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Quality of care provided by mid-level health workers: systematic review and meta-analysis

Qualité des soins prodigués par les agents de santé de niveau intermédiaire: revue systématique et méta-analyse

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Zohra S Lassi et al.Effectiveness of mid-level health workers

Abstract

1 Objective

To assess the effectiveness of care provided by mid-level health workers.

2 Methods

Experimental and observational studies comparing mid-level health workers and higher level health workers were identified by a systematic review of the scientific literature. The quality of the evidence was assessed using Grading of Recommendations Assessment, Development and Evaluation criteria and data were analysed using Review Manager.

3 Findings

Fifty-three studies, mostly from high-income countries and conducted at tertiary care facilities, were identified. In general, there was no difference between the effectiveness of care provided by mid-level health workers in the areas of maternal and child health and communicable and noncommunicable diseases and that provided by higher level health workers. However, the rates of episiotomy and analgesia use were significantly lower in women giving birth who received care from midwives alone than in those who received care from doctors working in teams with midwives, and women were significantly more satisfied with care from midwives. Overall, the quality

of the evidence was low or very low. The search also identified six observational studies, all from Africa, that compared care from clinical officers, surgical technicians or non-physician clinicians with care from doctors. Outcomes were generally similar.

4 Conclusion

No difference between the effectiveness of care provided by mid-level health workers and that provided by higher level health workers was found. However, the quality of the evidence was low. There is a need for studies with a high methodological quality, particularly in Africa – the region with the greatest shortage of health workers.

Keywords:

Résumé

Objectif

Évaluer l'efficacité des soins fournis par les agents de santé de niveau intermédiaire.

Méthodes

Des études expérimentales et observationnelles comparant des agents de santé de niveaux intermédiaire et de niveau supérieur ont été identifiées à l'aide d'une revue systématique de la documentation scientifique. La qualité des éléments de preuve a été évaluée à l'aide des critères GRADE (Grading of Recommendations Assissment, Development and Evaluation – Méthode d'évaluation des recommandations, de détermination, d'élaboration et d'évaluation), et les données ont été analysées à l'aide d'un gestionnaire d'examen.

Résultats

Cinquante-trois études ont été identifiées, la plupart provenant de pays à revenu élevé, et menées dans des établissements de soins tertiaires. En général, il n'y avait pas de différence entre l'efficacité des soins prodigués par des agents de santé de niveau intermédiaire dans les domaines de la santé maternelle et infantile et des maladies contagieuses et non contagieuses et ceux prodigués par des agents de santé de niveau supérieur. Cependant, les taux de recours à l'épisiotomie et aux analgésiques étaient significativement moins élevés chez les femmes accouchant avec la seule aide d'une sage-femme que chez les femmes prises en charge par des docteurs secondés par des sages-femmes, et les femmes étaient significativement plus satisfaites des soins prodigués par les sages-femmes. Dans l'ensemble, la qualité des éléments de preuve était basse, voire très basse. La recherche a également identifié six études observationnelles, provenant toutes d'Afrique, qui comparaient les soins de praticiens cliniques, de techniciens chirurgicaux ou de cliniciens non-médecins avec les soins prodigués par des médecins. Les résultats étaient généralement similaires.

Conclusion

Aucune différence n'a été constatée entre l'efficacité des soins prodigués par des agents de santé de niveau intermédiaire et ceux fournis par des agents de santé de niveau supérieur. Cependant, la qualité des éléments de preuve était basse. Il est nécessaire d'effectuer des études basées sur une méthodologie de haute qualité, en particulier en Afrique, la région qui manque le plus d'agents de santé.

Resumen

Objetivo

Evaluar la eficacia de la atención proporcionada por los trabajadores sanitarios de nivel intermedio.

Métodos

A través de un examen sistemático de la literatura científica se identificaron diversos estudios experimentales y observacionales que comparaban a los trabajadores sanitarios de nivel intermedio con los de nivel superior. Se evaluó la calidad de las pruebas científicas con ayuda de los criterios GRADE y se empleó el programa Review Manager para el análisis de los datos.

