

Patient Discharge Instructions in the Emergency Department and Their Effects on Comprehension and Recall of Discharge Instructions: A Systematic Review and Meta-analysis

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Study objective: We conduct a systematic review with meta-analysis to provide an overview of the different manners of providing discharge instructions in the emergency department (ED) and to assess their effects on comprehension and recall of the 4 domains of discharge instructions: diagnosis, treatment, follow-up, and return instructions.

Methods: We performed a systematic search in the PubMed, EMBASE, Web of Science Google Scholar, and Cochrane databases for studies published before March 15, 2018. A quality assessment of included articles was performed. Pooled proportions of correct recall by manner of providing discharge instructions were calculated.

Results: A total of 1,842 articles were screened, and after selection, 51 articles were included. Of the 51 included studies, 12 used verbal discharge instructions only, 30 used written discharge instructions, and 7 used video. Correct recall of verbal, written, and video discharge instructions ranged from 8% to 94%, 23% to 92%, and 54% to 89%, respectively. Meta-analysis was performed on data of 1,460 patients who received verbal information only, 3,395 patients who received written information, and 459 patients who received video information. Pooled data showed differences in correct recall, with, on average, 47% for patients who received verbal information (95% confidence interval 32.2% to 61.7%), 58% for patients who received written information (95% confidence interval 44.2% to 71.2%), and 67% for patients who received video information (95% confidence interval 57.9% to 75.7%).

Conclusion: Communicating discharge instructions verbally to patients in the ED may not be sufficient. Although overall correct recall was not significantly higher, adding video or written information to discharge instructions showed promising results for ED patients. [Ann Emerg Med. 2019;■:1-10.]

Please see page XX for the Editor's Capsule Summary of this article.

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INTRODUCTION

To ensure that patients are discharged safely, it is important that they have a good understanding of their diagnosis, treatment, follow-up, and return instructions. Therefore, giving patient discharge instructions is an important task of health care professionals in the emergency department (ED).

In a planned and structured situation, such as an outpatient clinic, patient education may already be challenging. In the ED, patient education is even more difficult because of multiple factors.

First, a visit to the ED is mostly an unplanned, unexpected, and therefore stressful situation for the

patient. Frequently, patients have acute onset of pain and are worried about their health, which makes it difficult to focus on the provided information. Second, the ED can be crowded and hectic, with a high workload for the health care professionals. Patient instructions, frequently consisting of new and complex information, are often briefly explained and can therefore be difficult for patients to remember or reproduce.¹ Third, patient-related factors, such as a language barrier, impaired cognitive function, or low literacy, can complicate patient education.² Fourth, disease-specific symptoms can also impede recall; for example, in patients with mild traumatic brain injury.³

Editor's Capsule Summary*What is already known on this topic*

Patients discharged from the emergency department (ED) need a clear understanding of their home care and follow-up plans.

What question this study addressed

This systematic review examined whether there are differences in comprehension of verbal, verbal plus written, and verbal plus video discharge instructions.

What this study adds to our knowledge

Results for individual studies were highly variable. Video instructions produced the highest recall (66.8%); however, they were not statistically better than written (57.8%) or verbal-only (47.0%) instructions.

How this is relevant to clinical practice

Patients may require a multimodal approach to receiving ED discharge instructions. Video may be useful in some cases.

Multiple studies have shown deficits in comprehension of discharge instruction.⁴⁻⁶ For example, Engel et al⁶ showed that a mere 13% of patients understood each of the 4 major domains of discharge instructions (diagnosis and cause, care given in the ED, care after the ED visit, and instructions on when to return to the ED).⁶

Various studies have investigated patient education with a range of communication tools, and their results suggest that type of communication may influence correct recall of patients. To better understand and quantify the differences in patients' comprehension of discharge information, a literature synthesis is needed. Our primary objective was to perform a systematic review with meta-analysis to provide an overview of the different manners of providing discharge instructions in the ED and to assess their effects on comprehension and recall of diagnosis, treatment, follow-up, and return instructions.

