The Effect of Telephone Interventions on Individuals' Cancer Early Diagnosis and Screening Applications: A Systematic Review

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Abstract

Aim: Screening programmes are of great importance, aiming to detect and treat lesions at an early stage before they progress to tumours. The aim of this systematic review is to examine the effects of telephone interventions on cancer early diagnosis and screening applications.

Methods: For the study, PubMed, Cochrane, Sciencedirect, Web of Science, ProQuest Central and Google Scholar databases were searched using the identified keywords. A total of 11 randomized controlled studies that met the inclusion criteria, published in English and Turkish language, published between 2013-2023, were included in this systematic study. For quality assessments, checklists for "Randomized Controlled Studies created by the Joanna Briggs Institute" and in bias assessments, "A revised Cochrane risk-of-bias tool for randomized trials" designed by the Cochrane group were used.

Results: It is seen that the individual-specific or non-personalized reminder messages and counseling over the phone were effective in 6/9 studies with individuals between 39-7968, in 4 months-3.5 years. The telephone was used to make appointments and complete the cancer screening program for colonoscopy and colorectal screening with stool occult blood, breast and cervical cancer screening with mammography.

Conclusion: It is recommended to integrate reminder messages and telephone counseling into cancer early diagnosis and screening programs, and to conduct more studies that will lead to clinical and academic arrangements that will increase the quality of presentation and service regarding telehealth methods.

Keywords: Cancer, diagnostic screening programs, telenursing, telephone.

Telefon Müdahalelerinin Bireylerin Kanser Erken Teşhis ve Tarama Başvurularına Etkisi: Sistematik Derleme

Öz

Amaç: Tarama programları lezyonların tümörlere ilerlemeden erken evrede saptanıp tedavisinin sağlanmasını amaçlayarak ciddi önem taşımaktadır. Bu sistematik derlemenin amacı, telefon müdahalelerinin bireylerin kanser erken teşhis ve tarama başvurularına etkisini incelemektir.

Özgün Araştırma Makalesi (Original Research Article)
Geliş / Received: 02.03.2025 **Kabul / Accepted:** 13.04.2026
DOI: https://doi.org/10.38079/igusabder.1649852
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ETHICAL STATEMENT: The research protocol was registered in the 'PROSPERO' database, which allows systematic review and meta-analysis studies to be recorded, with the registration number CRD42023432512.

Yöntem: Çalışma için PubMed, Cochrane, Sciencedirect, Web of Science, ProQuest Central ve Google Scholar veri tabanları belirlenen anahtar kelimeler kullanılarak taranmıştır. Taramalar sonunda; İngilizce dilinde, 2013-2023 yılları arasında yayınlanmış, tam metnine ulaşılan, dahil edilme kriterlerine uyan 11 randomize kontrollü çalışma araştırma kapsamına alınmıştır. Çalışmaların kalite değerlendirmeleri Joanna Briggs Enstitüsü tarafından oluşturulmuş randomize kontrollü çalışmalar için kontrol listesi; yanlılık değerlendirmeleri ise Cochrane grubunun tasarlamış olduğu "Randomize çalışmalar için revize edilmiş Cochrane yanlılık riski aracı (RoB 2)" kullanılarak yapılmıştır.

Bulgular: Kişiye özgü ya da kişiye özgü olmayan standart hatırlatma mesajları ile telefonla danışmanlığın, örneklem büyüklüğü 39 ile 7968 arasında değişen ve müdahale süresi 4 ay ile 3,5 yıl arasında olan çalışmaların 6/9'unda etkili olduğu görülmüştür. Telefon kolonoskopi ve gaitada gizli kan ile kolorektal; mamografi ile meme ve serviks kanseri tarama tetkikleri için randevu alma ve kanser tarama programını tamamlamada kullanılmıştır.

Sonuç: Hatırlatma mesajları ve telefonla danışmanlığın, kanser erken teşhis ve tarama programlarına entegre edilmesi, tele sağlık yöntemleriyle ilgili sunum ve hizmet kalitesini arttıracak klinik ve akademik boyuttaki düzenlemelere öncülük edecek daha fazla çalışma yapılması önerilmektedir.

Anahtar Sözcükler: Kanser, telefon, telefonla hemşirelik, teşhis tarama programları.

