

Effect of interventions to improve health care services for ethnic minority populations

Louise Forsetlund¹, Morten Christoph Eike^{1,2} and Gunn E. Vist¹

1) Norwegian Knowledge Centre for the Health Services, PO Box 7004 St. Olavsplass, 0130 Oslo, Norway

2) Current address: Institute of Medical Genetics, University of Oslo, Oslo, Norway

Correspondence: Louise Forsetlund, e-mail: louise.forsetlund@kunnskapssenteret.no

ABSTRACT

Objectives: Since the early 1990s there has been an increasing awareness of social and ethnic inequity in health and for the last few years there has also been an increasing focus on disparities in the quality of health services to ethnic minority groups. The aim of this review was to collect and summarise in a systematic and transparent manner the effect of interventions to improve health care services for ethnic minorities.

Methods: We searched several medical databases for systematic reviews and randomised controlled trials. Two researchers independently screened for and selected studies, assessed risk of bias, extracted data and graded the quality of the evidence for each outcome in the included studies. The analysis was done qualitatively by describing studies and presenting them in tables.

Results: We included 19 primary studies. The interventions were targeted at reducing clinical, structural and organisational barriers against good quality health care services. Eight studies examined the effect of educational interventions in improving outcomes within cross-cultural communication, smoking cessation, asthma care, cancer screening and mental health care. In six comparisons the effect of reminders for improving health care services and patient outcomes within cancer screening and diabetes care was examined. Two studies compared professional remote interpretation services to traditional interpretation services, two studies compared ethnic matching of client and therapist and two studies examined the effect of providing additional support in the form of more personnel in the treatment of diabetes and kidney transplant patients. Most patients were African-Americans and Latin-Americans and all ages were represented.

Conclusions: Educational interventions and electronic reminders to physicians may in some contexts improve health care and health outcomes for minority patients. The quality of the evidence varied from low to very low. The quality of available evidence for the other interventions was too low to draw reliable conclusions. We found no studies that only included young patients, but we suggest that interventions targeted at health personnel or health organisations may be applicable regardless of the age of the patient population. This review reveals that the evidence for interventions to improve health care for minorities is sparse and generally of low quality.

Since the early 1990s, an increasing awareness has emerged both nationally and internationally that socioeconomic inequalities in Western societies are still so large that they lead to significant differences in people's health, and that these differences are increasing (1-3). The lower the socioeconomic status, the poorer health (4). Several studies have suggested that this also applies to child and adolescent health (5-7). In parallel with the realization of the significance of socioeconomic factors, studies have also emerged of the groups that constitute the majority of those with low socioeconomic status, namely migrants and non-western immigrants (8-16). These studies have reported several significant differences in health both between some of the groups and ethnic Norwegians as well as between and within individual groups of immigrants.

Immigrants constitute one of several minority groups in Norway. Minorities are interpreted to mean people who have a different cultural and/or lingual background than the country's majority population, including chil-

dren of two parents with this background. The definition of immigrants has recently been redefined by Statistics Norway: Persons who are born abroad to two foreign born parents, and who have moved to Norway. Those born in Norway with two immigrant parents are defined as "Norwegian-born to immigrant parents" (17). Earlier terms like western and non-western have been replaced by names of continents. Because we refer to publications that use older terminology, however, we will use the same terminology as used in these. Accordingly, by immigrants we mean persons who are born abroad to two foreign born parents and their descendants (who also have two foreign born parents). Other minority groups in Norway are national minorities such as Jews, Kvener (people of Finnish origin), Forest Finns, Roma (gypsies) and the Romani people, as well as the Sami, who are also considered to be indigenous (18).

If we look at young immigrants in the age group 16-24 years, the self-reported information in the report

from Statistics Norway 2005/2006 about immigrant health can be interpreted as young immigrants having equally good health as ethnic Norwegians (14). Still, as with all averages, the totals for young immigrants probably conceal variations in health depending of parents' and/or own country of birth and the specific health related challenges tied to the group (19,20). Although fewer immigrant youths stated having at least one medical condition compared to the same age group in the general population, there are still a larger proportion of minority youths who feels that their lives are affected to a large extent by health problems (14). Regarding psychosomatic symptoms and mental health problems the youth group seen as a whole appeared more troubled than the corresponding age groups in the general population in this survey (14). However, other studies indicate that overall mental health in young people varies by type of parental national origin and by gender (21-23). Immigrant youths visited their family physician and specialists more often, and were more often admitted to hospital during the last 12 months. These and other preliminary data indicate that immigrant minority groups may have fairly equal access to health care services, although there may be variations between groups (14,24,25).

Regarding satisfaction with the health services, 72% of the age group 16-24 years reported to be satisfied in the Statistics Norway's survey. This is a lower rate of satisfaction than was reported by the older participants in the age group 55-70 years (80%), even though the older participants had poorer health (14). The survey does not compare the results for the youth group with those from the general population for this particular question. On request, Statistics Norway stated that 8% of 16-24 year olds reported feeling they are not being treated as well as ethnic Norwegians.

Regarding minority groups such as Jews, Kvener, Forest Finns, Roma and the Romani People, we do not know of any survey of their access to, nor their satisfaction with, health services for any age group. We know of only one survey of Sami youth, which reported that they utilised health services to the same extent as non-Sami youth (26).

The quality of health care services is just one of many complex factors, including socioeconomic status, that are considered important influencing factors for differences in health (27). Health care services are influenced by political decisions in many areas, at different levels, and by what is considered a political priority at any given time. Still, quality improvement of the health care services is the area where the health care system has the opportunity to contribute independently to the development of greater equality in health, as opposed to other areas of influence, like labour market politics, housing market politics or educational politics. A review performed by the American Institute of Medicine in 2002 found that there were disparities in treatment of minority and majority population in al-

most all clinical areas, from early preventive interventions to treatment of pain, which could not be attributed to differences in insurance status, income, age or seriousness of disease (28-31). None of these studies focused on young people, but two later published reviews examined ethnical disparities in health care for adolescents (32) and children (33). These reviews concluded that in some areas in American health care disparities existed, even after controlling for socioeconomic factors.

There has been conducted little research in Norway on the quality of health care services to minority groups, or on the existence of actual disparities in treatment, irrespective of age. An editorial in *Tidskrift for Den norske legeförening* in 2008 tried to spark a debate about the existence of institutional racism from a system perspective in the Norwegian health care system, but without response (34). There are, however, studies that indicate that there are factors that can act as barriers against an equal health service for minorities (26,35-39). Only one of these studies focused on youths as a specific group, and the same study was the only one that included Sami, rather than non-western immigrants (26). Some studies have actually found disparities in treatment and patient outcomes, all within obstetric care (40-44). The Norwegian Medical Association sums up some of the barriers in their 10-point program for a better health care service for the minority group non-western immigrants. Among these barriers are lack of knowledge about health care services, different understanding of symptoms and diseases, language differences, physician-patient communication, length of consultation and the cultural competence of health care personnel (20). Additionally, the feeling of being discriminated against might in itself function as a barrier to seeking help from the health care services (26).