MATERIALS AND METHODS**Study Design**

We conducted a systematic review following the Preferred Reporting Items for Systematic Reviews and Meta-analyses guidelines.⁷ We registered the design of this systematic review in the International Prospective Register of Systematic Reviews.⁸

Selection of Participants and Data Collection and Processing

We performed a systematic search in the PubMed, EMBASE, Web of Science Google Scholar, and Cochrane databases. The information specialist from the Academic Library of the Erasmus Medical Center Rotterdam assisted in developing an extensive literature search. The search terms are listed in [Appendix E1](#) (available online at <http://www.annemergmed.com>). Articles about discharge instructions in the ED that measured recall were included independently of patient characteristics. We included randomized controlled trials, retrospective and prospective cohort studies, cross-sectional studies, and time-series studies published before March 15, 2018. Articles not written in English were excluded.

Articles were first selected according to title and abstract by 2 independent reviewers (A.E.H. and S.C.P.A.). Then, final selection was made on articles' full text. In case of disagreement, a third researcher (J.A.H.) decided whether to include or exclude the debated article. References from selected articles were checked for relevant articles. For each included study, we extracted information on the participants (number, age, sex, education level, and language barrier), manner of patient education (verbal, written, video, telephone, or all 4), way of measuring correct recall, percentage of correct recall, and domain of patient education in which correct recall was measured.

The checklist of the Cochrane Library was used to assess the quality and risk of bias of each included article. Articles were judged on selection bias, performance bias, detection bias, attrition bias, and reporting bias, and a conclusion was made about overall risk of bias for each article.⁹

Outcome Measures

The outcome measure of our study was comprehension and recall of discharge instructions after the ED visit. Discharge instructions were subdivided into 4 domains: diagnosis, prognosis, treatment, and return instructions. Comprehension and recall of discharge instructions were determined by manner of providing discharge instruction.

Primary Data Analysis

Manner of providing discharge instructions (information on diagnosis, treatment, follow-up, return instructions, or all 4) was categorized into verbal, written, video, and telephone discharge instructions. For each of these categories, pooled correct recall was determined, expressed by percentage of patients who could correctly recall discharge instructions. We followed a step-by-step guide to perform a meta-analysis by manner of providing discharge

instructions, using a random-effects model in an Excel spreadsheet (version 2010; Microsoft, Redmond, WA).¹⁰ We used spreadsheets capable of producing customized forest plots that were developed by Neyeloff et al¹⁰ to generate the forest plots. Studies that reported only increase of correct recall or studies that did not report overall proportions of correct recall were excluded from the calculation of pooled estimates of correct recall. A meta-analysis was not conducted for discharge instructions by telephone because only 2 studies were available.

We used the I^2 statistic to assess the percentage of variation across studies that is due to heterogeneity rather than chance.¹¹ An I^2 value of 25% or lower is associated with low heterogeneity, 50% is associated with moderate

heterogeneity, and 75% or higher is associated with high heterogeneity.¹¹ Subsequently, we compared the pooled correct recall and confidence intervals (CIs) of verbal, written, and video discharge instructions. We used CIs to assess whether correct recall by manner of providing discharge instructions was statistically significant.

RESULTS

The search resulted in 1,842 articles; after selection, 51 met the inclusion and exclusion criteria (Figure 1). Of the 51 included studies, 12 used verbal discharge instructions only,¹²⁻²³ 30 used written discharge instructions,^{3,5,6,24-51} 7 used video,⁵²⁻⁵⁸ and 2 used telephone^{59,60} discharge