Introduction

Cancer is the second most common cause of death in the world, after cardiovascular disease[1]. Early diagnosis is essential to reduce cancer deaths. Screening programmes aim to detect precancerous lesions and early-stage cancers, and to detect and treat lesions at an early stage before they develop into tumours. Awareness raising and screening programmes are therefore very important[2]. In randomised controlled trials, community-based screening programmes have been shown to reduce breast cancer mortality by 20%[3]. Although the literature clearly shows that early detection of cancer through screening is an effective strategy, community participation in cancer screening is not as high as desired[4-8].

Telehealth is defined as the use of telehealth technologies to deliver healthcare services. Developments in telehealth technologies such as remote patient monitoring and surveillance tools continue to change and facilitate the way care is delivered[9,10]. The benefits of telehealth systems include reducing the need for specialists through remote access, reducing the cost of advanced treatment through early diagnosis and treatment options, monitoring adherence to treatment through the patient follow-up system, early assessment of treatment response, and minimising the physical requirements for health education[11]. The aim of this systematic review is to examine the effect of telephone interventions, one of the telehealth applications, on individuals' cancer screening.

Research questions

1. For which types of cancer are telephone interventions used for early detection and screening?

2. For which types of cancer screening are telephone interventions used?

3. Are telephone interventions effective in cancer screening?

4. Are telephone interventions effective in completing the cancer screening process?

Material and Methods

Type of Study

This study is a systematic review. PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) reporting checklist[12] was utilised in writing the article.

Study Population and Sample

To reach the studies that are the subject of this study, the Cochrane Library, ProQuest Central, PubMed, Science Direct and Google Scholar databases were searched between 1 May and 1 June 2023, and research articles published between 2013 and 2023 were included in the study. Table 1 shows the identified keywords. Different combinations of these keywords were used in the search, as shown in Table 1.

Table 1. Keywords and search strategy

Database	**Keywords**
Search 1. Google Scholar (Turkish)	'tele sağlık' 'telefon' 'kanser' 'onkoloji' 'erken teşhis' 'tarama' 'önleme'
Search 2. Cochrane Library (English)	Record Title: Telehealth AND Cancer OR Oncology AND Early Diagnosis OR Screening Title Abstarct Keyword: telephone counseling AND Prevention
Search 3. ProQuest Central (English)	noft (telehealth OR telemedicine OR telenursing OR telephone counseling OR telephone) AND title (cancer OR oncology) AND title (early detection of cancer OR early diagnosis OR screening)
Search 4. PubMed (English)	(Telephone counseling[Title/Abstract]) OR (Telephone[Title/Abstract]) AND (Cancer[Title]) OR (Oncology[Title]) AND (Early detection of cancer [Title/Abstract])
Search 5. Science Direct (English)	'Telehealth' AND 'Cancer' AND 'Early detection of cancer'

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Inclusion and Exclusion Criteria

The inclusion and exclusion criteria were set according to PICOS[13].

Inclusion Criteria

P (Patient): People who have participated in cancer screening programmes aged 18 and over

I (Intervention): Telephone counselling

C (Comparison): --

O (Outcome): Impact on cancer screening and early detection applications

S (Study design): Randomised controlled trials

Exclusion Criteria

P (Patient): People under 18 years of age

I (Intervention): E-mail, web-based support

C (Comparison): --

O (Outcome): Psychological symptoms

S (Study design): Quasi-experimental studies, reviews of controlled clinical trials (including systematic reviews), panel presentations, meta-analyses, retrospective studies, congress abstracts, dissertations, replications/duplications.

Data Collection Tools

The findings of the studies included in this review, including imprint/country, sample/age, sample characteristics, evaluation criteria, implementation/intervention, intervention period, follow-up period, were categorised and a data extraction form was created as Table 4.

Use of Data Collection Tools

Three independent reviewers were involved in each stage of the systematic review (screening, eligibility and inclusion in the review). The search strategy was documented at each stage to record the date of searches in each database, the keyword combinations used in each database and the total number of publications found. A Prisma flowchart was created to select appropriate publications and document the total number of articles; all articles found were exported to create a Mendeley database. A data extraction tool was created in Excel, taking into account the data collection form created by the researchers.

