

AN UNLIKELY SUITOR: INDUSTRIAL ENGINEERING IN HEALTH PROMOTION

T.S. Hattingh

School of Mechanical, Industrial and Aeronautical Engineering
University of the Witwatersrand, Johannesburg
teresa.hattingh@wits.ac.za

ABSTRACT

Primary healthcare forms the foundation for transforming healthcare in South Africa. The primary healthcare system is based on five pillars, one of them being health promotion. The principles of health promotion advocate that promoting health and wellness within communities will reduce the burden of disease at both primary and higher levels of the healthcare system. The challenge in South Africa, is that the factors affecting communities often inhibit their ability to control their health. In addition, the health promotion function within clinics is under-resourced: each health promoter serves impoverished communities of up to 50,000 people. This study aims to identify how industrial engineering principles can be applied to assess and improve the impact of health promotion on communities, and ultimately on the health care system as a whole. An industrial engineering approach has analysed five clinics within the Ekurhuleni Municipality in Gauteng. The results show a distinct lack of consistency between clinics. Common issues include a lack of standard processes, structures, measures, resources, and training to support health promotion. The problems identified are commonly analysed and addressed by industrial engineering in organisations, and industrial engineering could be a useful method for evaluating and improving the impact of health promotion on communities. Recommendations for improvement and further work were made based on the findings.

OPSOMMING

Primêre gesondheidsorg is die grondslag vir transformasie van gesondheidsorg in Suid-Afrika. Die primêre gesondheidsorgsisteem word gebaseer op vyf pilare waarvan een die bevordering van gesondheid behels. Die beginsels van gesondheidsbevordering hou voor bevordering van gesondheid en welstand in gemeenskappe die las van siekte op beide die primêre en hoër orde gesondheidsisteme sal verlig. Die uitdaging in Suid-Afrika is egter dat die faktore wat gemeenskappe raak dikwels hulle vermoë om hulle gesondheid te beheer inhibeer. Daarbenewens gaan die gesondheidsbevorderingsfunksie binne klinieke mank aan hulpbronne: elke persoon wat hierdie rol vervul bedien tipies 'n verarmde gemeenskap van tot 50 000 persone. Hierdie artikel ondersoek die aanwending van die beginsels van die bedryfsingenieurswese om impak gesondheidsbevordering te verbeter. Vyf klinieke in die Ekurhuleni Munisipaliteit in Gauteng is bestudeer. Die resultate toon gebrek aan konsekwentheid tussen die klinieke. Algemene probleem hou verband met die gebrek aan standard prosesse, structure, maatstawwe, hlpbronne en opleiding. Voorstelle ter verbetering word voorgehou soos gebasser op die beginsels van die bedryfsingenieurswese.

1. INTRODUCTION

This paper discusses the appropriateness of opportunities to use the discipline of industrial engineering in the field of health promotion. The paper begins by introducing health promotion broadly, and specifically in South Africa. Current challenges are then introduced, leading to the rationale and objectives for the study. A literature review discusses studies that have assessed health promotion in South Africa, and shows how the current challenges facing health promotion are well-suited to the techniques and processes used in industrial engineering.

2. BACKGROUND

2.1 Essence of health promotion

In 1978, 128 nations from around the world, including South Africa, met to discuss widespread health issues. The biggest problem was extremely high mortality rates for mothers and for children under five. The outcome was the unveiling of a new focused approach to health care: the primary health care approach [1]. The World Health Organisation proposed that health systems have better outcomes when built on a primary health care approach, with health promotion as a key element [2].

According to the Ottawa Charter for Health Promotion [3], health promotion is "the process of enabling people to improve increase control over, and improve their health". The principles of health promotion, as outlined in a discussion document [4], state that health promotion:

1. involves the population as a whole in the context of their everyday life, rather than focusing on people at risk for specific diseases;
2. is directed towards action on the determinants or causes of health;
3. combines diverse but complementary methods or approaches;
4. aims particularly at effective and concrete public participation; and
5. emphasises that health professionals have an important role in nurturing and enabling health promotion.