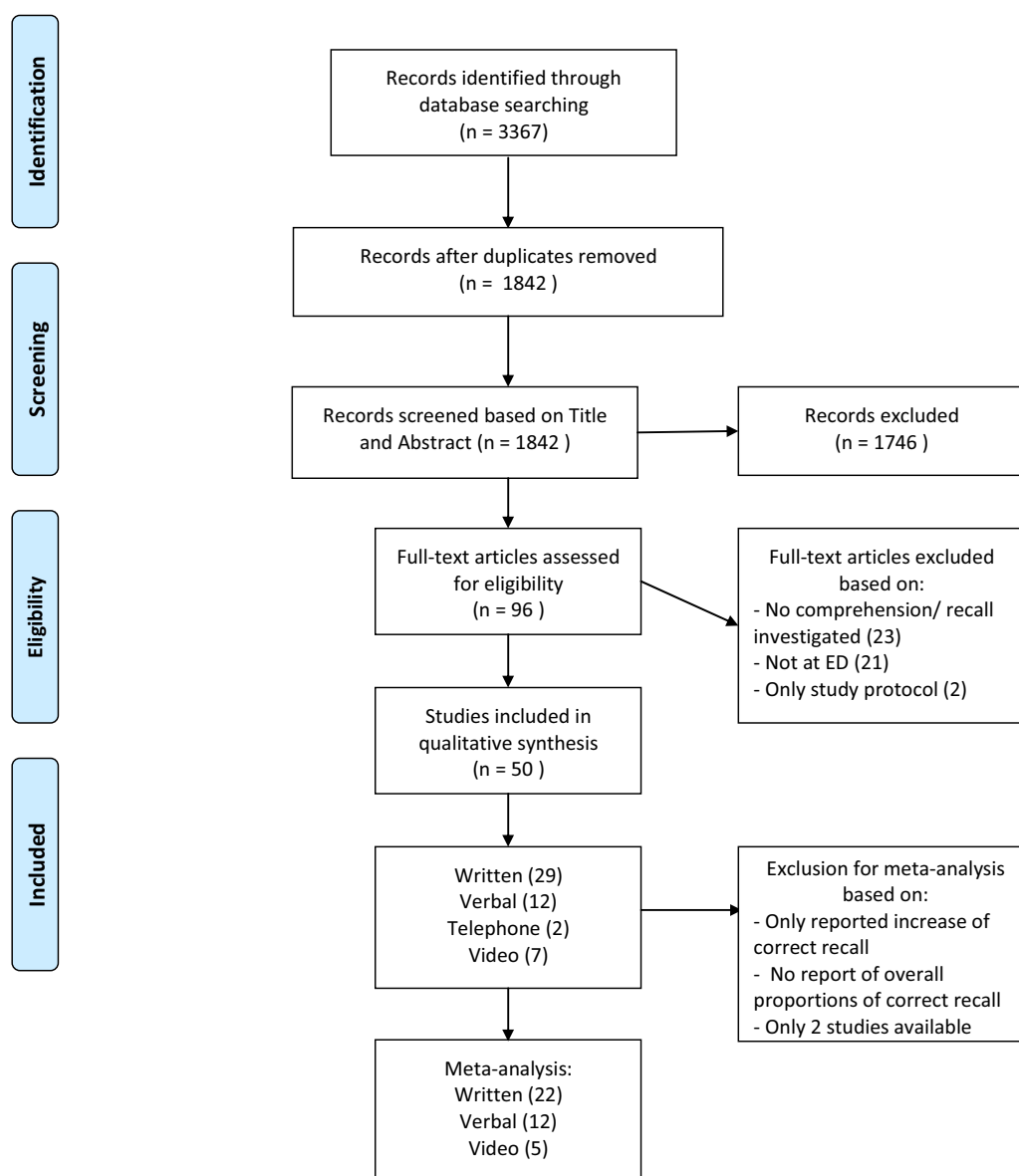


Figure 1. Flowchart of the study identification process.

instructions. Of these, 33 were observational cross-sectional studies and 18 were randomized controlled trials.

The quality assessment of the included studies is shown in [Appendix E2](#) (available online at <http://www.annemergmed.com>). We assessed articles according to their way of generating comparable groups and found several randomized controlled trials^{24,47,54,56,57} and 6 2-phase cohort trials^{3,22,35,48,51,58} to have a high risk of bias. Because of a significant percentage of patients lost to follow-up, we judged 14 articles^{3,15,21,25,30,34,37,44-46,52,54,58,59} to have a high risk of incomplete data. Twenty articles did not describe the level of education^{6,15,17,20-22,24,27,29,35,39,44,46,48,52,53,55,58-60} and 9 articles did not mention whether there was a language barrier^{12,15,23,25,35,43,44,51,60} and therefore probably had selection bias.

Most studies assessed recall of discharge instructions in 4 domains: diagnosis, treatment, follow-up instructions, and return instructions. Recall was measured in different ways throughout the different studies; for example, by face-to-face interview, telephone interview, or written questionnaire.