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As author and journal details are removed after duplicates are removed, only article titles and/or abstracts could be viewed during the identification phase of the studies. To filter the article titles and abstracts according to the inclusion/exclusion criteria, they were grouped into included and excluded categories by one researcher (TE). The titles and/or abstracts in the excluded category were then assessed by another researcher (ÖÖ). After this assessment, the articles that the researcher (ÖÖ) considered should be included were included in the inclusion category. Full text access was provided to all articles included in the inclusion category. The full texts were independently assessed by two researchers (TE-ÖÖ). After this stage, any excluded studies were recorded with the reasons for exclusion and this process was documented in the database and in the Prisma flowchart. The tool was approved by the members of the research team before screening began. One researcher (TE) extracted data from the included articles and finalised the database. The other researcher (ÖÖ) independently checked the accuracy of the data extraction and the database.

Analysing the Data

The articles (n=626) were then added to the Mendeley library for parsing and selection of suitable articles for the study. After the duplications were removed, the remaining articles (n=614) were first sifted by looking at the titles and abstracts (n=586), and the full texts of 28 potentially relevant articles were analysed and the articles that did not meet the inclusion criteria (n=17) were excluded from the study. The full texts (n=11), which were evaluated in terms of eligibility, were subjected to detailed examination, and finally, it was decided to include 11 studies in the synthesis. The research selection process of the systematic review is given in the PRISMA flow diagram in Table 2.

Table 2. PRISMA-P flow chart of the research

<table>
<tr><td>DETERMINATION</td><td colspan="3">Research articles detected by database search (n=626)
Google Scholar= 141
Cochrane Library= 40
ProQuest Central= 126
PubMed= 56
Science Direct= 263</td></tr>
<tr><td></td><td colspan="3"></td></tr>
<tr><td rowspan="2">SCANNING</td><td colspan="2" rowspan="2">After removing duplicates according to headings included research articles (n=614)</td><td>Excluded research articles by abstract (n=586)
Causes;
- Thesis (n=93)
- Book (n=29)
- Report (n=35)
- Review (n=139)
- Retrospective study (n=18)
- The subject is not suitable (n=272)</td></tr>
<tr><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>

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SUITABILITY	**For suitability included full text research articles (n=28)**		**Excluded full-text research articles (n=17)** **Causes;** Semi-experimental (n=3) Full text not available (n=3) Not in English or Turkish (n=3) Studies out of date (n=8)
INCLUSION	**Includes full-text research articles (n=11)**		

Evaluation of Methodological Quality of Studies

Evaluation of the methodological quality of the studies is given in Table 3 according to the Joanna Briggs Institute (JBI).

Table 3. Quality Assessment of studies according to the JBI systematic review checklist for randomized controlled studies

Researches	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	Total (%)
Chamber(2014)[14]	+	-	+	-	-	-	-	+	+	?	?	?	+	38.4% (13/5)
Clouston(2014)[15]	+	?	+	-	-	-	-	+	+	+	+	?	+	53.8% (13/7)
Lowery (2014)[16]	+	?	+	-	-	-	-	+	+	+	+	+	+	61.5% (13/8)
Hirst (2014)[17]	+	-	+	+	+	-	+	+	+	?	?	?	+	61.5% (13/8)
Acera (2017)[18]	+	-	+	-	-	-	+	+	+	+	+	+	+	69.2% (13/9)
Linde (2017)[19]	+	+	+	-	+	-	-	+	+	?	?	?	+	53.8% (13/7)
Luckmann (2017)[20]	?	?	+	-	-	-	+	+	+	+	+	?	+	53.8% (13/7)
Bauner (2018)[21]	+	?	+	-	-	-	+	+	+	+	+	+	+	69.2% (13/9)
Oyalowo (2022)[22]	+	-	+	-	-	-	-	+	+	+	+	+	+	61.5% (13/8)
Denis (2017)[23]	?	?	+	-	-	-	-	+	+	+	+	+	+	53.8% (13/7)
Sepucha (2023)[24]	+	?	+	-	-	+	-	+	+	+	+	+	+	69.2% (13/9)

C: Criterion + Yes; - No; ? Unknown/Not Applicable; Criterion 1 – 13; JBI Criteria for systematic review checklist for randomized controlled trials

Assessing the Risk of Bias

Bias evaluation of the studies according to the Cohcrane Bias Assessment Tool (ROB-2) is given in Table 4.

