed might be willing to take part, loosely based on our own, or others' understanding.

Accepted Manuscript - BJGP Open - BJGPO.2022.0175

The GP medical record systems can identify patients at increased risk of clinically severe COVID-19. Moreover, by linking to the Norwegian Immunisation Registry (SYSVAK) the GP systems can differentiate between unvaccinated and vaccinated patients. At each GP office a GP assistant retrieved a list of unvaccinated patients over 18 years of age with an increased risk of severe COVID-19. To limit the burden on participating GPs, we decided to draw a maximum of ten patients to the intervention group, per GP. Hence, if a GP had fewer than 20 eligible patients, half of them were allocated to the intervention group, and if the number of eligible patients was 20 or more, only 10 were drawn to the intervention group and the remainder were allocated to the control group. The list was stored at the GP office. See further details under *Randomisation* below.

Intervention

Each participant in the intervention group was contacted by their GP by phone. The control group received no intervention beyond usual care. When the GPs called their patients, they explained the purpose of the phone call (i.e. a chance to discuss, and ask questions about, the vaccine). The GPs emphasised that participation in the project was completely voluntary. We provided the GPs with a 1-page guide for the phone call with patients, and a 2-page document with suggestions on how to address some issues we expected patients to raise (see Supplementary file).

Outcome

Our only outcome was COVID-19 vaccination; we compared the proportion of participants in the intervention group to the proportion of participants in the control group that had become registered as vaccinated against COVID-19 in Norwegian Immunisation Registry, during the follow up period.

In practice, outcome measurement was done by repeating the data extraction procedure carried out at the start of the study: At each GP office a GP assistant retrieved a list of unvaccinated patients over 18 years of age with an increased risk of severe COVID-19. By comparing this list with the original list that had been stored in the GP office, the reductions in number of unvaccinated people in the intervention and control groups were determined. The project leader (MT) supervised this process by phone and reported the figures to the research team's data analyst (IHE).

Sample size

An a priori sample size calculation showed that if the proportion of those vaccinated in the intervention group was 20%, and 10% in the control group, we would need 400 participants with a 1:1 allocation ratio to have 80% power to detect the difference with a statistical significance level of 5%.

Randomisation

The list of names extracted from the electronic medical record system was printed out on a spreadsheet with each patient numbered. Up to ten of the patients on the list were randomly allocated to the intervention group and the remainder to the control group. This was done by using a random number generator (www.gigacalculator.com). By inserting the number of patients on the list and the number of patients to be drawn to the intervention group, the generator yielded a list of random numbers. The patients with these numbers were allocated to the intervention group. The GP assistant highlighted the names of these patients, and then wrote their names on a separate piece of paper. This paper, with the names of the patients in the intervention group, was given to the GP. The spreadsheet with all the extracted names from the medical records system, (both intervention and control group patients), was stored in a closed envelope in a locked cupboard at the GP office. The GPs were blinded to the identities in the control group. The project leader (MT)

Accepted Manuscript - BJGP Open - BJGPO.2022.0175

supervised the randomisation process, either by being present at the GP office (15 GPs) or by phone (10 GPs). Members of the research team did not see any patient names. All personal data were handled exclusively by employees at the GP office.

Statistical Methods

The analysis adhered to the intention to treat principle, i.e. the participants were analysed in accordance with the group they were randomised to. We did not impute any data. Randomisation was conducted per GP. There is likely statistical dependence between patients who belong to the same GP, e.g. because the patients share similar environments and because one can choose ones' GP in Norway. Furthermore, GPs may vary in their persuasiveness. To account for this correlation, the data were analysed using a random effects model, where we included a random intercept per doctor (to model correlation between patients) and a random slope of the intervention (to model differences in persuasiveness).

We used Stata 17 and R version 3.6.3 statistical software. The R-script and dataset are found in the Supplementary file.

Post-trial focus group discussion

We convened a post-trial digital focus group discussion (FGD) with five of the GPs who had participated in the study. The aim of the FGD was to gain insights that might explain the trial results, by exploring the GPs' reflections on the intervention and the characteristics of the patients group involved. The FGD was digitally recorded, transcribed, and analysed by an issue-based approach.[12]

Patient and public involvement

Owing to the nature of this study, including time constraints due to the small window of opportunity for carrying out the trial, and data privacy constraints, no patients or members of the public were involved in the study design, analysis, interpretation of data, or revision of the manuscript. The project lead (MT) is a practicing GP.