The barriers can be categorized as organisational, structural or clinical (45). An organisational barrier can, for example, be a mismatch in the composition of leaders and practitioners in the health care service to that of the ethnic composition in the population. A reasonable hypothesis appears to be that ethnic matching of patient and therapist can potentially reduce this barrier. Lack of interpreters and insufficient language-adapted information material can be classified as structural barriers. Clinical barriers can be behaviour and modus operandi amongst health personnel. For example, negative expectations and opinions about the patient can affect the quality of the treatment (28).

The objective of this review was to collect and evaluate in a systematic and transparent manner the effect of interventions targeted at health care personnel or health care organisations to improve health care services for minorities. This review article is an adapted and revised version of a report in Norwegian from the Norwegian Knowledge Centre for the Health Services on the same subject (46).

METHODOLOGY

Literature search

We performed an extensive literature search in several medical databases (46). The search included all age groups and was not restricted with regard to languages. We searched the following databases: The Cochrane Library, MEDLINE, EMBASE, British Nursing Index, ISI Social Sciences/Science Citation Index (SSCI/SCI) and Research and Development Resource Base (RDRP). Additionally, in December 2009, we made a citation search of a few selected studies in the citation database SSCI/SCI.

Inclusion criteria

The population was patients who belonged to an ethnic minority in the country of residence, regardless of age. Interventions of interest were those directed at health care personnel and/or organisations either alone or as part of a complex intervention package with the specific aim of improving the quality of health care services for minority populations. In some cases, however, the border between patient-oriented interventions and organisation-oriented interventions is somewhat unclear. For example, although case management-resembling interventions would involve organisational changes, we considered these primarily as patient oriented interventions to be excluded. However, we included interventions targeted at both health personnel and patients.

Outcomes of interest included quality of health care services, use of health care services, patient health or the quality of life for patients. Inclusion criteria for study design were systematic reviews of high quality and randomised controlled trials.

Inclusion, assessing risk of bias and grading the quality of evidence for each outcome

Two authors independently screened all unique titles that were identified in the literature search. If one author assessed the title as relevant, the article was acquired in full text. Full text articles were independently evaluated by two authors for relevance according to the inclusion criteria. Included studies were assessed by two authors for risk of bias according to the Cochrane Handbook (47). We evaluated the quality of the evidence for each outcome using GRADE (Grading of Recommendations, Assessment, Development and Evaluation). The GRADE methodology uses study-design as the starting point, then uses eight criteria to evaluate each outcome. The quality of the evidence for each outcome is classified in four categories – high, medium, low and very low quality, which implies a varying degree of confidence in the results. More details on how to use GRADE is available on the web pages: www.gradeworkinggroup.org. For a detailed description of the methods used at the Norwegian Knowledge Centre for the Health Services, see our handbook <http://www.kunnskapssenteret.no/Verkt%C3%B8y/2139.cms>.

RESULTS

Results of the literature search

The systematic reviews we identified through the literature search were either limited to specific patient groups, for example asthmatics with a minority background, or to specific interventions, such as interventions to increase cultural competence (48-53). The literature searches in these reviews were all performed in 2006 or earlier and thus were likely to be outdated. Although one of the systematic reviews had a very similar scope to ours (effect of strategies to improve the quality of health services for minority populations), it was limited to studies from the U.S. only and the literature search dated as far back as 2003 (48). Therefore, instead of updating existing reviews, we considered it more appropriate to conduct a new systematic review to answer our question. Primary studies in the previous reviews were checked against our inclusion criteria, and those included were checked against our own search results. The literature search algorithm returned 2637 references, of which we assessed 57 in full text. 38 of these studies were excluded, mostly due to non-relevant design or intervention, leaving a total of 19 included primary studies (54-73).

Included studies

We classified the included interventions according to three types of barriers; organisational, structural or clinical barriers (45). These were further subgrouped into a total of seven categories (Table 1).

Interventions directed at clinical barriers

Educational interventions

Four randomised controlled trials evaluated the effect of training health care personnel. All had slightly different, but similar objectives: To improve cross-cultural communication, cultural competency, cultural sensitivity and to reduce communication barriers. The interventions were of varying duration and were implemented in different contexts, and two of them also included training of the patients (Table 2).

Both of the interventions that also involved patients demonstrated statistically significant results (Harmsen 2005, Dansereau 1996). The results for the other two interventions were mixed (Thom 2006, Wade 1991). The quality of the evidence for all results was graded as very low.

Complex interventions with an educational program

Four randomised controlled trials evaluated the effect of complex interventions with focus on educational programs (Table 3). Three of these (Allen 1998, Manfredi 1998, Miranda 2003) had interventions for both health personnel and patients, while the fourth trial (Evans 1997) had interventions directed at health personnel only. The studies evaluated interventions to teach physicians counselling skills to help patients stop smoking (Allen 1998), improve cancer screening (Manfredi 1998), improve care of depressive patients

Table 1. Categories of included interventions.

Interventions directed at clinical barriers	
<i>Educational interventions</i>	
Harmsen 2005 (54)	Education of both health personnel and patients, course in cross-cultural competence for physicians and videos for the patients.
Thom 2006(55)	Education of health personnel, physicians were given education in cultural competence.
Wade 1991(56)	Education of health personnel, psychotherapists were educated in cultural sensitivity.
Danserau 1996 (57)	Education of both health personnel and patients in „node-link-mapping“ (a way of visualising problems and consequences of choices) .
<i>Complex interventions with education</i>	
Allen 1998(58)	Education of both health personnel and patients, physicians received training, reward incentives and summaries of patients' smoking habits, and patients were given information about smoking cessation.
Manfredi 1998 (59)	Education of health personnel and patients, personnel were trained in screening for cancer, reminders and follow-up. Patients received health care cards and information.
Miranda 2003 (60)	Education of health personnel and patients, personnel were given training and resources to support implementation, patients received culturally adapted information that encouraged either cognitive behavioural therapy or follow-up by nurses.
Evans 1997 (61)	Physicians, nurses and other health care personnel received education in prevention and treatment of asthma, and new medicines were made available
Interventions directed at structural barriers	
<i>Reminders</i>	
Burack 1996 (62)	Reminders to health personnel and patients about mammographic screening.
Burack 1998 (63)	Reminders to health personnel and patients about pap smears.
Phillips 2005 (64)	Reminders to physicians in the primary health care service regarding type 2 diabetes treatment
<i>Complex interventions with reminders</i>	
Burack 1994 (65) Burack 1997 (66)	Reminders to health personnel: Physicians received electronic reminders about mammographic screening and training.
McDermott 2001 (67)	Reminders to health personnel and education in diabetes treatment as well as follow-up and newsletters, reviewing patient journals with feedback, visits by specialist teams and guidelines.
Phillips 2005 (64)	Reminders to physicians in the primary health care service regarding type 2 diabetes treatment with both personal feedback and feedback in groups about the physician's treatment.
<i>Professional interpretation services</i>	
Gany 2007 (68)	Remote simultaneous interpretation in general practice or emergency clinics.
Hornberger 1996 (69)	Remote simultaneous interpretation in polyclinics for mothers with young children.
Interventions directed at organisational barriers	
<i>Matching</i>	
Thompson 2006 (70)	Treatment of minor mental problems by therapist with same ethnicity as patients.
La Roche 2006 (71)	Ethnic matching for teacher and child in a complex educational program for coping with asthma.
<i>Follow-up and support</i>	
Bellary 2008 (72)	Follow-up and support to medical offices where extra time with nurse, diabetes nurse and link worker was given.
Chrisholm 2002 (73)	Follow-up and support to physicians from clinical pharmacists in treatment of kidney transplants patients.