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Table 4. Revised Cochrane risk-of-bias tool for randomized trials (ROB-2)

Researches/ **RoB-2 Criterion**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
Risk of bias due to randomizatin process	+	+	+	+	+	+	?	+	+	?	+
Risk of bias due to deviations from intended interventions (impact of assignment on intervention)	?	?	?	+	?	?	?	?	?	?	?
Risk of bias due to deviations from intended interventions (impact of adherence on intervention)	?	?	?	?	?	?	?	?	?	?	?
Risk of bias due to incomplete outcome data	?	+	+	?	+	?	+	+	+	+	+
Risk of bias in measuring the outcome	?	+	+	?	+	?	+	+	+	+	+
Risk of bias in selection of reported result	?	?	?	?	?	?	?	?	?	?	?

+ Low risk of bias, ? Suspected risk of bias, - High risk of bias

Chambers (2014)[14]; Clouston (2014)[15]; Lowery (2014)[16]; Hirst (2014)[17]; Acera (2017)[18]; Linde (2017)[19]; Luckmann (2017)[20]; Bauner (2018)[21]; Oyalowo (2022)[22]; Denis (2017)[23]; Sepucha (2023)[24]

Ethical Dimension of Research

Since the research data were obtained from publications scanned in the literature and there is no risk of material/moral harm, ethics committee approval is not required. The research protocol was registered in the 'PROSPERO' database, which allows recording systematic review and meta-analysis studies, with the registration number '32512'.

Limitations of the Research

Limitations of this study; scanning five databases and not scanning the gray literature. Since a limited number of research results, eleven articles, were included in the study, the results should be evaluated carefully and generalizations should not be made.

Results

Study Patterns

11 randomized controlled studies[14-24] published between 2013 and 2023 were included in the systematic review.

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Study Location

The trials included in the systematic review were conducted in the USA, Germany, the Netherlands, France, Scotland, Canada, Spain, England, and Tanzania; in private clinics[14,15,17,20], in the national health systems of the countries[16,21,22], or in a cancer screening programme[18,19,23,24] that was not part of a clinic or hospital.

Characteristics of Participants

The sample size of the studies included in the systematic review was found to be a minimum of 39 and a maximum of 7968. Some of the participants were people who met the criteria for cancer screening but did not participate in a screening programme[14,15,17-20,22,23], some were first-degree relatives of cancer patients[16,21], and in one study, people with no previous screening history whose colonoscopy was cancelled because of COVID-19 between March and May 202024. Other anthropometric and sociodemographic characteristics of the participants are shown in Table 5.

Table 5. Some Characteristics of the Studies Analysed in the Systematic Review

Country	Sample/ Age	Sample Characteristics	Evaluation Criteria	Intervention	Time	Follow-up Period	Telephone Intervention
Chambers et al. (2014)[14] Scothland	Control: 150 Intervention 1:150 Intervention 2: 150 Intervention 3: 150 50-70 years old	Women living in areas included in the Scottish Index of Multiple Deprivation 1-12 who do not receive services from the East of Scotland Breast Screening Centre.	Availability of a breast cancer screening appointment within three months of receiving a reminder	**Control:** Standard reminder sent by the East of Scotland Breast Screening Centre **Intervention 1 (TEL):** telephone reminder **Intervention 2 (TEL-SUPP):** telephone reminder + telephone counselling **Intervention 3 (TEL-SUPP-AR):** telephone reminder + telephone counselling + AR - expected remorse intervention	17 month	3 month	Telephone consultation
Clouston et al. (2014)[15] Canada	Control: 39 Intervention: 40 50-74 years old	Individuals aged 50-74 years with a history of colorectal cancer and no symptoms, polyps or bowel disease requiring follow-up colonoscopy by family physicians in the City of Winnipeg who receive fee-for-service community-based services.	Fecal occult blood test within four months	**Control:** Routine care **Intervention:** after assessing the results of the family physicians, the individual was given a fridge magnet explaining how to access the support line telephone number and website managed by the nurse (the intervention was considered to have started when the individual reached this contact line and contacted the nurse)	4 month	8 month	Telephone consultation
Lowery et al. (2014)[16] Amsterdam	Mail group: 310 Telephone group: 322	Two national cancer family registries, the Colon Cancer Family Register (C-CFR) and the Cancer Genetics	1) Colonoscopy screening within 24 months of randomisation	**Intervention:** Telephone counselling based on behavioural theory	24 month	6st month 12st month 24st month	Telephone consultation