2.2 Overview of health promotion in South Africa

This section will review the context of the current status of health promotion in South Africa.

In the 2011/2012 national government expenditure estimates for South Africa, 2.8 per cent of the health budget was allocated to primary health care services. This excludes HIV and AIDS and TB; it also excludes maternal, child, and women's health, which had a separate budget allocation of 31.2 per cent of the health budget [5]. There are also significant budget allocations that include economic affairs, and that address issues such as employment, housing and community amenities, social protection, and education.

The primary health care services budget is divided into four areas: district health services (46.4 per cent), communicable diseases (17 per cent), non-communicable diseases (88.3 per cent), and health promotion and nutrition (2.8 per cent). District health services coordinate and implement broad programmes that include health promotion at all levels, including community-based services. It is notable that the primary health care services budget allocation is expected to reduce significantly as a proportion of total health-spend over the next two budget year periods to less than 0.5 per cent [5].

The allocation for HIV and AIDS, TB, and maternal, child, and women's health includes treatment of HIV, prevention interventions to reduce new HIV infections, HIV testing, improving the quality of life of people living with HIV and AIDS, immunisation campaigns, and TB control. It also includes support of two non-profit institutions, Soul City and

Lovelife, who are involved in health promotion activities specifically related to HIV and AIDS (0.3 per cent of this specific allocation) [5].

Allocations from the national treasury are, however, not the only source of funding for health promotion in South Africa. International donor agencies provide technical and financial support for health promotion interventions [6].

Health promotion service delivery is the responsibility of the national, provincial, and local governments. The National Health Promotion Directorate provides a supporting role, while local and provincial governments are responsible for implementation [5].

The Gauteng Department of Health, the provincial department within which this study falls, has based its strategy for health promotion on the five key action areas of health promotion set out in the Ottawa charter [2]:

- developing public policies and influencing legislation in order to safeguard health;
- creating living, working, playing, and learning environments that are conducive to health;
- developing the ability of individuals by means of education and provision of information, to adopt healthier lifestyles and to deal with illnesses;
- strengthening community action for health through information partnerships and civil participation;
- re-orienting health services to put greater emphasis on promoting health and preventing disease in collaboration with communities.

The district primary health care system is planning to roll out a new approach to primary health care based on the Brazil model [7] of family health teams. During the first phase, planned for roll out in 2011/2012, 50 primary health care outreach teams were to be deployed across South Africa. These teams were to consist of professional nurses, enrolled nurses, and community health workers, and would each serve approximately 1,500 families (6,000 people). Medical specialists in district support teams were to support these teams [5].

2.3 Challenges facing health promotion in South Africa

The primary health care approach in South Africa faces many challenges. Kautzky and Tollman [1] highlight key issues, including:

- a curative-orientated health service;
- a lack of leadership and management capacity within the health sector;
- historical issues that result in overlapping and poorly-defined areas of responsibility between local and provincial departments;
- high rates of medical expertise migration;
- severe health worker shortages;
- an imbalanced distribution of resources within the sector; and
- a complex and evolving burden of disease.

The complex burden of disease is characterised by a burden of communicable, non-communicable, perinatal, maternal, and injury-related disorders. Non-communicable diseases are prevalent in both urban and rural areas, and are increasingly affecting poorer people in urban areas, resulting in increased pressure on acute and chronic health care services [8].

Many areas within South Africa face other challenges that directly affect health issues: a lack of basic utilities and services including clean water and sanitation, low literacy rates, overcrowding, high levels of crime and violence, unemployment, and substance abuse [9]. Although the primary health care approach has operated for more than 30 years, the poorest and those in most need of medical attention still often lack access to public service healthcare despite the provision of free primary health care services. This is often due to the cost of visiting hospitals and clinics, especially transport and lost opportunity costs [1].