All patients discharged from the ED normally receive verbal discharge instructions. We found 12 studies that investigated recall of verbal discharge instructions. In these studies, correct recall of such instructions differed widely, from 8% to 94% ([Table 1 in Appendix E2](#), available online at <http://www.annemergmed.com>).¹²⁻²³

In various studies, one or more of the different domains of patient education were investigated. For example, a single-center cross-sectional study demonstrated that 66% of patients had a fair or poor understanding of discharge instructions in at least one domain of discharge instructions.¹⁶ Another cross-sectional study found that the most accurate recall was on domain of diagnosis; this was correct for 82% of patients, whereas only 43% of patients could correctly recall discharge instructions in all 4 domains.¹⁵ Complete understanding of their diagnosis was reported for only half of the patients.¹⁸

In a study that specifically investigated knowledge of prescribed medication by questionnaire, none of the questions were answered correctly by 37% of patients. Fifty-seven percent of patients could recall the purpose of the medication, and 62% could recall when to receive the medication. Only 8% of patients could answer all questions on medication use correctly.¹²

In regard to follow-up instructions, of all adult patients in the study by Qureshi et al,¹⁷ 94% who were advised to consult their general practitioner after their ED visit could recall this advice correctly.

In general, there seems to be no correlation between the number of domains measured in the different studies and

correct recall. Studies investigating 4 domains showed correct recall for 19.9% to 67% of patients.^{14,20} Studies investigating only one domain showed correct recall for 25.3% to 94% of patients.^{12,17} However, according to one study, recall seemed better if just one simple instruction was given to a patient.¹⁷

Griffey et al¹³ studied a special conversation technique used with verbal instructions, the teach-back method whereby a patient is asked to “teach back” the information received from a caregiver to receive clarifying feedback from him or her. They found a significant improvement in comprehension of follow-up instructions of 31%, but no significant difference in comprehension of diagnosis and treatment. However, a more recent prospective before-after study found that the teach-back method had an improvement of recall of 15% in all aspects of discharge instructions, regardless of patient age and education level.¹⁹

One study showed that if verbal instructions were supported by illustrations on a tablet, understanding of diagnosis and treatment improved significantly.¹⁴

Four studies specifically investigated verbal discharge instructions for parents of children discharged from the ED. Waisman et al²³ found correct recall of discharge instructions for 75% of parents. However, Chappuy et al²⁰ found that only 20% of parents understood all domains of discharge instructions correctly, and recall was less when parents thought their child was in pain. Two studies found that verbal instructions improved recall significantly if added to written discharge instructions.^{21,22}

Twenty-nine studies investigated recall of written discharge instructions. Most studies showed that adding verbal instructions improved correct recall of discharge instructions significantly, with 7% to 31% correct recall ([Table 2 in Appendix E2](#), available online at <http://www.annemergmed.com>).^{5,25,26,33,34} Nonetheless, several studies showed a wide range of incorrect recall in at least one domain, varying from 23% to 92%.^{6,27,29,32,37,39}

Four studies specifically investigated elderly patients.^{41,43-45} For example, Hastings et al^{43,44} found that 43% to 56% of patients did not understand return instructions completely. They found improvement on recall of medication knowledge if written instructions were individualized instead of preprinted in a standard format.⁴⁵ Even with written discharge instructions, patients with cognitive impairment were less likely to correctly recall the discharge instructions than those without cognitive impairment.⁴¹

To improve patients' recall, written discharge instructions could be optimized. A randomized controlled trial that compared written instructions with and without illustrations showed that adding illustrations improved

correct recall significantly.^{24,28} If written information is simplified, correct recall improves significantly.^{30,38}

Another factor influencing correct recall of written discharge instruction is health literacy. Patients with a low health literacy had less understanding of discharge instructions than those with high literacy.³⁶

Studies investigating parents of children discharged from the ED with written instructions found that when verbal and written information was combined, correct recall was better than when verbal-only or written-only information was used,^{3,47,48} especially for treatment discharge instructions.⁵¹ Although 93% of parents thought they understood the discharge instructions about diagnoses for their child, there was incorrect recall for 22% of parents.⁴⁹ Another study found 32% incorrect recall about treatment of the child even after parents received written discharge instructions.⁵⁰ A study using storytelling (written experiences from other parents) as a communication tool showed no difference in correct recall.⁴²

Seven studies investigated recall of video discharge instructions. Discharge instructions using an information video improved recall significantly (Table 3 in Appendix E2, available online at <http://www.annemergmed.com>).^{52,54} Nonetheless, these studies showed a wide range of correct recall in at least one domain, varying from 54% to 89%. For example, Chakravarthy et al⁵³ showed improvement from 65% to 82% correct recall when a discharge video was used.