Resultados

Se identificaron 53 estudios, la mayoría de ellos de países de ingresos elevados y que se habían efectuado en centros de atención sanitaria terciaria. En general, no se observaron diferencias entre la eficacia de la atención prestada por los trabajadores de salud de nivel intermedio y la proporcionada por los trabajadores de salud de nivel superior en las áreas de salud materno-infantil y en relación a las enfermedades transmisibles y no transmisibles. Sin embargo, los índices de episiotomía y el uso de analgésicos fueron significativamente inferiores en las mujeres que dieron a luz únicamente con la ayuda de una matrona en comparación con aquellas cuya atención corrió a cargo de médicos que trabajaron conjuntamente con matronas. Las mujeres estuvieron mucho más satisfechas con el trabajo de las matronas. En general, la calidad de las pruebas científicas fue baja o muy baja. La búsqueda también identificó seis estudios observacionales, todos ellos realizados en África, que comparaban la atención de los encargados clínicos y la de los instrumentadores quirúrgicos o clínicos sin licencia para practicar medicina con la de los médicos. Los resultados fueron, en su mayoría, similares.

Conclusión

No se encontró diferencia alguna entre la eficacia de la atención proporcionada por trabajadores sanitarios de nivel intermedio o de nivel superior. No obstante, la calidad de las pruebas científicas era baja. Es necesario realizar estudios con una calidad metodológica alta, especialmente en África, la región con la mayor escasez de personal sanitario.

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Резюме

Цель

Оценить качество медицинской помощи, предоставляемой средним медицинским персоналом.

Методы

На основе систематического обзора научной литературы были отобраны экспериментальные и обсервационные исследования, в которых сравнивается качество услуг, получаемых от медицинского персонала среднего и более высокого уровня. Качество собранных данных оценивалось на основе методологии GRADE (система градации и оценки качества рекомендаций), собранные данные были проанализированы с помощью программы Review Manager.

Результаты

Было отобрано 53 исследования, главным образом из стран с высокими доходами, проведенных в учреждениях специализированной медицинской помощи. В целом не было выявлено разницы между эффективностью медицинской помощи, оказываемой медперсоналом среднего уровня в области материнского и детского здоровья и инфекционных и неинфекционных заболеваний, и помощью, оказываемой медицинскими работниками более высокого уровня. Однако показатели использования эпизиотомии и анальгезии были значительно ниже при родах женщин, получавших помощь только от акушерок, по сравнению с теми родами, которые вели врачи, работающие в группах с акушерками; и женщины были значительно более удовлетворены уходом акушерок. Но качество этих данных было низким или очень низким. В процессе поиска также было выявлено шесть обсервационных исследований, все из Африки, в которых проводилось сравнение медицинского ухода, получаемого от сотрудников клиник, хирургических техников и медицинских работников, не являющихся врачами. Результаты в целом были сходными.

Вывод

Не обнаружено никаких отличий между эффективностью медицинской помощи, оказываемой медперсоналом среднего уровня, и помощью, оказываемой медицинскими работниками более высокого уровня. Однако качество этих доказательств являлось низким. Существует потребность в изучении данного вопроса с более высоким методологическим качеством, особенно в Африке, регионе с наиболее острой нехваткой работников здравоохранения.

13 Introduction

In 2000, 189 countries adopted the United Nation's Millennium Declaration and its eight Millennium Development Goals, including Goals 4, 5 and 6, which are directly related to health. However, progress towards achieving the associated health targets falls far below expectations, especially in developing countries. Recent reviews have clearly identified interventions that can have a positive effect on maternal and child health and neonatal survival but implementing them throughout the general population has been hampered by a lack of trained and motivated health workers.[1]–[6] Moreover, the poor performance of health systems in delivering effective, evidence-based interventions for priority health conditions has been linked to the poor retention, inadequate performance and poor motivation of health workers, as well as to shortages of personnel and their maldistribution. As health systems around the world and the international health community increasingly embrace the goal of universal health coverage, which will inevitably result in greater demands on health systems and existing health workers, the need to address these shortcoming is becoming imperative.[7] In parallel, there is growing recognition that skilled and semi-skilled mid-level health workers, who are sometimes referred to as "outreach and facility health workers", can play a major role in community mobilization and in delivering a range of health-care services.