2.4 Rationale for the study

It is clear that the promotion of health within South Africa is a critical pillar of the primary health care approach. This has far-reaching implications for mortality rates and for the cost of all levels of healthcare. There are, however, severe constraints for healthcare in South Africa, including primary healthcare and health promotion. External factors also create an extremely harsh and unsympathetic environment for health promotion activities.

To put it plainly: health promotion is a complex system that operates within a severely constrained environment. This type of scenario is well-matched to situations where industrial engineering as a discipline has been used to improve overall effectiveness. We therefore believe that an industrial engineering approach could be very suitable in enabling health promotion to become more efficient and ultimately more effective in achieving its objectives. Findings from the research could be used to improve health promotion activities at local and provincial levels, and ultimately guide policy decisions on the support and structure of health promotion and the allocation of resources.

3. AIM AND OBJECTIVES

3.1 Aim

The aim of this research was to evaluate health promotion activities in five clinics in Ekurhuleni (a local or municipal district in the Gauteng province of South Africa) using an industrial engineering approach.

3.2 Objectives

The objectives of this project were to:

- evaluate the extent to which health promoters are achieving health promotion goals in their targeted communities;
- identify constraints that affect the ability of health promoters;
- determine the applicability of industrial engineering techniques, and the extent to which they could be used, to evaluate and improve health promotion in Ekurhuleni clinics; and
- identify possible opportunities to improve the effectiveness and efficiency of health promoters.

This is a preliminary study to identify issues and opportunities within health promotion in Ekurhuleni. Results from this study will be used to develop further projects in collaboration with public health and industrial engineering.

4. LITERATURE SURVEY

4.1 Assessments of health promotion in South Africa

Several studies have assessed health promotion in South Africa. This review will highlight some of the important issues identified in these studies.

A review by Onya in 2007 [6] identified a stable structure for health promotion service delivery at the national government level, but huge disparities between provinces at the provincial level. Several issues relating to resources were discussed, including a lack of standards for health promotion training and education, and a general lack of a career path for health promotion practitioners. At a more strategic level, Onya identified that there were few trained health promotion specialists in a position to inform the government, and that research into, and evaluation of, health promotion is limited. He also noted that, although several NGOs provide health promotion services, there is no single coordinating body. Onya stressed the need for a well-coordinated monitoring and evaluation system of health promotion services in South Africa.

Mayosi et al. [8] conducted a review of health promotion activities in 2009. Their findings revealed similar themes to those from Onya's study. Although there are several models of community-based interventions for the control and management of non-communicable diseases, their effectiveness has still to be established. Links between governmental, non-governmental, and community-based agencies are weak, with provincial and national departments also operating largely in isolation. Mayosi et al. stress the importance of collaboration and partnerships between district and provincial services, communities, community-based institutions, and academic institutions. In addition to these issues relating to structure and partnerships, they also discuss the importance and relevance of informed decision-making. They describe how reliable systems of clinical support, record keeping, and referral are uncommon in health care delivery in South Africa. Decisions are typically made centrally and several hierarchical levels above those actively undertaking the work. Mayosi et al. believe that this constrains decision-making. Authorities also lack insight into local needs, are geographically distant, and are difficult to communicate with. The authors refer to the health promotion system in Thailand, which has a high-performing health system that is supported by the generation of local data and evidence supporting their action. They believe that a strengthened district-based primary health care system is required to manage the complex health challenges facing South Africa. They suggest that this requires an integrated model that includes a robust surveillance system and that incorporates care at all levels with established training, supervision, and support for all initiatives.

4.2 Essence of industrial engineering

Industrial engineering is the integration of resources and processes into cohesive strategies, structures, and systems for the effective and efficient production of quality goods and services [10]. It is involved with the analysis, design, planning, operation, and management of processes in any environment, from manufacturing and production processes through to service processes. Good industrial engineering embraces a systems approach that encompasses all aspects of the organisation horizontally across the value chain, as well as considering the key features that make up an organisation - people, organisational structure, technology, information, and measurement systems - and their impact on business performance. This is done through the use of fundamental principles and specialised tools and techniques [11].