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	20-60 years old	Network (CGN), between February 2005 and July 2006	2) Knowledge, attitudes and beliefs about colorectal cancer screening, barriers to screening	Control Document containing general information about scanning			
Hirst et al. (2014)[17] England	Control: 1600 Intervention: 1600 50-69 years old	Adults eligible for screening with a telephone number registered for 180 general examinations in London	1) Proportion of individuals providing a completed faecal occult blood test within 18 weeks of first invitation. 2) Completion of registration of mobile phone numbers at individual level in the clinical system	**Control:** routine care (information letter+brochure that a faecal occult blood test kit will be sent as part of the national colorectal cancer screening programme) **Intervention:** Routine care + text message reminder to self-complete and return faecal occult blood test kit after eight weeks	18 week	7 month	Same reminder message
Acera et al. (2017)[18] Spain	Intervention 1: 1578 Intervention 2: 1367 Intervention 3: 2396 Control: 428 30-70 years old	Women who have lived in the Barcelona (Cerdanyola) area for more than six months and who have not had a cervical cytology result in their cervical cancer screening history for 3.5 years.	Cervical cancer screening	**Intervention 1:** Personalised screening invitation **Intervention 2:** Personalised screening invitation + information leaflet **Intervention 3:** Personalised screening invitation + information leaflet + personalised phone call **Control:** request for officially recommended cervical cancer screening	3,5 year	June 2011-December2013	Telephone consultation
Linde et al. (2017)[19] Tanzania	Intervention: 350 Control: 350 25-60 years old	Tanzanian women who tested positive for HR (high risk) HPV (human popilloma virus)	1) Screening programme uptake 2) Cervical cancer knowledge, estimation of cost-effectiveness of SMS intervention	**Intervention:** 15 one-way educational text messages + SMS reminders for appointments **Control:** Routine care	10 month	14 month	Same reminder message
Luckmann et al. (2017)[20] America	Intervention 1: 7968 Intervention 2: 7943 Intervention 3: 7876	Women who have been patients at the Fallon Clinic Centre for 24 months or more and have not had a mastectomy.	Planning mammography within two weeks after the intervention	**Intervention 1:** Reminder document **Intervention 2:** Reminder document + reminder call **Intervention 3:** Reminder document + telephone counselling	4 year	12st month 18st month	Telephone consultation
Bauner et al. (2018)[21] Germany	Sample patients (IP Index patients) (n=1109) Control (n=557) Intervention (n=552) First-degree relatives (FDR) (n=261): 28-75 years old Control (n=136) Intervention (n=125)	IP: Patients with a first diagnosis of colorectal cancer at a German colorectal cancer centre and three independent gastroenterology practices between December 2012 and August 2015. FDR: No colonoscopy or CT scan in the last five years, no history of colorectal cancer, familial adenomatous polyposis or chronic inflammatory	1) Colonoscopy appointment within 30 days of intervention 2) Cancer/adenoma detection, barriers to screening colonoscopy, symptoms up to 30 days after colonoscopy	**Control:** hand-delivered or mailed study leaflet with information on familial risk and colorectal cancer screening **Intervention:** Hand delivery or postal delivery of a study leaflet with information on familial risk and colorectal cancer screening + telephone counselling	6 month	1st month 3st month 6st month	Telephone consultation

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Oyalowo et al. (2022)[22] America	Control: 200 Intervention 1: 200 Intervention 2: 200 50-75 yaş	Asymptomatic patients who are eligible for colorectal cancer screening or surveillance at the University of Pennsylvania Health System, have been referred for colonoscopy, and do not have a scheduled colonoscopy appointment.	1) Rate of colonoscopy within 120 days of enrolment 2) Colonoscopy appointment rate	**Control:** routine care (contact by post, telephone reminder for colonoscopy appointment) **Intervention 1:** after telephone contact and assessment, uniform non-personalised message **Intervention 2:** after telephone contact and assessment, personalised private message	1 year	July 2017-August 2018	Personalised reminder message/ Same reminder message
Denis et al. (2017)[23] **France**	Telephone counselling 1474 Motivational interviewing by telephone 1531 Control: 19.756	Individuals aged 50-74 years in the Haust-Rhin and Bas-Rhin regions	Screening for faecal occult blood one year after surgery	**Control:** Routine care (delivery of the faecal occult blood kit) **Intervention 1:** Delivery of the kit according to the results of the telephone counselling **Intervention 2:** Delivery of the kit according to the results of the motivational interview (to encourage screening - telephone counselling)	15 month	February 2011 April 2012	Telephone consultation
Sepucha et al. (2023)[24]	Control: 400 Intervention: 400 45-75 yaş arası	Adults between the ages of 45 and 75 years with no previous screening history whose colonoscopy screening was cancelled due to COVID-19 between March and May 2020.	Preferred screening method (colonoscopy, delayed screening, faecal-based test, not sure)	**Intervention:** Sending an email explaining the option of colonoscopy, faecal occult blood testing and colonoscopy four times in two weeks, one or two weeks after the email, telephone call with non-clinical research staff who had received coaching training. **Control:** Routine care; scheduling by gastroenterology department	September 2020 November 2020	6 month	Telephone consultation