Results

Recruitment and Participant flow

Figure 1 illustrates the flow of participants through the trial. 25 GPs from a total of 11 GP offices agreed to take part. A total of 654 unvaccinated at-risk patients over 18 years old were retrieved from the electronic medical records system and included in the trial. The number of included patients per GP varied from 5 to 87 (median 18). In total, 202 patients were allocated to the intervention group and 452 to the control group. The 654 unvaccinated at-risk patients constituted around 2% of all patients on the GPs' lists. The average follow-up period was 7.5 weeks (range 6.0 to 9.4) (see figure 2 for graphic presentation). Based on reports from the GPs, we estimate that they managed to reach 76% of the patients they were meant to call.

Numbers analysed

All 654 randomised participants were included in the analyses.

Outcomes and estimation

At follow up, 8.9% (18/202) in the intervention group and 5.3% (24/452) in the control group had been vaccinated (OR 1.72; 95% CI 0.90 to 3.28) (see Table 1).

Accepted Manuscript - BJGP Open - BJGPO.2022.0175

For most GPs (N=13), none of the patients took a vaccine after receiving a phone call. For 7 GPs, 1 patient took a vaccine after receiving a phone call, for 2 GPs, 2 patients took a vaccine and for 1 GP, 3 patients took a vaccine after receiving a phone call.

Table 1: Primary endpoint of the trial. Values are numbers (percentages) of patients.

Endpoint	Control (n=452)	Intervention (n=202)	OR (95 % CI)
Vaccinated			
No	428 (94.7)	184 (91.1)	1.00 (reference)
Yes	24 (5.3)	18 (8.9)	1.72 (0.90 to 3.28), p=0.10

CI = Confidence interval

Focus group discussion

In the FGD, the GPs expressed the view that the majority of those who were still not vaccinated at the time of the study had either a profound vaccine scepticism or impaired abilities to function in day-to-day life. The GPs all agreed that the intervention was implemented too late in the pandemic, for several reasons. First, the vaccine coverage was already very high at the time of intervention, and only a small group of people at increased risk of severe COVID-19 were not yet vaccinated. Second, the less frightening omicron variant was already dominating the viral landscape, and it had also recently become known that the vaccine did not effectively prevent transmission, as initially assumed by the health authorities. These were the most common reason that patients gave for not taking the vaccine, according to the GPs. Third, the public discourse around the pandemic and vaccination had changed rapidly prior to the rollout of the intervention, and the GPs experienced that many of the patients had already reflected on and made their decision regarding whether to take the vaccine. The GPs experienced some negative responses from patients, typically related to the fact that the patients had been identified as unvaccinated from national health registries. For more details on the FGD findings, see the Supplementary file.

Discussion

Summary

We observed that unvaccinated patients at increased risk of severe COVID-19 were more likely to be vaccinated against COVID-19 if they received a phone call from their GP, but the result is uncertain and may be due to chance. The vaccination rate in the intervention group was 4.6 percentage points higher than in the control group – a smaller effect size than what our trial was powered to demonstrate.

Strengths and limitations

It could be argued that our trial was underpowered, however we believe an effect size of less than 10 percentage points in vaccination uptake, i.e. more than 10 phone calls to achieve one additional vaccinated patient, is unlikely to be worth the effort, considering the cost and limited availability of GP time.

A weakness of our study is that we have very limited data per participant. We are therefore not able to describe the characteristics of the study population, e.g. age or country of origin. Also, we cannot rule out that some of the study participants had already taken the vaccine without this being reported to the national registry, (e.g. if the vaccination happened abroad), or that some were erroneously classified being at increased risk of severe COVID-19. We opted for a simplistic trial for

Accepted Manuscript - BJGP Open - BJGPO.2022.0175

feasibility reasons: By avoiding the use of personal data we could have a speedy process of ethical approval and data protection procedures. One reason the use of personal data was ethically challenging was that it was practically impossible for us to obtain written consent from all participants. We had also planned to ask the GPs to complete a form after each phone call but decided to sacrifice this data source to limit the burden on the GPs and, again, to avoid using personal data.

A major strength of our study is that we were able to evaluate the effectiveness of a policy-relevant intervention within a matter of months, using sound scientific methods, at very low cost. Timeliness and relevance are key factors for research findings to be perceived as germane for policy makers.[13] Furthermore, the focus group discussion with participating GPs yielded important insights for the interpretation of the trial results.

We cannot exclude that the GPs who took part in our study may have contacted their unvaccinated patients more than an average GP would have done outside a trial setting, for two reasons: The participating GPs may be more positive to such interventions than other GPs, and they may have made an extra effort to please the research team.