(Miranda 2003) and to improve care of children with asthma (Evans 1997).

Even in those studies where the intervention was aimed at both health professionals and patients, the results were mixed. Two of the four studies that tested the effects of a complex educational program within different themes showed statistically significant positive results on the chosen primary outcomes (Miranda 2003, Evans 1997). The quality of the evidence for the results from these four studies varied from very low to low.

Interventions directed at structural barriers

Reminders

Two randomised controlled trials examined the effect of computerized reminders of mammography or pap screening to either physicians only or to both patients and physicians (Burack 1996, Burack 1998). A third,

three-armed study examined the effect of computerized reminders to physicians to improve diabetes care (Phillips 2005). All studies were carried out in the U.S. with a focus on African-American women (table 4).

None of the three comparisons of computerized reminders only to physicians showed statistically significant effects on the chosen primary outcomes. One of the two comparisons of reminders to both physicians and patients had statistically significant results for pap-screening but not for mammography screening. However, the quality of the evidence for the outcomes 'number of women completing mammography' and HbA1c-level was low, and very low for the outcome 'number of women completing pap-smears'.

Complex interventions with reminders

Three randomised controlled trials, two from the U.S. and one from Australia, examined the effect of com-

Table 2. Description of studies included under training interventions.

Study Country	Organisation, health personnel and patients	Intervention	Results
Harmsen 2005 (54) Netherlands)	General practice setting (19 physicians in each group). Results for western and non-western patients were presented separately. We retrieved data for the 369 non-western patients. Age: 0-65+.	Physicians participated in a 2.5-day course in inter-cultural communication. Patients were shown a 12 minute video in the waiting room focusing on how to communicate with their physician in a direct way. Comparison: Usual practice.	Mean score (scale from -1 to 1) for mutual understanding between physician and non-western patients in the intervention group after 6 months was 0.21 higher than in the control group (95% CI 0.002 to 0.422).
Thom 2006 (55) (USA)	Four medical offices participated, one academic medical office and one office in the country-side got the intervention (23 physicians with 247 patients). One community-based medical office and one office from the city were the control group (30 physicians with 182 patients). Patients were of different ethnicities: Latino/Hispanic, African-American, Caucasian non-Hispanic, Asian. Age: 54.9 (\pm 11.6) - 62.1 (\pm 11.4).	GPs and resident physicians were given training (3 to 4.5 hours) in cultural competence and feedback from patients on the extent of perceived cultural competence behaviour. Comparison: Feedback only.	Patients' perception of physician's cultural competence after 6 months. Questions on 13 behaviour items, scale 1-5. The scale score was transformed to a 0 to 100 scale by dividing the total score by 13 to get a mean score, subtracting 1, then multiplying by 25. Mean improvement score was 1.9 higher in the intervention group than in the control group, but not statistically significant: (95% CI -7.95 to 11.71).
Wade 1991 (56) (USA)	Organisation unclear. Eight female therapists, four African-American and four Caucasian. 80 African-American female patients (40 in the intervention group and 40 in the control group). Age: 19-44.	Education and skill-training of psychotherapists for a total of four hours in cultural sensitivity and about low-wage African-American women's attitudes to therapy. Comparison: Usual practice.	Patients' perception of the counselling relationship after three sessions. Mean of several items in an index measured by scales 1-7. Mean score in the intervention group was 15.7 scores higher than in the control group (95% CI 12.3 to 19.1).
Dansereau 1996 (57) (USA)	Three metadon clinics. Drug counsellors (14 in the intervention group and 9 in the control group). Opioid addicts (156 in the intervention group and 147 in the control group). African-Americans (20% in the intervention group and 25% in the control group), Caucasian (45% in the intervention group and 35% in the control group) and Mexican-American (35% in the intervention group and 40% in the control group). Age: 35-42.	Node-link-mapping: Drug counsellors were given handbook-based training in "node-link-mapping". Patients were given guidance in using "node-link-mapping". Comparison: General counselling skills refresher training.	Urine samples for opiates and cocaine after 6 months. Participants in the intervention group had statistically significant fewer urine samples positive for opiates.

plex interventions that all included reminders as one of the elements (Table 5). One study examined computerized reminders in addition to feedback to physicians regarding their diabetes treatment compared to regular practice (Phillips 2005). Another study compared reminders in addition to orientation of health personnel and free mammography for the patients with a limited version of the same intervention (Burack 1997). The third study compared a recall and reminder system in addition to feedback, training of health personnel and follow-up of the practices which included an outreach diabetes team (McDermott 2001). The studies included African-American and patients of Aboriginal descent, as well as a selection of low-income patients without ethnic specification.

All of the three studies showed statistically significant effects on the chosen outcomes. The quality of the evidence for these results is low.

Professional interpretation services

Two randomised controlled trials examined the effect of using simultaneous translation via remote consecutive medical interpreting (Table 6). The controls used for comparison in the two studies were two slightly different types of regular practice. Both studies were conducted in the U.S., and included Spanish, Mandarin and Cantonese speaking patients.

Both studies showed statistically significant effects on the selected primary outcomes. The quality of the evidence for these results was very low.

Interventions directed at organisational barriers

Matching clients and therapists

Two randomised controlled trials examined the effect of matching clients and therapist. In one of the studies African-Americans were matched with a European-American or African-American therapist and in the

Table 3. Description of included studies regarding complex training interventions.