Type and Content of Intervention

Some of the studies included in the systematic review compared routine care with telephone counselling[14-16,18,20,21,23,24]; others compared routine care with SMS application[17,19,22]. Telephone interventions were non-personalised standardised reminder messages17,19, telephone counselling[14-16,18,20,21,23,24], comparison of personalised and non-personalised standardised reminder messages.

Duration of the Intervention

In the trials included in the systematic review, the duration of the intervention ranged from a minimum of 4 months to a maximum of 3.5 years[15,18].

Evaluation Criteria

The evaluation criteria for the studies included in the systematic review included the effect of telephone counselling on cancer screening and screening uptake, as well as the secondary outcomes of carcinoma adenoma detection, barriers to implementation, complications, level of knowledge, attitudes and beliefs about screening methods, registration of contact information with national screening programme clinics, and cost-effectiveness of the SMS intervention.

Effects of Interventions on Cancer Screening Uptake

The effect of the telephone intervention used in the studies included in the systematic review on early diagnosis and screening referrals was compared between the intervention and control groups after the intervention and is presented in Table 6.

Table 6. The effect of telephone counselling on cancer early diagnosis and screening applications

Outcomes	14	15	16	17	18	19	20	21	22	23	24
Personalised special reminder message									+		
Uniform, non-personalised reminder message				+		+			+		
Telephone consultation	+	+	+		+		+	+		+	+
Planning-making an appointment	?						–		+		
Intervention		+	+	?	+	?		ND	+	+	+
Carcinoma/adenoma detection								ND			
Barriers to intervention								?			
Complications								?			
Information level			ND			?					
Attitudes and beliefs			ND								
Registration of National Screening Programme Clinic contact details				?							
Cost-effectiveness of SMS intervention						?					

\+ : Statistically significant increase _ : Statistically significant decrease
ND: No statistical difference ? : The result is unclear
Chambers (2014)[14]; Clouston (2014)[15]; Lowery (2014)[16]; Hirst (2014)[17]; Acera (2017)[18]; Linde (2017)[19]; Luckmann (2017)[20]; Bauner (2018)[21]; Oyalowo (2022)[22]; Denis (2017)[23]; Sepucha (2023)[24]

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After telephone counselling, one study found a statistically significant increase between groups in the completion of screening and cancer screening in one study[22], a significant decrease between groups in one study[20], and the results were unclear in one study[14]. Six trials found a statistically significant increase between groups in completing cancer screening requests after telephone intervention[15,16,18,22-24]; one trial found no difference between groups[21]; and two trials were equivocal[17,19]. One study found that there was no difference between groups in carcinoma/adenoma detection as a secondary outcome, and the results were unclear regarding barriers to implementation and complications[21]. Again, one study found that there was no significant difference between groups in knowledge among the secondary outcomes[16] and the results of another study were equivocal[19]. Among the secondary outcomes, it was found that there was no difference between the groups in terms of attitudes and beliefs[16]. Finally, it was determined that the results of the studies on the secondary outcomes of registering contact information with national screening programme clinics[17] and the cost-effectiveness of the SMS intervention[19] were unclear.

Discussion

This systematic review looked at the impact of telephone counselling, one of the telehealth applications, on individuals' cancer screening. It is estimated that 30% to 50% of cancers currently seen are preventable if cancer risk factors are avoided and current evidence-based prevention strategies are implemented[25]. This systematic review shows that telephone interventions are used in the early detection and screening of colorectal, breast and cervical cancers. For these cancers, the included studies found that telephone intervention was used in colonoscopy, faecal occult blood, mammography, and cervical screening programmes to increase uptake and completion of screening.