Most studies using a video were targeted at parents of children discharged from the ED. The parents showed significant improvement in knowledge of the diagnosis and treatment compared with those who did not see the information video.⁵⁵⁻⁵⁸

Two studies investigated recall of discharge instructions by telephone. These studies showed that adding telephone follow-up to standard discharge instructions did not improve correct recall in elderly patients and parents (Table 4 in Appendix E2, available online at <http://www.annemergmed.com>).^{60,61}

A meta-analysis was performed on data of 1,460 patients who received verbal information only, 3,395 patients who received written information, and 459 patients who received video information. Figures 2 to 4 provide an overview of the overall pooled correct recall of verbal, written, and video discharge instruction. Variation in correct recall was moderate across studies on video discharge instructions ($I^2=50.1%$) and high across those on verbal and written discharge instructions (verbal $I^2=95.6%$; written $I^2=97.7%$). The highest pooled recall was estimated for video discharge instructions (number of studies=6; pooled correct recall 66.8%; 95% CI 57.9% to 75.7%) and written discharge instructions (number of studies=22; pooled correct recall 57.8%; 95% CI 44.2% to 71.2%). The pooled correct recall of verbal discharge instructions was 47.0% (number of studies=11; 95% CI 32.2% to 61.7%).

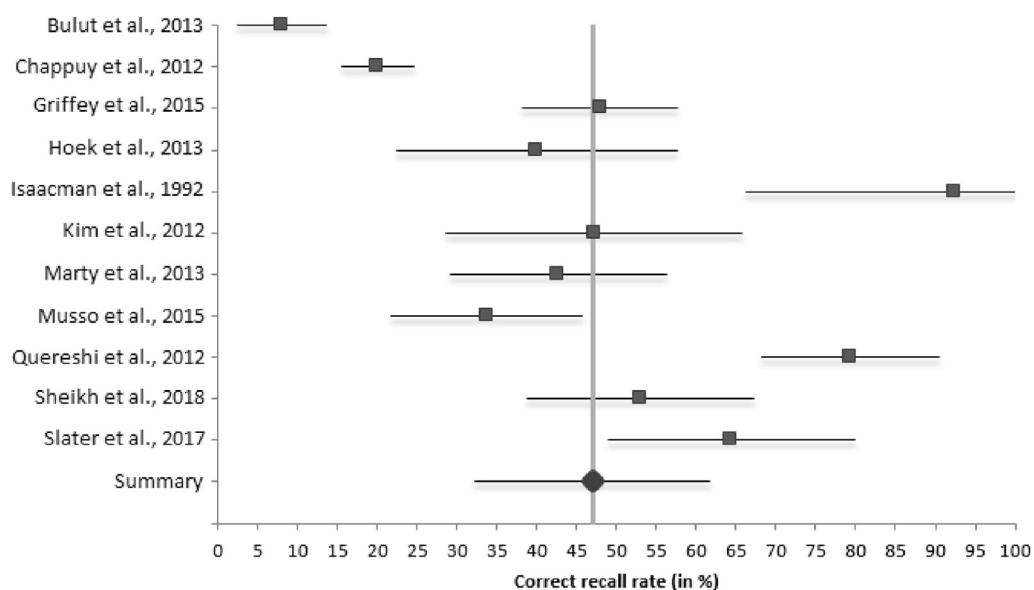


Figure 2. Forest plot of pooled correct recall rates of verbal discharge instruction.