Although mid-level health workers have been defined in a variety of ways (Table 1), the definitions commonly agree that they will have received shorter training than physicians but will perform some of the same tasks.[10] Typically, these workers follow certified training courses and receive accreditation for their work.[10] Many, such as nurse auxiliaries and medical assistants, undergo shorter training than physicians and the scope of their practice is narrower, but this is not necessarily the case for all. For example, sometimes nurses and nurse practitioners spend more than 5 years in training and perform some of the same tasks as doctors. Similarly, non-physician clinicians may have, in total, spent an equal amount of time in training as medical doctors and may perform a comparable range of tasks, including surgery. Despite differences in the roles and training of mid-level health workers and despite a continuing struggle for their acceptance, today many countries rely ever more heavily on these workers to improve the coverage and equity of health care.[11] Although mid-level health workers have played a vital role in many countries' health-care systems for over 100 years, interest in them has been renewed only in the past 10 years, principally because of the serious shortage of health workers in many developing countries, the burden of diseases such as human immunodeficiency virus (HIV) infection and the emerging importance of other conditions, such as noncommunicable diseases. Many African and Asian countries have successfully invested in these workers.[12]–[15]

WHO, World Health Organization.

Our aim was to test the hypothesis that mid-level health workers are as effective as higher level health workers at providing good quality care in priority areas of the health service. We also hoped to increase understanding of their effectiveness and of how they can best be integrated into national health-care systems.

14 Methods

We performed a systematic review of studies on the role of mid-level health workers in delivering to the general population health-care services that are as-

sociated with the achievement of Millennium Development Goals on health and nutrition or with the management of noncommunicable diseases. We included all randomized and nonrandomized controlled trials, controlled before-and-after trials and interrupted time-series studies. Less rigorously designed studies, such as observational (cohort and case–control) and descriptive studies, were also examined to understand the context within which mid-level health worker programmes are implemented, the types of health-care providers involved, the types of interventions delivered and the outcomes obtained. We aimed to compare the effectiveness of: (i) different kinds of mid-level health workers; (ii) mid-level health workers and doctors or community health workers; and (iii) mid-level health workers working alone or in a team.

For the purpose of this study, a mid-level health worker was defined as a health-care provider who is not a medical doctor or physician but who provides clinical care in the community or at a primary care facility or hospital. He or she may be authorized and regulated to work autonomously, to diagnose, manage and treat illness, disease and impairments, or to engage in preventive care and health promotion at the primary- or secondary-health-care level. The definition includes midwives, nurses, auxiliary nurses, nurse assistants, non-physician clinicians and surgical technicians (Table 2). Workers who specialize in health administration or who perform only administrative tasks and those who provide rehabilitative or dentistry services were excluded. However, no type of patients or recipient of health services was excluded.

A systematic search of the Cochrane Library, Medline, Embase and Cinahl databases, the Latin America and the Caribbean database LILACS and the Social Sciences Citation Index was performed, without language restrictions. Articles in both peer-reviewed and grey literature were included and the authors of relevant papers were contacted to help identify additional published or unpublished works.

The main health-care outcomes we considered were morbidity, mortality, outcomes associated with care delivery, health status, quality of life, service utilization and the patient's satisfaction with care. Two review authors independently extracted all outcome information. Data were collected on all health workers and care recipients involved, on health-care settings and on each study's design and outcomes.