Telephone interventions are known to have many advantages, such as ease of use, ability to reach large groups of people and low cost effectiveness[26]. In this systematic review, personalised reminder messages, non-personalised one-size-fits-all reminder messages and telephone counselling practices were evaluated against each other and against routine care practice in telephone interventions. In the study by Hirai et al. (2016), a personalised message intervention was reported to be more effective than routine care, but not more effective than a generic, non-personalised message[27]. Similarly, a study included in this systematic review evaluated routine care, personalised message and uniform message practices in colorectal cancer screening. When comparing routine care and personalised messages, the study found that personalised messages increased the rate of colonoscopy appointments within 120 days of registration. However, it was found that there was no difference in uptake when personalised messaging was compared with non-personalised blanket messaging[22]. One of the other two trials that evaluated the effect of telephone counselling on screening uptake compared a reminder document and a reminder call with telephone counselling, and concluded that telephone counselling was less effective in increasing screening uptake[20]. When the study was analysed, it was found that only 33.4% of the women contacted completed the telephone counselling process; the reasons for not completing the process were lack of time, reluctance to talk

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about mammography or to have a mammogram, and family or personal illness. Considering that less than half of the women contacted completed the telephone counselling, it is normal that the effect of telephone counselling on making a screening appointment would be lower.

A review of the literature found that counselling changed the rates of faecal occult blood testing and sigmoidoscopy between 11% and 12%, although there were studies[28,29] showing that telephone counselling increased knowledge of colonoscopy but did not affect the uptake of colonoscopy[30,31]. Studies of cervical cancer reported that individuals' existing knowledge played a key role in their participation in the screening programme[32,33]. In this systematic review, almost all studies reported that telephone counselling increased screening status[15,16,18,22-24]. One study examined the colonoscopy status of first-degree relatives of cancer patients after telephone counselling, but reported that this had no effect on screening status[21].

The result of the study by Bauner et al. shows that the first-degree relatives who participated in the study did not take any step towards cancer screening, despite being so close to the person with cancer, suggesting that telephone counselling is not an effective method for these individuals in this context. A study conducted in Iran involved family carers of women with breast cancer. In a randomised controlled pretest-posttest trial, women in the intervention group received education and counselling via a telephone application. In the trial, the carers were trained in telephone care. What is breast cancer? What should be done for early detection? Telephone calls were made on topics such as the importance of mammography and breast examinations. In contrast to this trial, the rate of mammography among women in the intervention group who received telephone training was about 13% before the trial, but about 78% after the trial. In the control group, the rate of mammography was not significantly different between the pre-test and post-test results[34].

When reviewing the studies, it is generally found that people report that the information they receive through telephone counselling is useful for early diagnosis and screening practices, but at the same time it is found that there is a focus on a single screening method and that the shared decision-making process is not implemented[35,36]. Some studies have shown that the ideal of shared decision-making is very effective[37,38]. One of the included studies reported an increase in screening after telephone counselling[24]; people whose colonoscopy was cancelled due to COVID19 between March and May 2020 were asked to state their screening preferences and to use the screening method with a decision coach in the same year. The study found that most patients preferred colonoscopy after meeting with the decision coach, and only 20% wanted to use the stool-based test. Studies have also reported that stool-based tests are being used as an effective method for routine screening, especially during periods of difficult access to colonoscopy during the pandemic[39].

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Conclusion

Telephone interventions were carried out in 397 968 people over 4 months to 3.5 years, 6 trials were effective, 2 trials were similar, 1 trial was equivocal. Telephone intervention was used to make appointments for colonoscopy and faecal occult blood testing for colorectal cancer screening, mammography for breast cancer screening, and cervical cancer screening, and to complete the cancer screening programme. The telephone intervention was found to be effective in implementing colorectal, breast and cervical cancer screening programmes.

In addition to routine practice, it is recommended that reminder messages and telephone counselling should be integrated into cancer screening programmes in order to reach more people at risk of cancer, to facilitate the cancer follow-up process of health professionals and to minimise time loss, and that more studies should be conducted to guide clinical and academic arrangements to improve the quality of presentation and service related to telemedicine methods. In addition, it is recommended that reminder messages and telephone counselling be integrated into the practices of the Cancer Department, Cancer Screening and Monitoring Unit under the Ministry of Health, Public Health Institution of Turkey (THSK), and that special reminder messages be sent to first-degree relatives of cancer patients and uniform reminder messages be sent to individuals working in high-risk professions.

Conflict of Interest: There are no disclosed conflicts of interest for the author.

Financial Support: There was no institutional or organizational funding for the study.

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