Comparison with existing studies

In their Cochrane review on interventions to increase influenza vaccination rates, Thomas and colleagues found that personalised phone calls had "significant positive effects" on demand for influenza vaccination.[10] Our results seem to show little or no effect of phone calls, but there are plausible explanations for this discrepancy, as discussed above. To our knowledge there have been few, if any, randomised trials of phone calls made by GPs to improve vaccine uptake, and no trials of phone calls to improve COVID-19 vaccination.

Implications for research and/or practice

Our findings indicate that a phone calls from GP had limited effect on vaccination coverage. The effectiveness of this and similar interventions is likely influenced by the timing of implementation, and the composition of the target group. When we conducted our trial, vaccines had been readily available for one year and the vast majority (94%) of the at-risk population had been vaccinated at least once.[2] Phone calls from GPs may prove more effective in other settings, for example where a larger proportion of the population has not yet been vaccinated.

How this fits in

According to reports in the English media, a phone call from their GP led many unvaccinated individuals to take the COVID-19 vaccine. Earlier studies have identified personalised phone calls as a measure that may increase influenza vaccine coverage. Our findings indicate that a phone call from GPs had limited effect on vaccination coverage, but the effectiveness was likely influenced by the timing of implementation and the composition of the target group.

Ethics statements

Ethical approval

Accepted Manuscript - BJGP Open - BJGPO.2022.0175

The Regional Committee of Research Ethics assessed our study protocol, and concluded that the trial did not qualify as health research in the legal sense, and therefore no formal ethical approval was required (Regional Ethics Committee South East D, application number 353036).

Data availability statement

Our data set is freely available and is included in the Supplementary file.

Acknowledgments

We thank the GPs, the GP assistants and all patients who made the conduct of the study possible. Christopher J. Rose (Centre for Epidemic Interventions Research, Norwegian Institute of Public Health) helped with the statistical analyses, and Heather Munthe-Kaas proofread the manuscript (both Centre for Epidemic Interventions Research, Norwegian Institute of Public Health).

Footnotes

Contributors: EF and MT had the idea for the study. All authors except CH and AH designed the trial and cowrote the study protocol. MT recruited participants and collected data. MT and EF prepared the guides for the GPs. IHE conducted the main study analysis. CH, AH and MT prepared and convened the focus group discussions. CH and AH analysed the data collected from the focus group discussions. All authors cowrote the manuscript led by AF. MT was the chief investigator and guarantor. All authors reviewed and commented on the manuscript before submission and gave approval to submit for publication. The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit for publication. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

Funding: No external funding.

Competing interests: All authors have completed the ICMJE uniform disclosure form at www.icmje.org/disclosure-of-interest/ and declare that they have no competing interests.

The lead author affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

Dissemination to participants and related patient and public communities: All GPs who took part in the study will be sent a summary of trial results and further dissemination will be via a variety of sources, mainly targeting decision makers in Norway, but also towards the public via media outlets.

1. Korang SK, von Rohden E, Veroniki AA, et al. Vaccines to prevent COVID-19: A living systematic review with Trial Sequential Analysis and network meta-analysis of randomized clinical trials. *PLoS One* 2022;17(1):e0260733. doi: 10.1371/journal.pone.0260733 [published Online First: 2022/01/22]
2. Covid-19 ukerapport – Uke 48. . Oslo: Folkehelseinstituttet [Norwegian Institute of Public Health], 2021 https://www.fhi.no/contentassets/8a971e7b0a3c4a06bdbf381ab52e6157/vedlegg/3.-alle-ukerapporter-2021/ukerapport-uke-48-29.11---05.12.21.pdf (accessed 1 Feb 2023).
3. Rapport fra ekspertgruppe. Innvandrerbefolkningen under koronapandemien. Smitte, vaksine og konsekvenser for integreringen. Oslo: Kunnskapsdepartementet, 2021