Industrial engineering originated in the manufacturing industry, the most well-known being automotive manufacture. It uses a holistic approach that aims to improve productivity and efficiency as well as quality and effectiveness. The approach has been extended over the years to all forms of production and manufacture, and to the service industry, which includes organisations in the airline industry, retail, supply chain and logistics, governmental organisations, and healthcare institutions.

The approach used originates from the scientific method and the Deming plan, do, check, act cycle which encourages a circular approach to improvement, and ensures that any changes or initiatives are carefully planned and designed, implemented, and then measured to verify that the required results are achieved. The process then builds a culture of continuous improvement and problem-solving. Most industrial engineering, when used in an organisation, also focuses on the development of people and engagement with the process leading to what is sometimes referred to as a 'learning organisation'.

4.3 Industrial engineering in healthcare

Aktas et al. [12] identified that limitations in healthcare funding for hospitals necessitate the more effective use of resources, but that healthcare systems are complex and depend on a variety of economic, structural, and organisational factors that are dependent on one another. In addition to these complex systems, many of the factors that affect these systems are uncertain. This combination of complex systems and a variety of uncertain factors is typical of the problems that industrial engineering has been developed to analyse and solve.

As a result, the literature describes numerous examples of how industrial engineering techniques and principles have been applied in healthcare to improve the balance between resources and service and to improve the effectiveness of delivered healthcare services. Globally, most notably in the United States, health systems engineering is evolving as a specific niche within the field of industrial engineering, with associated societies and academic programmes.

'Lean' is a specific area within industrial engineering that is becoming more popular specifically in healthcare. Lean is a philosophy that originated from the Toyota Production System. In essence it aims to do more with less through a process of continuous learning and improvement. Using several case studies, Kim et al. [13] discuss the applicability of Lean in hospitals, and argue that the use of well-designed systems can result in substantial improvements in quality and efficiency. This is especially necessary in the face of rapidly-rising healthcare costs and variability in medical practice. De Souza [14] provides a summary of more than 90 papers since 2002 that have discussed the application of Lean specifically in healthcare. About half of these include case studies where interventions have been made in real scenarios. The overwhelming majority of these are from the US and the UK. De Souza classifies the case study papers into four categories that illustrate the scope of the application of techniques such as Lean. These include the category of those that are similar to manufacturing because they include the physical flow of materials (such as pharmacy, radiology, pathology and laundry), a category of patient flow that looks at the physical pathways of patients, a category of organisational themes that looks at organisations from a strategic point of view and a category of managerial and support that typically includes the flow of information.

5. METHOD

The approach used for the project included four phases.

- Phase 1 - Gaining an understanding of the current state through:
 - Interviews and surveys with health promoters and clinic staff
 - Observational visits to the clinic
 - Work sampling of health promoter activities
 - A review of documented clinic processes
 - Observational visits to the surrounding communities
 - Collection of relevant and available data on health promotion activities and their impact
- Phase 2 - Analysis of the collected and observed information from Phase 1.
 - Mapping of processes: understanding constraints, identifying value adding and non-value adding activities, evaluating the availability of resources
 - Mapping of organograms, reporting structures, and responsibility diagrams
 - Linking inputs to outputs, and assessing process efficiency and effectiveness
 - Root cause analysis of the identified issues
- Phase 3 - Comparative analysis of clinics to identify isolated issues and more general systemic issues
- Phase 4 - Identification of main areas for improvement, brainstorming of possible solutions, and recommendations for further work

This study was conducted as part of the third year Industrial Engineering degree programme at the University of the Witwatersrand. Students were divided into five groups and allocated to five different clinics in Ekurhuleni. Although groups conducted studies separately, the class held weekly sessions to discuss the methodologies and techniques used, as well as their findings.