The statistical analysis was performed using Review Manager (Nordic Cochrane Centre, Copenhagen, Denmark). Risk ratios (RRs) and mean differences, with 95% confidence intervals (CIs), were calculated for dichotomous and continuous variables, respectively. Study heterogeneity was assessed using I^2 and χ^2 statistics. Two review authors independently assessed the risk of bias in each study using a form describing standard criteria, which was obtained from the Cochrane Effective Practice and Organisation of Care Group.[18] We analysed the quality of the evidence supporting study findings using the approach developed by the Grading of Recommendations Assessment, Development and Evaluation (GRADE) working group.[19],[20] The quality of the evidence for each outcome was rated high, moderate, low or very low.

15 Results

The search identified 24 246 database records, which led to the retrieval of documentation on 327 studies for a full text review (Fig. **??**). Of the 327, 53 met the eligibility criteria and were included in the review (Table 3, available at:). Most studies compared either care provided by midwives with that provided by

doctors working in a team along with midwives or care provided by nurses with that provided by doctors. Moreover, most were conducted in high-income countries and at tertiary care facilities. The studies were experimental in design and their results were pooled for the meta-analysis (Table 4). Since the evidence in all studies was found to be of low or very low quality, as assessed using GRADE criteria, the findings of the meta-analysis should be interpreted with caution.

Database search for experimental studies of mid-level health workers' effectiveness, 1973–2012

ART, antiretroviral therapy; *DSM-III-R, Diagnostic and Statistical Manual of Mental Disorders*, 3rd edition revised; HIV, human immunodeficiency virus.

ART, antiretroviral therapy; CI, confidence interval; NA, not applicable; RR, risk ratio.

Thirteen of the 53 studies[21]–[33]

compared the care provided by midwives with that provided by doctors working in a team with midwives. On meta-analysis, no significant difference in the antenatal hospitalization rate was found between care provided by midwives alone and that provided by doctors working with midwives (RR: 0.95; 95% CI: 0.79–1.13). However, the absence of intrapartum analgesia was more likely with care from midwives alone (RR: 1.13; 95% CI: 0.96–1.33), but not significantly so, and the use of opiate or regional anaesthesia was significantly less likely (Table 4). Episiotomy was also significantly less likely with care from midwives alone (Fig. **??**). However, there was no significant difference in rates for the induction of labour, instrumental delivery or caesarean section (Table 4). The postpartum haemorrhage rate was not significantly lower with care from midwives alone and there was no significant difference between the groups in the rate of fetal or neonatal death, preterm birth or admission to the neonatal intensive care unit (Table 4).

Forest plot showing the risk of episiotomy when pregnancy care is provided only by midwives versus when it is provided by obstetricians or other types of doctors as part of a team including midwives, 1993–2012

CI, confidence interval; RR, risk ratio.

Note: The values to the left of the 1 indicate a lower risk of episiotomy when pregnancy care is provided only by midwives and those to the right of 1 indicate a higher risk when the care is administered by obstetricians or other types of doctors as part of a team including midwives.

In one study, women were significantly more satisfied with antenatal care provided by midwives alone but there was no significant difference between the groups in satisfaction with intrapartum or postpartum care.[31] Turnball et al.[30] also reported that women were more satisfied with care from midwives alone than care from doctors working with midwives in a team. Wolke et al.[33] compared the level of satisfaction with health workers in general between groups of patients managed by midwives and those managed by junior paediatricians: the care provided by midwives was perceived as being significantly better than that provided by physicians (RR: 1.23; 95% CI: 1.10–1.37).

Four of the 53 studies[34]–[37]

compared auxiliary nurse midwives with doctors. There was no significant difference in the likelihood of an incomplete abortion between groups of patients managed by auxiliary nurse midwives and those managed by doctors (RR: 0.93; 95% CI: 0.45–1.90). Nor was the likelihood of a complication during (RR: 3.07; 95% CI: 0.16–59.1) – or an adverse event after (RR: 1.36; 95% CI: 0.54–3.40) – manual vacuum aspiration significantly greater with auxiliary nurse midwives.