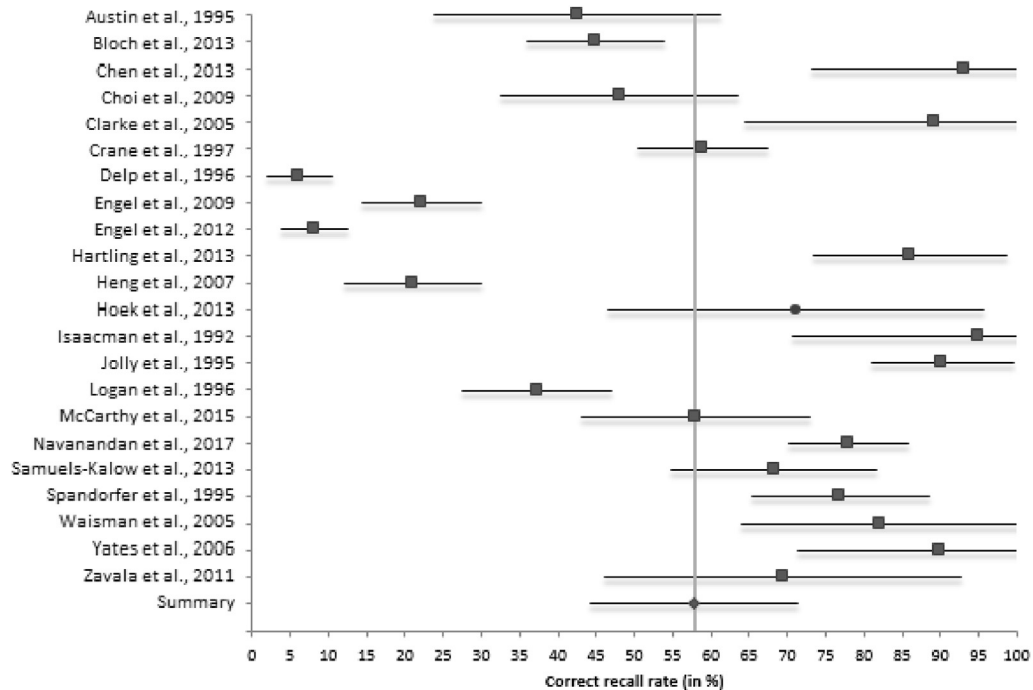


Figure 3. Forest plot of pooled correct recall rates of written discharge instruction.

LIMITATIONS

This systematic review has several limitations. First, the included studies are difficult to compare because of the variety in methods for discharge instructions, different ways of measuring and different definitions of recall, and heterogeneity in patient populations. For example, studies have used different follow-up periods to measure recall. It has been shown that duration between providing discharge instructions and measuring recall influences outcome.⁶² This might influence the results of the meta-analysis,

although the ED patient population is heterogeneous and patients must receive discharge instructions based on the best available evidence.

Second, not all included studies were of the same quality; nevertheless, in the group of verbal, written, and video discharge instructions there were enough articles of relatively good quality to draw conclusions.

Third, our review focused on correct recall of diagnosis, treatment, follow-up, and return instructions. We did not investigate whether correct recall influences patients'

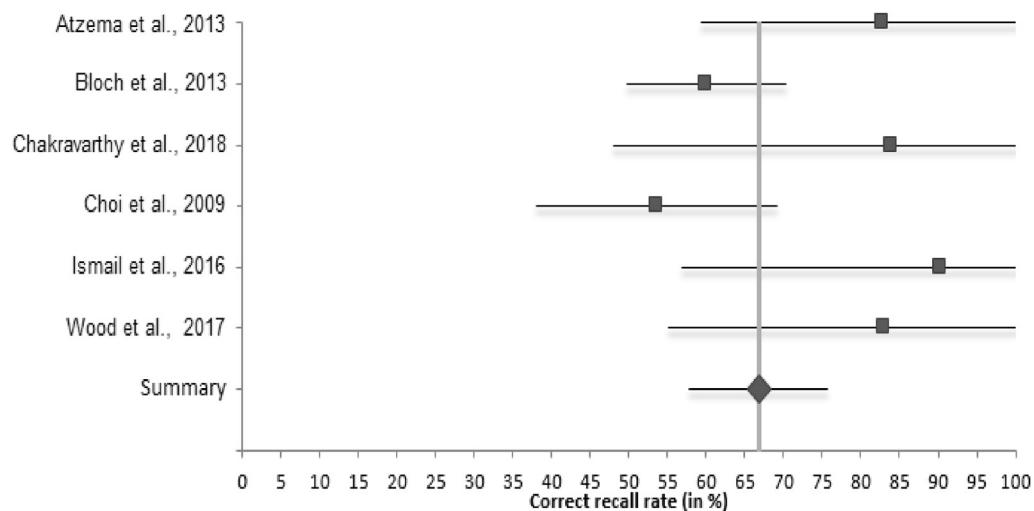


Figure 4. Forest plot of pooled correct recall rates of video discharge instruction.

symptoms, recovery, or both. For future studies, we recommend studying the health benefits of correct recall of discharge instructions in the ED.