Study Country	Organisation, health personnel and patients	Interventions	Results
Allen 1998 (58) (USA)	Polyclinics in hospitals. 158 resident physicians, 65 in the intervention group only, 53 in the control group only and 40 that were given the intervention and had patients in both the control and the intervention group. African-American smokers (515 in the intervention group and 571 in the control group). Age: 32.6 – 33.7.	Resident physicians received 2 hours education, reward and a summary of the patient's history of smoking attached to the outside of the patient journal. Patients received written self-help material about smoking cessation. Comparison: Usual practice.	Smoking cessation at 12 months: Self-reported quit-rates: 10.6% in the intervention group versus 8.4% in the control group, not statistically significant.
Manfredi 1998 (59) (USA)	General practitioners in 51 medical offices. African-American and Latin-American patients/cancer screening (52392 in the intervention group and 42230 in the control group). Age: 18-65+.	Letter from the medical director encouraging the practices to improve cancer screening, on-site training of staff, two follow-up visits, invitation to continuing medical education seminar, mailing to patients of a health maintenance card with instructions, guidelines, feedback, chart reminder system and patient health maintenance card to educate patients. Comparison: Letter from the medical director with a supply of flow sheets.	Number of patients screened with clinical breast examination at 12 months: RR 1.15 (0.99 to 1.33).
Miranda 2003 (60) (USA)	181 physicians and nurses, 93 African-American, 778 Caucasian and 398 Latin-American patients with probable depression (numbers in each group not stated). Age: 17+.	Several kinds of education for health personnel, funds to support implementation of the interventions. Patients were given culturally adapted written materials and videos to encourage them to start treatment (either cognitive behavioural therapy or follow up by nurses). Comparison: Usual care.	Number of patients who received counselling or used antidepressant medications at an appropriate dosage at 6 months: 50.9% of the patients in the intervention group versus 39.7% of patients in the control group (p<0.001).
Evans 1997 (61) (USA)	22 children's clinics with 134 employees, including physicians, nurses, public health nurses, lab-assistants and other employees. African-American (44% in the intervention group and 46% in the control group) and Latin-Americans (33% in the intervention group and 34% in the control group) children, it is unclear how many children. Age <12.	Physicians, nurses and other employees received education in preventing and treating asthma, protocols and guidelines, as well as follow-up and support from a specialist nurse. New medicines were made available. Comparison: waiting list for training, supply of same medications, same guidelines.	Identification of new children with asthma at 2 years follow-up: 40 per 1000 in the intervention group versus 16 per 1000 in the control group (p<0.01).

other African-American and Latin-American children with their families were matched or not matched to therapists of same origin (Table 7).

None of the studies had statistically significant results. The quality of evidence for these results is too low to draw any conclusions about the effect of matching on patient health outcomes.

Follow-up and support interventions (additional personnel resources)

Two randomised controlled trials examined the effect of two different interventions of a supportive nature for health personnel in treating patients of Asian and African-American ethnicity (Bellary 2008, Chisholm 2002) (Table 8). In one study, support in the form of extra personnel resources for follow-up of patients was compared with giving the control group the same treatment protocol without extra resources (Bellary 2008). In the other study, support in the form of counselling

by a pharmacist of both physicians and patients was compared with a control group without such support (Chisholm 2002).

The studies had mixed results. One study demonstrated a statistically significant effect for the chosen outcome. The quality of the evidence for the positive results was graded as very low and for the results of the other study the quality was graded as low.

DISCUSSION

Interventions directed at clinical barriers

Educational programs

In five out of eight studies in which health personnel received an educational program as a single intervention or as part of a multifaceted intervention, there was a statistically significant improvement, either in the patients' assessment of the practitioner's cultural com-

Table 4. Description of studies included under reminders.

Study Country	Organisation, health personnel and patients	Interventions	Results
Burack 1996 (62) (USA)	Two medical centres with a total of 20 physicians. African-American women (1) n=590; 2) n=592; 3) n=590; Control: n=596). Age: 40-65+.	Computer-based reminders of mammography screening, three groups: 1) reminders to physicians, 2) reminders to patients, or 3) reminders to both physicians and patients (only comparisons for group 1 vs control and 3 vs control are relevant here). Comparison: Usual practice.	Number of women that had mammography after one year: Group 1 compared to control: No statistically significant results. Group 3 compared to control: No statistically significant results.
Burack 1998 (63) (USA)	Three medical centres with a total of 20 physicians. African-American women: 1) n=960; 2) n=964; 3) n=960; Control: n=964). Age: 18-40.	Computerized reminders of pap-screening, three groups: 1) reminders to physicians, 2) reminders to patients, or 3) reminders to both physicians and patients (only comparisons between group 1 vs control and 3 vs control are relevant here). Comparison: Usual practice.	Number of women that had pap-screening: Group 1 compared to control: 1.05 (95% CI 0.86 to 1.28) Group 3 compared to control: 1.23 (95% CI 1.01 to 1.50)
Phillips 2005 (64) (USA)	Diabetes clinic serving non-insured patients. Each of the 20 half-day clinic units with approximately eight physicians in each were distributed to one of four groups (later articles state there were 345 physicians in total): Five units in each group – in later articles it is unclear whether it was the units or physicians that were randomly assigned. 4138 patients, 94% African-American, average time with diabetes 10 years. Average age: 59 years.	Three different interventions: 1. Feedback group: Endocrinologists gave feedback to each physician regarding his/her diabetes treatment, both individually and in groups. 2. Reminders group: Computerized reminders to physicians focused on metabolic control (HbA1c), cardiovascular risk factors and diabetes complications. The reminders were printed and attached to the journal of each patient. 3. Feedback and reminders: Intervention 1 and 2. 4. Control: Usual practice. In this comparison we used the data from comparison of group 2 versus group 4 (control).	HbA1c-level: Mean difference at 3 years: -0.15 (p=0.34).

petence or of a clinical outcome for minority patients. Four of these studies at least partly included the age group of 12-20 years. Even though a synergy effect could have been expected of interventions targeting both health personnel and patients, the results indicate that these interventions were not successful more often than interventions targeted only at health personnel. As we graded the quality of the evidence for the results from the eight studies as very low or low, we cannot draw any certain conclusions about the effect of educational interventions in this particular context. However, our results are supported by a systematic review of a large number of studies from a wide range of settings in health care (74). The review concluded that different forms of education either alone or as part of a more complex intervention may have a small to moderate, but context-dependent effect on improvement of health personnel practices, as well as a smaller effect on patient outcomes across patient populations.

Interventions directed at structural barriers

Reminders

Five of the six studies that examined computerized reminders either alone or as part of a complex intervention showed statistically significant positive effects for

the respective selected outcome. The results in two of the comparisons in these six studies that included interventions which targeted both health personnel and patients were mixed. The quality of the evidence for the results from the six studies ranged from very low to low. However, again the results are supported by another systematic review with a broader scope about the effectiveness of computerized reminders for health personnel in studies across a wide range of outcomes and health care settings (75). Combined with this review, we conclude that computerized reminders to physicians under certain circumstances may have a small effect on patient outcomes and health professionals' behaviour.

Professional interpretation services

The two studies that compared remote simultaneous interpretation with common use of interpreters were both positive in their findings. However, the quality of the evidence of these results was graded as very low. Therefore, we cannot draw any conclusions. It is worth noting that professional interpreters in patient contact with health care generally seem to be underused (14). It is worrying that among young people aged 16-24 years who reported having a need for an interpreter, only 20% actually received a professional interpreta-

Table 5. Description of studies included under complex interventions with focus on reminders.