6. CURRENT STATE

The current state is used to understand factors that determine and affect health promotion initiatives in clinics that formed part of this study and their surrounding communities. The

approach was to consider the clinics as systems with various inputs, outputs, internal processes, and external factors. The main elements that developed from this approach included clinic size and location, organisational structure, the activities of health promoters at clinics and the allocation of time to these activities, planning of activities, and measurement and feedback on the effectiveness of health promotion initiatives. The findings might be specific to a particular clinic, or they might identify themes that were common to several or all clinics.

6.1 The clinics and health promoters

The size of the clinics and of the communities that they serve varied significantly across the five cases, even though all were situated in the same municipal district. Clinics served up to 50,000 people in the surrounding community. Areas within the community for which health promoters were responsible included informal settlements, urban settlements, local businesses, primary schools, crèches, and taxi ranks.

The clinics had either one or two health promoters. The education of the health promoters varied, with only some having received formal training in health promotion. In general they lacked computer literacy skills, and many did not have a driver's licence.

6.2 Organisational structure

The organisational structure for a health promoter is shown in Figure 1. Health promoters officially report to the regional office through the health promotion (HP) liaison officer. The health promoter relies on input from the regional office in order to carry out campaigns. This includes assistance with the planning and selection of campaigns (location and content of the campaign), arranging transport, campaign-specific training, and resources such as pamphlets, posters, and other material.

However, because they are based in a clinic, there is an implicit reporting line to the clinic head. Interviews conducted in the clinics revealed that the health promoter is often expected to perform auxiliary activities in addition to their health promotion duties so that the clinic functions effectively. One of the main reasons for this is that clinics are often heavily under-resourced. These auxiliary activities do not always fit within the regional health department's job description for health promoters. As a result of the complex reporting structures, there is often confusion about accountability and responsibility for the health promoters' activities.

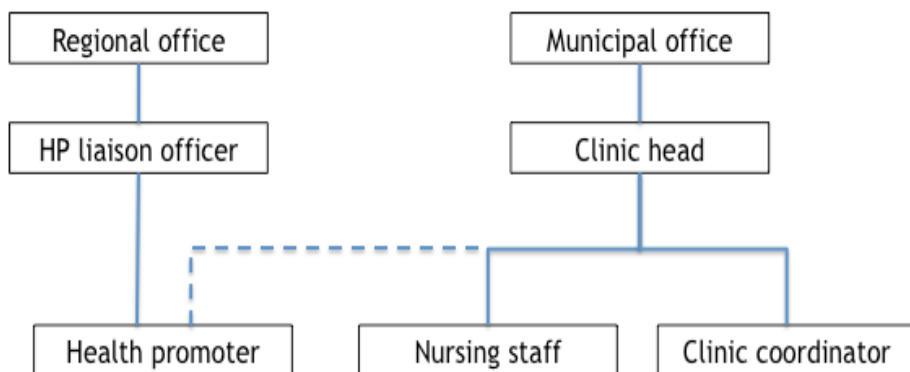


Figure 1: Typical reporting structure for a health promoter

6.3 Functions performed and focus of activities

According to their job description in the Gauteng Department of Health (GDoH), health promoters are required to:

- positively influence the lifestyle of other people;

- assist, support, and empower individuals, groups, and communities to act in ways that safeguard their health;
- provide and use information to improve health and reduce illness;
- prioritise support for the initiatives of the GDoH;
- build a purposeful and focused partnership within the community.

Using interviews and observations, along with work-sampling techniques and process mapping, it was established that health promoters are involved in various activities within both the clinic and the community. The nature of and time allocated to the health promoters' activities varied significantly between clinics. For analysis and comparison purposes, typical activities were broken down into three categories: general responsibilities, health promotion within the clinic, and health promotion within communities.