Accepted Manuscript - BJGP Open - BJGPO.2022.0175

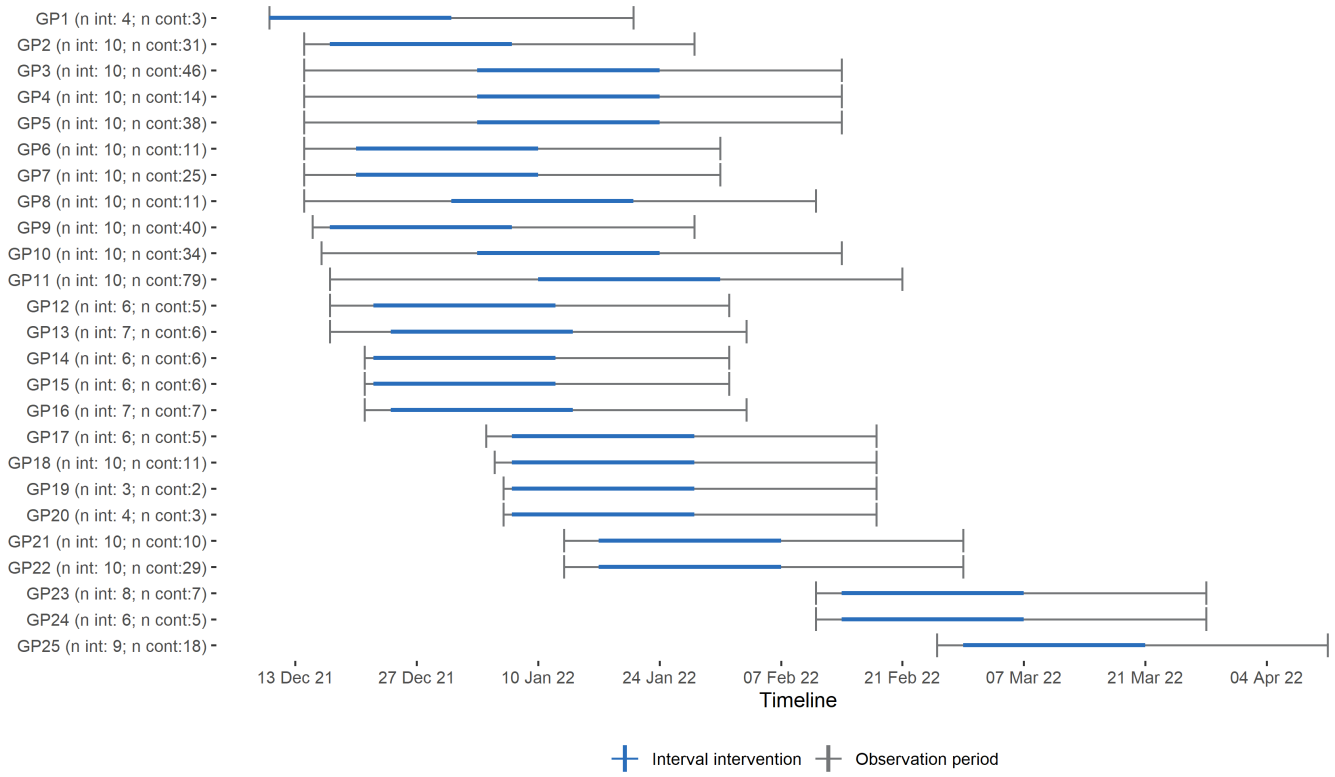
https://www.imdi.no/contentassets/c10db702b4fc4c25b6c0d2073a05617b/innvandrerbefolkningen_under_koronapandemien.pdf (accessed 1 Feb 2023).
4. Kan T, Zhang J. Factors influencing seasonal influenza vaccination behaviour among elderly people: a systematic review. *Public Health* 2018;156:67-78. doi: 10.1016/j.puhe.2017.12.007 [published Online First: 2018/02/07]
5. Lu PJ, Srivastav A, Amaya A, et al. Association of provider recommendation and offer and influenza vaccination among adults aged >/=18years - United States. *Vaccine* 2018;36(6):890-98. doi: 10.1016/j.vaccine.2017.12.016 [published Online First: 2018/01/14]
6. Giese C, Mereckiene J, Danis K, et al. Low vaccination coverage for seasonal influenza and pneumococcal disease among adults at-risk and health care workers in Ireland, 2013: The key role of GPs in recommending vaccination. *Vaccine* 2016;34(32):3657-62. doi: 10.1016/j.vaccine.2016.05.028 [published Online First: 2016/06/04]
7. Mak DB, Regan AK, Joyce S, et al. Antenatal care provider's advice is the key determinant of influenza vaccination uptake in pregnant women. *Aust N Z J Obstet Gynaecol* 2015;55(2):131-7. doi: 10.1111/ajo.12292 [published Online First: 2015/01/06]
8. McIntyre A, Zecevic A, Diachun L. Influenza vaccinations: older adults' decision-making process. *Can J Aging* 2014;33(1):92-8. doi: 10.1017/S0714980813000640 [published Online First: 2013/12/03]
9. Covid: Vaccine-hesitant patients in Leicester get GP phone calls.: BBC; 2021 [Available from: https://www.bbc.com/news/uk-england-leicestershire-56253139 accessed 21.09. 2021.
10. Thomas RE, Lorenzetti DL. Interventions to increase influenza vaccination rates of those 60 years and older in the community. *Cochrane Database Syst Rev* 2018;5:CD005188. doi: 10.1002/14651858.CD005188.pub4 [published Online First: 2018/05/31]
11. Who will get the coronavirus vaccine? : Norwegian Institute of Public Health; [Available from: https://www.fhi.no/en/id/vaccines/coronavirus-immunisation-programme/who-will-get-coronavirus-vaccine-first/2021.
12. Weiss RS. Learning from strangers: The art and method of qualitative interview studies. New York: The Free Press 1994.
13. Oliver K, Innvar S, Lorenc T, et al. A systematic review of barriers to and facilitators of the use of evidence by policymakers. *BMC Health Serv Res* 2014;14:2. doi: 10.1186/1472-6963-14-2 [published Online First: 2014/01/05]