Similarly, there was no difference between the groups in postoperative complications in women who underwent tubal ligation or in those who were referred to a specialist after insertion of an intrauterine device (Table 4).

One study[38] compared the effects of antiretroviral therapy (ART) in patients managed by nurses and those managed by doctors. There was no significant difference in the likelihood of ART failure between groups of patients managed by nurses and those managed by doctors (RR: 1.08; 95% CI: 0.39–2.14). Nor was there any difference in mortality, failure of viral suppression or immune recovery between the groups.

The search also identified one study[39] that compared nursing care of depression in the general population with standard care. There was no significant difference in measures of depression between patients managed by nurses compared with those managed by physicians (RR: 1.28; 95% CI: 0.83–1.98).

Twenty-eight studies[40]–[45],[47]–[51],[53]–[69]

compared the effectiveness of care provided by nurses and care provided by doctors in patients with chronic diseases, such as heart disease and diabetes. Most concerned secondary and tertiary care in developed countries. The meta-analysis showed that care provided by nurses was as effective as care provided by doctors: no significant difference between the groups was found in the need for a repeat consultation, improved physical functioning, attendance at follow-up visits or attendance at an emergency department after receiving care (Table 4). However, dissatisfaction was significantly lower with care received from nurses than with that received from doctors (RR: 0.20; 95% CI: 0.14–0.26). The likelihood of death at 12-month follow-up was also lower with care from nurses and the likelihood of compliance with drug treatment was higher (Table 4). However, these last two findings are based on the results of only one study.

All of the lower quality, prospective observational studies identified came from Africa and compared care delivered by clinical officers, surgical technicians or non-physician clinicians with that delivered by doctors.

Six observational studies compared the effectiveness of care provided by clinical officers and surgical technicians with that of care provided by doctors.[70]–[75]

Detailed descriptions of the interventions and types of mid-level health workers involved in these studies are provided in Table 5 (available at:). Since the studies were not experimental in design, data could not be pooled for analysis. Two studies from Malawi compared the outcomes of surgical procedures carried out by clinical officers and medical officers (i.e. doctors).[70],[71] In the prospective cohort study from Malawi, there was no significant difference in postoperative maternal health outcomes, such as fever, wound infection, the need for re-operation and maternal death, after emergency obstetric procedures performed by clinical officers or by medical officers (RR: 0.99; 95% CI: 0.95–1.03). In particular, there was no significant difference in the likelihood of a stillbirth with procedures performed by clinical officers (RR: 0.75; 95% CI: 0.52–1.09) or in the likelihood of early neonatal death (RR: 1.40; 95% CI: 0.51–3.87). Although 22 maternal deaths occurred in 1875 procedures performed by clinical officers compared with 1 in 256 procedures performed by medical officers, the difference was not significant. In a prospective cohort study from Mozambique,[72] haematomas occurred significantly more often after surgery performed by a surgical technician than after surgery performed by an obstetrician (odds ratio: 2.2; 95% CI: 1.3–3.9). Finally, a retrospective cohort study from the United Republic of Tanzania[73] found no difference in maternal mortality or perinatal mortality between care provided by an assistant medical officer and that provided by a medical officer.

ART, antiretroviral therapy.

16 Discussion

The meta-analysis showed that the outcomes of numerous interventions in the areas of maternal and child health and communicable and noncommunicable diseases were similar when the interventions were performed by mid-level health workers or higher level health workers. However, this finding must be interpreted with caution as the evidence obtained in the systematic review was generally of low or very low quality.

Mid-level health workers play an important role in maternal and child health since midwives are the primary health-care providers in many settings. The results of our meta-analysis indicate that antenatal care provided by midwives alone gave comparable results on most outcome measures to care provided by doctors working in a team with midwives. In addition, mothers were more satisfied with neonatal examinations performed by midwives alone. Midwives can provide continuity of care after childbirth and can advise mothers on other health-care issues concerning neonates, such as breastfeeding.