General responsibilities

- Support clinic staff, and form part of committees that plan and implement clinic activities.
- Respond when there is an outbreak of disease.
- Initiate and assist in clinic campaigns that typically involve immunisation, etc.
- Assist at the clinic help desk to refer patients.
- Assist nursing staff with basic tasks such as taking blood pressure and changing bed linen.
- Write reports.

Health promotion in the clinic

- Provide health promotion information through group talks and individual consultations to patients already visiting the clinic.
- Display posters and pamphlets.
- Maintain the dehydration corner.
- Select and set up video shows and exhibitions when used.

Health promotion in the surrounding community

- Actively promote community participation in health programmes by visiting various workplaces, schools, support groups, and self-help projects.
- Be actively involved and assist in community development projects such as gardening, crèches, soup kitchens, and support groups.
- Conduct major health promotion campaigns within communities.
- Collaborate with non-governmental organisations (NGOs), municipalities, and other groups and leaders within communities.
- Trace drug defaulters.
- Visit patients in their homes when necessary.

6.4 Planning of activities

The planning of health promoter's activities revealed the greatest variation between the clinics. Activities were planned based on various factors including the influence of clinic staff, the personality and skills of the health promoter, the perceived need within the community, and recommendations and input from the regional office. Input from the regional office largely took the form of annual calendars that provide general guidelines on topics to cover in specific months. There was no evidence that a standard approach was used. As a result, the content of health promotion activities and the form that they took was extremely varied.

6.5 Measurement and feedback

An attempt was made to identify whether the activities currently being undertaken by health promoters were in fact having an impact on community health. Through interviews it was established that health promoters and clinic staff agreed that health promotion does make a difference in the community. They felt that, not only does it create awareness of

diseases and symptoms, it also educates the public about precautions to take when faced with certain illnesses - which, they believed, then reduces the burden on the clinics. The introduction of health promotion was also seen as having made a positive difference to the number of chronic medication defaulters. There was, however, a feeling that although campaigns run at the clinic are effective, the effectiveness only lasts a few months, after which the community seems to regress or needs to be reminded of the issue.

Although there was a feeling among staff that health promotion was beneficial, there was no available data or other evidence to substantiate this, making it difficult to quantify the impact or provide any guidance about how specific campaigns or interventions are successful.

Most health promoters also tended to operate on their own within clinics, generally deciding what they should focus on. There was limited evidence of a collaborative approach to health promotion within regions. There was, however, a feedback forum that some health promoters attended with the regional health promotion liaison officer. This forum was used to discuss findings within clinics and problems being experienced.

There was no formal and consistent system to measure the health promoter's performance and efficiency. The clinic does, however, record all patient cases on a database system. The results from the database are evaluated once a month. The collected data can be used to guide the health promoter to address particular health topics that require a focus. Health promoters also record their daily and monthly activities in a variety of manual systems. The accuracy and consistency of this information is, however, highly questionable.

7. ANALYSIS

From the analysis of the current state, it became apparent that there were many areas where typical industrial engineering techniques and approaches could be applied to understand current constraints further, identify root causes where applicable, and determine areas for further investigation and improvement. Two of these were considered core to the effectiveness of health promotion in clinics: the organisational structure and an analysis of the activities performed.

A responsibility assignment matrix (or RACI matrix) was used to analyse the reporting structure and how it applied to activities performed within the clinic and as part of health promotion. The analysis will not be explored in detail in this paper, but it was found that there was an overall lack of accountability for many of the health promoters' activities. In addition, in many of the activities for which the health promoters were responsible, they were not properly enabled to undertake the activities. The dual reporting structure also meant that many of the responsibilities of the health promoters were not fully understood by clinic staff, and could result in conflict and the misalignment of health promotion goals. One of the key issues that arose from the analysis of the current state was that it was not obvious what health promoters spent their day doing, and how much time was being used for this. An investigation was carried out to determine how well what they were doing aligned with the health promotion goals of the district, and how much time was actually spent doing the different activities.