Study Country	Organisation, health personnel and patients	Interventions	Results
Burack 1994 (65) Burack 1997 (66) (USA)	In the first study five sites participated, while three participated in the second year of the intervention: Two organisations that served inhabitants in an inner city area of Detroit included two GP offices run by the Department of Health, the third was a part of a large HMO (health maintenance organisation). In the first study 2890 women participated, and in the second study 2826. The women belonged to low-income groups, but ethnicity was not explicitly stated. Age: 40 years or more	Two sequentially randomised controlled trials, both with one year follow-up. Physician and staff orientation, electronic reminders to physicians that identified women who should have mammography and elimination of out-of-pocket mammography costs for patients. The first part of the study seemed to contain a reminder to the patient also. Comparison: Physician and staff orientation, elimination of out-of-pocket mammography costs	Mammography completion at year 1 and year 2 at each kind of site: <u>Year 1</u> Primary care practices: OR 2.74 (95% CI 2.17 to 3.46) HMO: OR 1.59 (95% CI 1.23 to 2.05) <u>Year 2</u> Primary care practices: OR 1.84 (95% CI 1.40 to 2.40) HMO: OR 1.06 (95% CI 0.80 to 1.42)
McDermott 2001 (67) (Australia)	Cluster randomised trial with eight intervention units (301 diabetes patients of Aboriginal descent) which was randomly selected from a total of 21 (426 diabetes patients of Aboriginal descent). Age: 52.4 ±14.0 – 53.3 ±13.6.	Diabetes recall and reminder system, staff training in basic diabetes care, regular phone calls from the project manager, two-monthly newsletter, a mid-project workshop and indigenous healthcare workers responsible for managing the diabetes recall system and regular clinical checks to patients. Comparison: Diabetes outreach team, guidelines, audit and feedback.	Combined variable composed of different quality indicators: Combined RR 1.21 (95% CI 1.03 to 1.43)
Phillips 2005 (64) (USA)	Diabetes clinic which served non-insured patients, of which 87% of the patients were African-American. Each of the 20 half-day clinic units with approximately eight physicians in each were distributed to one of four groups (later articles state there were 345 physicians in total): Five units in each group – in later articles it is unclear whether it was the units or physicians that were randomly assigned. 4138 patients, 94% African-American, average time with diabetes 10 years. Average age: 59 years.	Three different interventions: 1. Feedback group: Endocrinologists gave feedback to each physician regarding his/her diabetes treatment, both individually and in groups. 2. Reminders group: Computerized reminders focused on metabolic control (HbA1c), cardiovascular risk factors and diabetes complications. The reminders were printed and attached to the journal of each patient. 3. Feedback and reminders: Intervention 1 and 2. 4. Control: Usual practice. In this comparison we used the data from comparison of group 3 versus group 4 (control).	HbA1c-level: Mean difference at 3 years -0.38 (p=0.01) in favour of the intervention group.

Table 6. Description of studies included under interpretation services.

Study Country	Organisation, health personnel and patients	Intervention	Results
Gany 2007 (68) (USA)	Out of 1276 English, Spanish, Mandarin and Cantonese-speaking patients at a primary health clinic and an emergency ward at a major municipal hospital in New York, 735 patients were chosen because they were considered to be in need of translation services. 371 were randomly selected for RCMI and 364 for use and selection of translation services at need. Age: 18+.	Simultaneous translation between physician and patient by a remote translator. The physician was given headphones if the patient was allocated to remote translation. All remote translators had participated in a 60 hour simultaneous translation course in the field of medicine. Comparison: Usual practice.	Satisfaction with physician communication /care: 71% in the intervention group rated their physician as 'very well' in treating them with respect versus 64% in the control group (p<0.05)
Hornberger 1996 (69) (USA)	58 mother-child pairs that only spoke Spanish were recruited when hospitalised for giving birth. Four paediatricians were involved in the treatment and three translators from a staff consisting of 20 full-time employees that had volunteered to participate in the study. Age: Not reported.	Simultaneous translation between physician and patient by a remote translator. The examination room was equipped with two headphones (with both microphone and receiver). The physician and patient could only hear the translator who simultaneously translated for the other in first person (for example: "I am worried because the child eats so little") and not the other's voice. Comparison: Usual practice.	Number of physician utterances: The remote-simultaneous interpreter service averaged 8.3 (10%) more physician utterances (95% confidence interval (95% CI 4.3 to 12.4)

Table 7. Description of studies included under matching.

Study Country	Organisation, health personnel and patients	Intervention	Results
Thompson 2006 (70) (USA)	4 African-American and 4 European-American therapists. 44 African-American clients in the local community. Age: 18+.	Clients were randomly assigned to European-American or African-American therapists for 10 one-hour sessions of interpersonal or problem solving therapy. The therapy sessions were filmed and reviewed weekly by the supervisor to ensure that the protocol was followed. Comparison: Therapists not matched.	Brief Symptom Inventory – An instrument with 53 elements for measuring symptom patterns: At 10 weeks there were no statistical significant differences between the matched and the non-matched group.
La Roche 2006* (71) (USA)	Children's hospital. Teacher/psychologist (number of health personnel was not given). Children with asthma with family (12 children in each group). African-American (27%) and Latin-American (73%). Age: (7 to 13 years).	Multifamily asthma group treatment (MFAAGT), a training program for mastering asthma which is based on allocentric self orientation and socioeconomic context of ethnic minorities. Included use of ethnic matching of teacher/psychologist and child. Comparison: Standard Psychoeducational Asthma Intervention (SPAI) without matching.	Mean number of visits to an emergency facility: At 12 months there was no statistically significant difference (-0.5 (95% CI -1.64 to 0.64)).

* Details of the intervention description is taken from a systematic review in which the authors obtained additional information from La Roche and colleagues (Chang 2007 (47)).

Table 8. Description of studies included under follow-up and support.

Study Country	Organisation, health personnel and patients	Intervention	Outcomes and results
Bellary 2008 (72) (UK)	Cluster randomised trial: 9 medical practices in the intervention group and 12 in the control group with more than 80% Asian patients. Age: <45-65+	Nurses, link workers, diabetes specialist nurses: Nurses trained with dealing with diabetes were 4 hours a week in the practices. They followed up the patients every other month and cooperated with the physician with implementing the treatment protocol. Link workers visited and taught patients. Two diabetes specialist nurses shared the responsibility for all the practices in the intervention group, while two other specialist nurses were responsible for all the practices in the trial. The GPs had an overall responsibility for implementing the treatment protocol in their practice and for making sure the prescribing process was changed. Comparison: Usual practice and distribution of an identical treatment protocol with defined targets.	Mean difference in Framingham 10 years coronary heart disease risk score: 0.06 (-0.56 to 0.68). "...Framingham risk of coronary heart disease estimated only for patients aged 30-74 years at baseline (n=1376)."
Chisholm 2002 (73) (USA)	13 African-American patients in the intervention group and 10 in the control group who had been through a kidney transplant. Age: Intervention: 51 (SD 16.8); Control: 47 (SD 12.7).	Pharmacists gave recommendations regarding drugs to the kidney specialists after having gone through the drugs for, and an examination of, each patient. They also gave information and advice to patients about the drugs they were given. Those patients that were more than 8 months post-transplant were followed up on a monthly basis by the pharmacists by phone. Comparison: Usual practice with no clinical pharmacist interaction.	Mean systolic blood pressure in the intervention group was 145,3 ± 16,8 versus 175,8 ± 33,9 in the control group (p=0,029).

tion service, while the rest got help from either friends or relatives and spouses. In addition, children and adolescents often have to act as interpreters for their parents in their consultations with health personnel (14).