Fourth, we categorized the included articles in the manner of discharge instructions (verbal, written, video, or telephone); however, discharge instructions are seldom provided in isolation. Although not measured in all the studies, the effect of verbal discharge instructions might influence the other manners of discharge instructions.

DISCUSSION

To our knowledge, this is the first systematic review with a meta-analysis about discharge instructions and their effect on correct recall in the ED. We distinguished 4 types of discharge instructions: verbal only, written information, video, and telephone follow-up. It is essential to differentiate between those types to determine the optimal way to provide discharge instructions so ED patients can be discharged home safely.

Verbal discharge instructions are part of standard care, although the results of our review showed that correct recall with this manner could be as low as 8%. Training of providers of discharge instructions on communication with the teach-back method might improve recall.

Our findings suggest that adding written information to standard care could improve recall from 47% to 58% on average. This result is comparable to those of studies in other research fields; for example, in rheumatic patients who received colchicine treatment and for patients who underwent cataract or hip surgery.⁶³⁻⁶⁵

The overall correct recall of adding a video to the discharge instructions was, although not significant, higher than correct recall in patients who received written instructions. All individual studies showed improvement of recall compared with standard care, with or without written information. This is comparable to other results found in different patient populations.^{66,67}

Although there seems to be a trend toward adding video to discharge instructions as the optimal manner, our meta-analysis showed that recall did not significantly improve. However, comparison between video and written information is hampered by the fact that videos were often used to inform about more complicated topics. For example, information about follow-up appointment after the ED visit is easier to remember than information about diagnosis and treatment.^{17,56} In other fields of medicine, patient education with video shows promising results. For example, a study directed to pregnant women that investigated patient education on influenza vaccination showed that women who were shown an instruction video

in addition to verbal information had significantly better understanding of the information about influenza vaccination compared with women who received only verbal information from a physician.⁶⁷ Furthermore, a study on patients with atrial fibrillation showed significant improvement of knowledge of atrial fibrillation when a video was added to verbal instructions compared with verbal instructions only.⁶⁸ More research is needed to investigate recall of video discharge instructions on the ED population, particularly in specific patient populations, such as patients with low health literacy. A study among patients with low health literacy showed a significantly better understanding of information about screening for colorectal cancer when animations combined with spoken text were used compared with written text only.⁶⁶ Moreover, the health benefit of correct recall of discharge instructions needs further investigation.

Heterogeneity in patient-population-related and patient-related factors, such as low health literacy or language barrier, may have contributed to the wide variation in correct recall by manner of discharge instructions. A study with volunteers from an outpatient clinic showed that health literacy might negatively influence understanding and recall of discharge instructions.² Because there were only a few articles reporting the effect of health literacy in the ED, we were not able to draw conclusions about the effect of health literacy on correct recall of discharge instructions. A language barrier might prohibit correct recall of discharge instructions.⁶⁹ However, in most studies included in this review, a language barrier was an exclusion criterion for enrollment in the study, so we were not able to provide an overview of the effect of language barrier on ED discharge instructions.

Other factors influencing recall of information as described in other areas of medical education may also be present in different levels for each patient; for example, emotional state during education, preexisting health status, and amount of information.⁷⁰ However, the included studies provided no information about these factors.

Communicating discharge instructions verbally to patients in the ED may not be sufficient. Although overall correct recall was not significantly higher, adding video or written information to discharge instructions showed promising results for ED patients. Further investigation is necessary to evaluate the effect of written and video discharge instructions on recall, including study of the health benefits of correct recall of discharge instructions in the ED.

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All authors attest to meeting the four ICMJE.org authorship criteria: (1) Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND (2) Drafting the work or revising it critically for important intellectual content; AND (3) Final approval of the version to be published; AND (4) Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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