Although the results varied between clinics, it was found in all of them that a significant amount of time was spent on general activities within the clinic that did not directly form part of the function of health promotion. In addition, it was found in all cases that health promoters spent most of their time promoting health within the clinic to patients who were already visiting the clinic. A limited amount of time was spent interacting with people in their communities. Data from selected clinics has been included to illustrate this phenomenon.

Figure 2 illustrates where the health promoters physically spent their time over a two-week period (90 hours). It is evident that 50 per cent of the time is spent working within the

clinic. Less than 45 per cent of their time was spent in the community. This was fairly typical of all clinics, although at some the health promoters spent even less time in the community.

Figure 3 illustrates the breakdown of activities that the health promoters perform while in the clinic. Less than 25 per cent of this time is spent on activities directly related to the promotion of health.

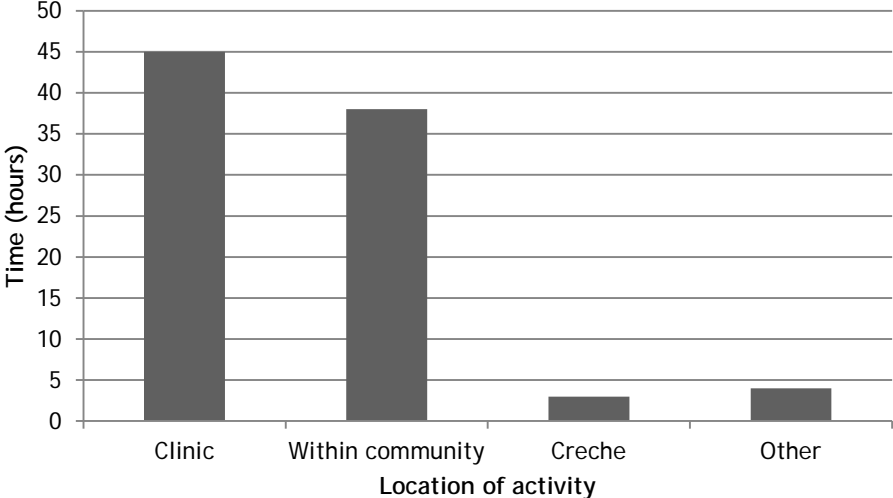


Figure 2: Number of hours spent by location in a 90-hour period

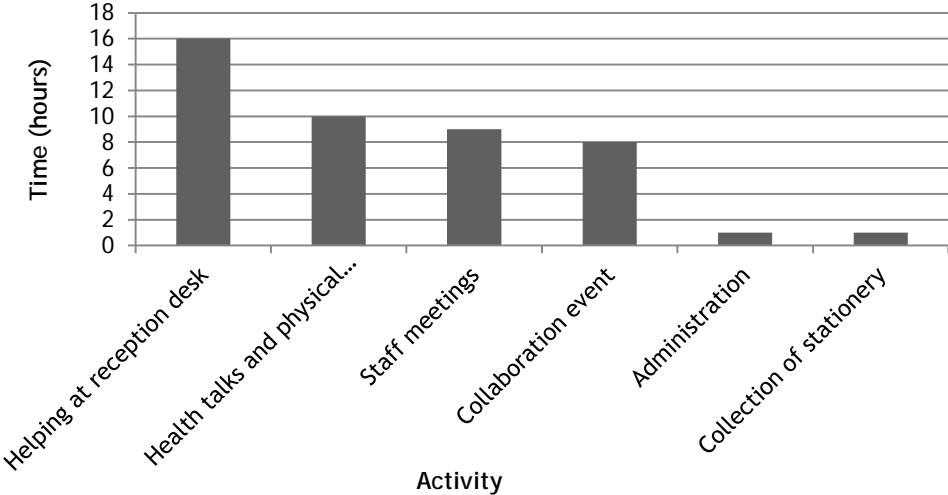


Figure 3: Number of hours spent at the clinic, by activity

Other issues that were analysed (but that are not discussed in this paper) were the use of structured planning methodologies, including feedback and measurement, and resource requirements for health promotion activities.