Interventions directed at organisational barriers

Matching of clients and therapists

The two studies that examined the effect of matching based on ethnicity were not consistent in their results. The quality of the evidence of the results was very low, meaning that no conclusions may be drawn. A

meta-analysis from 2002 of seven studies (of unknown design) that used matching showed no clinically significant impact on dropout from therapy (76). We know of one study from Norway where clients of Sami ethnicity was matched with their therapist for psychiatric treatment (77). Matching was associated with a statistically significantly increase in frequency of therapy sessions and symptom-related improvement in treatment of moderate duration, compared with non-matched client-therapist pairs. However, this was a single prospective observational study that did not give us any further basis for conclusions.

Follow-up and support interventions (additional personnel resources)

The two studies that examined the effect of an additional personnel resource intervention had inconsistent results and the quality of the evidence varied from very low to low. In summary, we can not decide whether follow-up and support in terms of personnel resources may affect patient outcomes.

LIMITATIONS

Our search was limited to studies with a randomized controlled design, where the purpose was to determine the effect of an intervention. This means that we have excluded many studies with other designs. We included only interventions that primarily targeted health personnel or the health care organisation and did not consider interventions exclusively aimed at patients.

Most studies were conducted in the U.S., where both treatment and ethnic minority issues in some cases can be very different from those under Norwegian circumstances. One of the most obvious differences is the limited U.S. state-funded health care system, which could mean that socioeconomic factors play a much greater role than in Norway. In addition, ethnic groups in U.S. studies of minorities often have a long settlement history, such as African-Americans, who are likely to face problems of a different nature than minority groups with a shorter history of settlement and perhaps limited language comprehension. On the other hand, the interventions were primarily targeted at health personnel who may not be so very different from Norwegian health personnel regarding reactions to for example educational programs and reminder interventions.

CONCLUSION

Educational interventions and computerized reminders to physicians may in some contexts improve health

care and health outcomes for minority patients. The quality of the evidence for these results varies from very low to low. The quality of available evidence for interventions such as remote interpretation services, ethnic matching and support interventions consisting of additional personnel resources are too low to draw conclusions. We found no studies that only included young patients, but we suggest that interventions targeted at health personnel or health organisations may be applicable regardless of the age of the patient population. This review reveals that the evidence base regarding the effect of interventions to improve health care for minorities is sparse and generally of low quality.

IMPLICATIONS FOR RESEARCH

Except for the few studies we found (24, 37-41) there seems to be a lack of research in the Norwegian context about potential disparities in health care, both for minorities in general and for minority youth. In spite of the awareness that language and cultural differences represent obvious barriers to good quality health care, we found no Norwegian randomised controlled studies of interventions aimed at reducing such barriers. Most of what we know is about immigrant youth's and Sami adolescents' use of health services and on a superficial level, immigrant youth's satisfaction with these services. Further research should test the effectiveness of general quality improvement interventions for minorities. Also, there is a need to establish whether ethnic disparities in treatment exist in the Norwegian setting, in particular for diseases where minorities are at higher risk. If disparities in quality of care are found, the reasons for these disparities should be investigated and interventions should be targeted accordingly. To determine the effectiveness of such interventions, it is important that any implementation includes an evaluation.

REFERENCES

1. Dahl E. Health inequalities and health policy: the Norwegian case. *Norsk epidemiologi* 2002; **12**: 69-75.
2. Grøholt EK, Dahl E, Elstad JI. Health inequalities and the welfare state. *Norsk epidemiologi* 2007; **17**: 3-8.
3. Mackenbach JP, Kunst AE, Cavelaars AE, Groenhouf F, Geurts JJ. Socioeconomic inequalities in morbidity and mortality in western Europe. The EU Working Group on socioeconomic inequalities in health. *Lancet* 1997; **349**: 1655-9.
4. Næss Ø, Rognerud M, Strand BH, red. Sosial ulikhet i helse: en faktarapport. Oslo: Folkehelseinstituttet, 2007 (Rapport 2007: 1).
5. Gissler M, Rahkonen O, Järvelin MR, Hemminki E. Social class differences in health until the age of seven years among the Finnish 1987 birth cohort. *Soc Sci Med* 1998; **46**: 1543-52.
6. Lundberg O. The impact of childhood living conditions on illness and mortality in adulthood. *Soc Sci Med* 1993; **36**: 1047-52.
7. Grøholt EK, Stigum H, Nordhagen R, Köhler L. Children with chronic health conditions in the Nordic countries in 1996: influence of socio-economic factors. *Ambulatory Child Health* 2001; **7**: 177-89.
8. Iversen VC, Morken G. Acute admissions among immigrants and asylum seekers to a psychiatric hospital in Norway. *Soc Psychiatry Psychiatr Epidemiol* 2003; **38**: 515-9.
9. Berg JE, Johnsen E. Innlegges innvandrere oftere enn etniske nordmenn i akuttpsykiatriske avdelinger? *Tidsskr Nor Lægeforen* 2003; **124**: 634-6.
10. Syed HR, Dalgard OS, Hussain A, Dalen I, Claussen B, Ahlberg NL. Inequalities in health: a comparative study between ethnic Norwegians and Pakistanis in Oslo, Norway. *Int J Equity Health* 2006; **5**: 7.
11. Vaage AB, Garlov I, Hauff E, Thomsen PH. Psychiatric symptoms and service utilization among refugee children referred to a child psychiatry department: a retrospective comparative case note study. *Transcult Psychiatry* 2007; **44**: 440-58.