Figure 1. Flow of participants in trial.

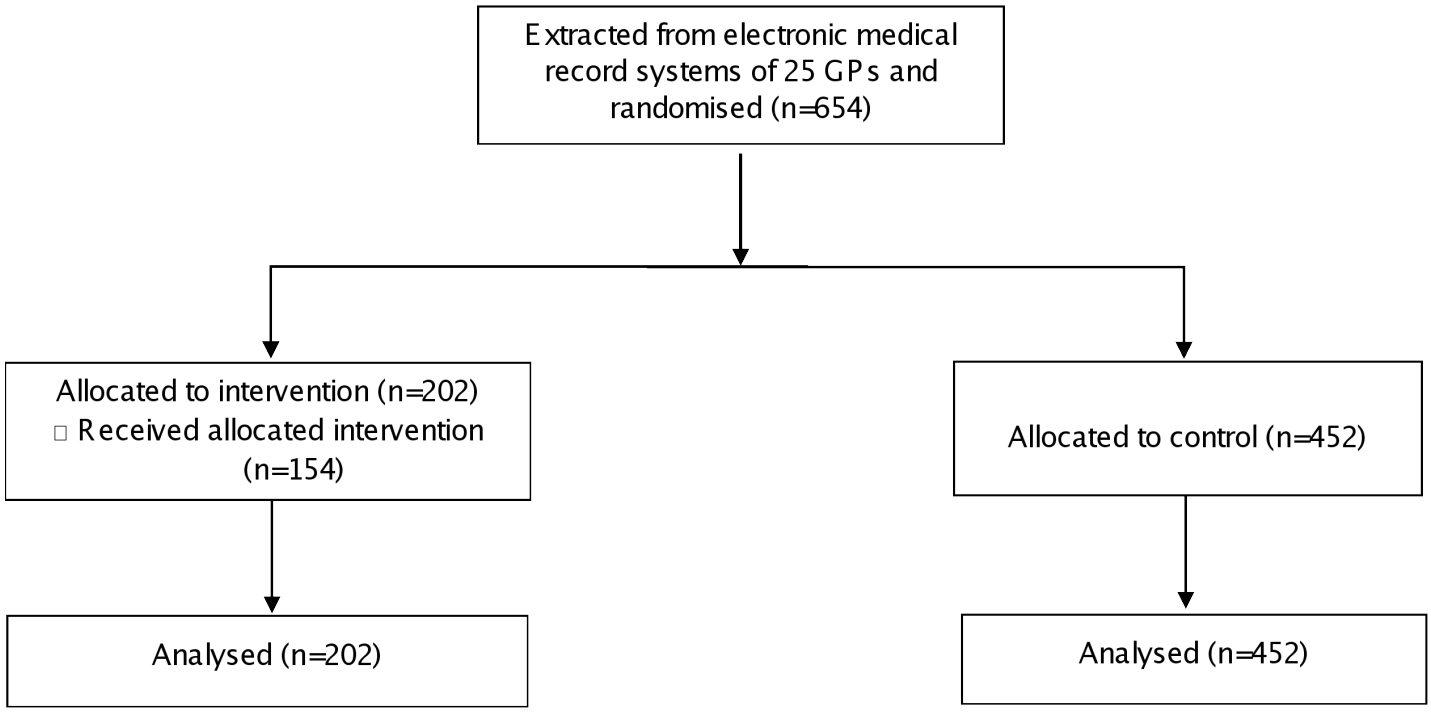
Figure 2. Timeline for each participating GPs and their included patients.

Accepted Manuscript - BJGP Open - BJGPO.2022.0175

022.0175



Accepted



022.0175
Accepted