8. IDENTIFICATION OF OPPORTUNITIES FOR IMPROVEMENT

Based on the findings from the study, a number of recommendations were made. Some of these require further investigation, which will form part of future research projects in this area. The recommendations that have been included are those that we believe will assist all clinics to improve. The level of recommendations vary from operational recommendations that should help current practices to run more effectively, to strategic and tactical recommendations that will require more systematic changes across regional and municipal boundaries.

Strategic recommendations

- There needs to be a review of the organisational structure of the health promoter. Perhaps health promoters should report directly to clinic heads so that health promotion can become an integrated and supported - but clearly-defined - activity within clinics. The health promotion liaison officer would then facilitate the working relationship between municipal and regional activities, and the health promoter would have a dotted functional reporting line to this officer for provision of expertise and support.
- The role of the health promoter in the primary health care system needs to be clearly defined by the provincial and municipal departments. This role then needs to be communicated to municipal, regional, and clinic staff. This is critical to facilitating a good working relationship between the various parties involved.
- Evaluation of programmes should be considered for health promotion in South Africa so that frameworks for measuring the effectiveness of health promotion initiatives can be developed. This should provide a more informed and focused approach to initiatives, and could also facilitate the establishment of standards for health promotion. Ultimately this will also enable the identification of best practice and continuous improvement.

Tactical recommendations

- A more structured and standardised approach needs to be developed for planning health promotion activities in clinics and communities, including the content to be targeted and the resources required. The standardised approach should incorporate an element for tailoring initiatives to the specific clinic, based on issues that are particularly relevant to the area.
- Guidelines should be provided, based on the evaluation framework proposed above, that suggest different methods for promoting health, placing an emphasis on promoting health in the wider community, and not just inside the clinics.
- A process should be developed to make better use of forums and networks that are already present in communities to promote health. This could include schools, religious organisations, and other community centres and groups. The training and use of leaders in these groups should also be considered as a core part of the health promoter's role, to increase the reach of health promotion activities in communities.

Operational recommendations

- Formal methods need to be developed for recording health promotion activities more accurately. The use and reporting of this data then needs to be designed. The use of feedback forums between health promoters also needs to be formalised for the sharing of knowledge and experience.
- The presentation of talks within clinics needs to become more focused. The introduction of dedicated waiting areas could be considered to facilitate discussion and participation. Incorporation of patients who regularly visit the clinic should be included. Placing television sets in waiting areas can also reduce the number of talks that the health promoter performs in the clinic. This will enable the health promoter to spend more time in the wider community.

9. CONCLUSIONS

From the preliminary study conducted at five clinics in a municipal district in Gauteng, it was found that:

- health promotion is subject to constrained resources, a lack of structure, and poorly-defined processes;
- resources currently available for health promotion in clinics can be used more effectively to come closer to achieving health promotion goals;
- industrial engineering techniques are well-suited to identify and evaluate the issues faced by health promotion as a function in clinics;
- several opportunities for improvement were identified, most of which require further work.

10. RECOMMENDATIONS FOR FURTHER WORK

Several opportunities for improvement have been identified, and these should be explored in more detail to determine feasible solutions that increase the effectiveness and efficiency of health promotion. These include:

- restructuring the organisational and reporting structure of health promoters and the health promotion liaison officers;
- a thorough assessment of the activities currently performed by health promoters, to increase the impact of those activities that directly affect health promotion in communities;
- a structured methodology for identifying campaigns and health promotion content that should be delivered to communities;
- the development of formal mechanisms for clinics and health promoters to share and collaborate on activities and findings;
- an investigation into the opportunities for exploiting existing networks in communities to increase the reach of health promotion; and
- development of a measurement and feedback system to determine the impact of health promotion initiatives.

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