12. Ayazi T, Bøgdal KP. Innvandreres bruk av poliklinisk psykiatrisk tjeneste. *Tidsskr Nor Lægeforen* 2008; **128**: 162-5.
13. Lien E, Nafstad P, Rosvold EO. Non-western immigrants' satisfaction with the general practitioners' services in Oslo, Norway. *Int J Equity Health* 2008; **7**: 7.
14. Blom S. Innvandreres helse 2005/2006. Rapport fra SSB; nr 35/2008. 2008. Oslo, Statistisk Sentralbyrå.
15. Kumar B, Grøtvedt L, Meyer HE, Sjøgaard AJ, Strand BH. The Oslo immigrant health profile. Oslo: Nasjonalt folkehelseinstitutt, 2008 (Rapport 2008: 7).
16. Berg JE. The level of non-Western immigrants' use of acute psychiatric care compared with ethnic Norwegians over an 8-year period. *Nord J Psychiatry* 2009; **63**: 217-22.
17. Statistisk sentralbyrå. Ny innvandrerguppering. <http://www.ssb.no/vis/omssb/lgangspubl/art-2008-10-14-01.html> (20.9.2010).
18. Statistisk sentralbyrå. Minifakta om Norge 2010. <http://www.ssb.no/vis/emner/00/minifakta/no/main.html> (20.9.2010).
19. Brunvand L, Brunvatne R. Helseproblemer blant innvandrerbarn i Norge. *Tidsskr Nor Lægeforen* 2001; **121**: 715-8.
20. Den norske legeforening. Likeverdige helsetjenester? – Om helsetjenester til ikke-vestlige innvandrere. Oslo: Den norske legeforening, 2008.
21. Oppedal B, Røysamb E. Young muslim immigrants in Norway: an epidemiological study of their psychosocial adaptation and internalizing problems. *Applied Development Science* 2007; **11**: 112-25.
22. Oppedal B, Azam GE, Dalsøren SB, Hirsch SM, Jensen L, Kiamanesh P, Moe EA, Romanova E, Seglem KB. Psykososial tilpasning og psykiske problemer blant barn i innvandrerfamilier. Oslo: Folkehelseinstituttet, 2008 (Rapport 2008: 14). <http://www.fhi.no/dokumenter/3ef60b2cba.pdf> (5.11.2010).
23. Vaage AB, Tingvold L, Hauff E, Ta TV, Wentzel-Larsen T, Clench-Aas J, Thomsen PH. *Child Adolesc Psychiatry Ment Health* 2009; **3**: 34.
24. Vaage AB, Garløv I, Hauff E, Thomsen PH. Psychiatric symptoms and service utilization among refugee children referred to a child psychiatry department: a retrospective comparative case note study. *Transcult Psychiatry* 2007; **44**: 440-58.
25. Hjern A, Haglund B, Persson G, Rosén M. Is there equity in access to health services for ethnic minorities in Sweden? *Eur J Public Health* 2001; **11**: 147-52.
26. Turi AL, Bals M, Skre IB, Kvernmo S. Health service use in indigenous Sami and non-indigenous youth in Norway: a population based survey. *BMC Public Health* 2009; **9**: 378.
27. Bamba C, Gibson M, Sowden A, Wright K, Whitehead M, Petticrew M. Tackling the wider social determinants of health and health inequalities: evidence from systematic reviews. *J Epidemiol Community Health* 2010; **64**: 84-291.
28. Van Ryn M. Research on the provider contribution to race/ethnicity disparities in medical care. *Med Care* 2002; **40**: I-140-I-151.
29. Van Ryn M, Fu SS. Paved with good intentions: do public health and human service providers contribute to racial/ethnic disparities in health? *Am J Public Health* 2003; **93**: 248-55.
30. Smedley BD, Stith AY, Nelson AR, Editors, Committee on Understanding and Eliminating Racial and Ethnic Disparities in Health Care. Unequal Treatment: confronting racial and ethnic disparities in health care. Free executive summary, 2003. http://www.nap.edu/catalog.php?record_id=10260 (20.9.2010).
31. Nelson A. Unequal treatment: report of the Institute of Medicine on racial and ethnic disparities in healthcare. *Ann Thorac Surg* 2003; **76**: S1377-81.
32. Elster A, Jarosik J, VanGeest J, Fleming M. Racial and ethnic disparities in health care for adolescents. *Arch Pediatr Adolesc Med* 2003; **157**: 867-74.
33. Riera A, Walker DM. The impact of race and ethnicity on care in the pediatric emergency department. *Curr Opin Pediatr* 2010; **22**: 284-289.
34. Hauff E. Innvandrere og psykiatriske tjenester: er norsk helsevesen preget av institusjonell rasisme? *Tidsskr Nor Lægeforen* 2008; **128**: 158.
35. Djuve AB, Pettersen HC. Syk og misforstått: en kartlegging av efraringene til 71 minoritetsspråklige pasienter ved Ullevål sykehus. Oslo: FAFO, 1998 (FAFO-notat 1998: 12).
36. Grut L, Tingvold L, Hauff E. Fastlegens møte med flyktninger. *Tidsskr Nor Lægeforen* 2006; **126**: 1318-20.
37. Alpers LM, Hanssen I. Sykepleieres kompetanse om etniske minoritetspasienter. Oslo: Lovisenberg diakonale høgskole, 2008.
38. Vangen S, Johansen REB, Sundby J, Tæen B, Stray-Pedersen B. Qualitative study of perinatal care experiences among Somali women and local health care professionals in Norway. *Eur J Obstet Gynecol Reprod Biol* 2004; **112**: 29-35.
39. Dyregrov K. Interkulturell kommunikasjon i allmennpraksis. *Tidsskr Nor Lægeforen* 1997; **117**: 2444-6.
40. Vangen S, Stoltenberg C, Schei B. Ethnicity and use of obstetrical analgesia: do Pakistani women receive inadequate pain relief in labour? *Ethn Health* 1996; **1**: 161-7.
41. Vangen S, Stoltenberg C, Skrondal A, Magnus P, Stray-Pedersen B. Cesarean section among immigrants in Norway. *Acta Obstet Gynecol Scand* 2000; **79**: 553-8.
42. Small R, Gagnon A, Gissler M, Zeitlin J, Bennis M, Glazier RH, Haelterman E, Martens G, McDermott S, Urquia M, Vangen S. Somali women and their pregnancy outcomes postmigration: data from six receiving countries. *BJOG* 2008; **115**: 1630-40.
43. Ahlberg N, Vangen S. Svangerskap og fødsel i et flerkulturelt Norge. *Tidsskr Nor Lægeforen* 2005; **125**: 586-8.
44. Vangen S, Stoltenberg C, Skjaerven R, Magnus P, Harris JR, Stray-Pedersen B. The heavier the better? Birthweight and perinatal mortality in different ethnic groups. *Int J Epidemiol* 2002; **31**: 654-60.
45. Betancourt JR, Green AR, Carrillo JE, Ananeh-Firempong O. Defining cultural competence: a practical framework for addressing racial/ethnic disparities in health and health care. *Public Health Rep* 2003; **118**: 293-302.
46. Eike MC, Forsetlund L, Kirkehei I, Vist GE. Effekt av tiltak for å forbedre kvaliteten av helsetjenester for etniske minoriteter: en systematisk oversikt over randomiserte kontrollerte forsøk. Oslo: Nasjonalt kunnskapssenter for helsetjenesten, 2010. In press. <http://www.kunnskapssenteret.no/> (5.11.2010).
47. Higgins JPT, Green S (eds). *Cochrane Handbook for Systematic Reviews of Interventions Version 5.0.2* [updated September 2009]. The Cochrane Collaboration, 2009.