Mid-level health workers often care for patients with chronic conditions such as diabetes mellitus and hypertension. Our meta-analysis indicated that patients were significantly more satisfied with care received from nurses than from doctors, though the evidence available was of low quality. Moreover, care provided by nurses was as effective as that provided by doctors. Another consideration is that consultations with mid-level health workers are less expensive for patients.

If health-related Millennium Development Goals are to be achieved, health systems will have to be strengthened so that more countries can deliver a wider range of health services on a much larger scale. It has been claimed that better quality health services could be achieved using the existing workforce, but there is compelling evidence that the number of people with access to health-care services is directly correlated with the number of health service providers.[76] Furthermore, there is also a correlation between the health of the population and the density of qualified health-care workers.[77] Thus, the number of health-care workers has a positive effect not only on access to health care but also on health outcomes. Clearly, any strategy that aims to increase the scope or reach of the health-care services must consider long-, medium- and short-term initiatives for increasing the skills and retention of health-care workers.

Although the use of mid-level health workers instead of medical doctors has proved successful in various contexts, such as in performing surgery, providing health-care services, health promotion and education and providing ART, the quality of care can be poor when mid-level health workers are not properly supervised or are inadequately trained.[78] Moreover, these factors can also have a negative effect on staff retention. Once it has been accepted that less-qualified health-care workers can provide as good a service as more qualified workers, attention should shift to optimizing the skills mix of the workforce. This would mitigate the effect of personnel shortages and help countries achieve the Millennium Development Goals.

This meta-analysis provides evidence supporting the concept of task-sharing, which is defined as the situation in which health-care tasks are shared, as part of a team-based approach to the delivery of care, with either existing or new health workers who have been trained for only a limited period or within only a narrow field. Task-sharing can help achieve the new paradigm of universal health coverage as well as health-related Millennium Development Goals. In addition,

mid-level health workers are less costly to train and employ than doctors and they are easier to retain in rural areas. However, it must be remembered that task-sharing alone cannot produce large-scale changes where there is a shortage of personnel. Any task-sharing strategy should be implemented alongside other strategies designed to increase the total number of health-care workers.[79]–[82]

The main obstacle to ensuring that mid-level health workers can help improve health outcomes is that they are often ignored by government policies, health workforce strategies and health system support measures, despite their widespread use. Until these workers are more comprehensively taken into account and supported, their potential contribution will not be fully realized.

This review has several limitations. First, most studies reviewed did not fully describe the characteristics of the mid-level health workers involved; in particular, the level and amount of training and supervision provided were not reported. Second, the meta-analysis included few studies of the role of mid-level health workers in HIV prevention and care, mental health or nutrition. Third, the quality of the evidence in the studies we identified was low or very low and, in particular, the majority of studies from Africa on non-physician clinicians and clinical officers were not experimental. Therefore, the results of these studies could not be pooled to generate evidence on the effectiveness of mid-level health workers.

There is a need for more studies of a high methodological quality, particularly experimental studies in primary health care and developing countries. In addition, further research is required on the effectiveness of mid-level health workers in low- and middle- income settings, where the challenge of accessing essential health services is greatest. There is also a remarkable dearth of information on the cost-effectiveness of programmes involving these health workers and on whether these programmes help ensure that care can be accessed on an equitable basis. Finally, there is a need for a systematic review to identify factors that determine whether interventions involving mid-level health workers are sustainable when scaled-up.

In conclusion, we found no difference between the effectiveness of care provided by mid-level health workers and that provided by higher level health workers. However, the quality of the evidence was low or very low. Better quality trials with longer follow-ups are needed, particularly in Africa. Countries in danger of missing health-related Millennium Development Goals should continue to scale up health-care interventions involving community health workers and mid-level health workers. Both national and subnational policies are needed to reduce the shortfall in human resources for health: the skills required by mid-level health workers and their roles should be clearly defined with reference to the level of demand from the local community and changing disease patterns in the country.

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