48. Beach MC, Cooper LA, Robinson KA, Price EG, Gary TL, Jenckes MW. Strategies for improving minority healthcare quality. Rockville: Agency for Healthcare Research and Quality (AHRQ), 2004 (Evidence Report/ Technology Assessment No. 90/AHRQ Publication No. 04-E008-02: 2004).
49. Chang AB, Taylor B, Masters IB, Laifoo Y, Brown ADH. Indigenous healthcare worker involvement for indigenous adults and children with asthma. *Cochrane Database Syst Rev* 2007, CD006344.
50. Davis AM, Vinci LM, Okwuosa TM, Chase AR, Huang ES. Cardiovascular health disparities: A systematic review of health care interventions. *Med Care Res Rev* 2007; **64**: 29S-100S.
51. Peek ME, Cargill A, Huang ES. Diabetes health disparities: a systematic review of health care interventions. *Med Care Res Rev* 2007; **64**: 101S-156S.
52. Saxena S, Misra T, Car J, Netuveli G, Smith R, Majeed A. Systematic review of primary healthcare interventions to improve diabetes outcomes in minority ethnic groups. *J Ambulatory Care Manage* 2007; **30**: 218-230.
53. Pearson A, Srivastava R, Craig D, Tucker D, Grinspun D, Bajnok I, *et al.* Systematic review on embracing cultural diversity for developing and sustaining a healthy work environment in healthcare. *Int J Evidence-Based Healthcare* 2007; **5**: 54-91.
54. Harmsen H, Bernsen R, Meeuwesen L, Thomas S, Dorrenboom G, Pinto D, *et al.* The effect of educational intervention on intercultural communication: Results of a randomised controlled trial. *Br J Gen Pract* 2005; **55**: 343-50.
55. Thom DH, Tirado MD, Woon TL, McBride MR. Development and evaluation of a cultural competency training curriculum. *BMC Med Educ* 2006; **6**: 38.
56. Wade P, Berstein B. Culture sensitivity training and counselor's race: Effects on Black female clients' perceptions and attrition. *J Couns Psychol* 1991; **38**: 9-15.
57. Dansereau DF, Joe GW, Dees SM, Simpson DD. Ethnicity and the effects of mapping-enhanced drug abuse counseling. *Addict Behav* 1996; **21**: 363-76.
58. Allen B, Jr., Pederson LL, Leonard EH. Effectiveness of physicians-in-training counseling for smoking cessation in African Americans. *J Natl Med Assoc* 1998; **90**: 597-604.
59. Manfredi C, Czaja R, Freels S, Trubitt M, Warnecke R, Lacey L. Prescribe for health. Improving cancer screening in physician practices serving low-income and minority populations. *Arch Fam Med* 1998; **7**: 329-37.
60. Miranda J, Duan N, Sherbourne C, Schoenbaum M, Lagomasino I, Jackson-Triche M, *et al.* Improving care for minorities: can quality improvement interventions improve care and outcomes for depressed minorities? Results of a randomized, controlled trial. *Health Serv Res* 2003; **38**: 613-30.
61. Evans D, Mellins R, Lobach K, Ramos-Bonoan C, Pinkett-Heller M, Wiesemann S, *et al.* Improving care for minority children with asthma: professional education in public health clinics. *Pediatrics* 1997; **99**: 157-64.
62. Burack RC, Gimotty PA, George J, Simon MS, Dews P, Moncrease A. The effect of patient and physician reminders on use of screening mammography in a health maintenance organization. Results of a randomized controlled trial. *Cancer* 1996; **78**: 1708-21.
63. Burack RC, Gimotty PA, George J, McBride S, Moncrease A, Simon MS, *et al.*: How reminders given to patients and physicians affected pap smear use in a health maintenance organization: results of a randomized controlled trial. *Cancer* 1998; **82**: 2391-400.
64. Phillips LS, Ziemer DC, Doyle JP, Barnes CS, Kolm P, Branch WT, *et al.* An endocrinologist-supported intervention aimed at providers improves diabetes management in a primary care site: Improving primary care of African Americans with diabetes (IPCAAD) 7. *Diabetes Care* 2005; **28**: 2352-60.
65. Burack RC, Gimotty PA, George J, Stengle W, Warbasse L, Moncrease A. Promoting screening mammography in inner-city settings: a randomized controlled trial of computerized reminders as a component of a program to facilitate mammography. *Med Care* 1994; **32**: 609-24.
66. Burack RC, Gimotty PA. Promoting screening mammography in inner-city settings. The sustained effectiveness of computerized reminders in a randomized controlled trial. *Med Care* 1997; **35**: 921-31.
67. McDermott RA, Schmidt BA, Sinha A, Mills P. Improving diabetes care in the primary healthcare setting: a randomised cluster trial in remote Indigenous communities. *Med J Aust* 2001; **174**: 497-502.
68. Gany F, Leng J, Shapiro E, Abramson D, Motola I, Shield DC, *et al.* Patient satisfaction with different interpreting methods: A randomized controlled trial. *J Gen Intern Med* 2007; **22**: 312-8.
69. Hornberger JC, Gibson CD, Jr., Wood W, Dequeldre C, Corso I, Palla B, *et al.* Eliminating language barriers for non-English-speaking patients. *Med Care* 1996; **34**: 845-56.
70. Thompson VLS, Alexander H. Therapists' race and African American clients' reactions to therapy. *Psychotherapy* 2006; **43**: 99-110.
71. La Roche MJ, Koinis-Mitchell D, Gualdrón L. A culturally competent asthma management intervention: a randomized controlled pilot study. *Ann Allergy Asthma Immunol* 2006; **96**: 80-5.
72. Bellary S, O'Hare J, Raymond N, Gumber A, Mughal S, Szczepura A, *et al.* Enhanced diabetes care to patients of south Asian ethnic origin (the United Kingdom Asian Diabetes Study): a cluster randomised controlled trial. *Lancet* 2008; **371**: 1769-76.
73. Chisholm MA, Mulloy LL, Jagadeesan M, Martin BC, DiPiro JT. Effect of clinical pharmacy services on the blood pressure of African-American renal transplant patients. *Ethn Dis* 2002; **12**: 392-7.
74. Forsetlund L, Bjorndal A, Rashidian A, Jamtvedt G, O'Brien MA, Wolf F, *et al.* Continuing education meetings and workshops: effects on professional practice and health care outcomes. *Cochrane Database Syst Rev* 2009, CD003030.
75. Shojania KG, Jennings A, Mayhew A, Ramsay CR, Eccles MP, Grimshaw J. The effects of on-screen, point of care computer reminders on processes and outcomes of care. *Cochrane Database Syst Rev* 2009, CD001096.
76. Maramba GG, Hall GCN. Meta-analyses of ethnic match as a predictor of dropout, utilization, and level of functioning. *Cultur Divers Ethnic Minor Psychol* 2002; **8**: 290-7.
77. Møllersen S, Sexton HC, Holte A. Effects of client and therapist ethnicity and ethnic matching: a prospective naturalistic study of outpatient mental health treatment in Northern Norway. *Nord J Psychiatry* 2009; **63**: 246-55.