Editor’s Message

I am glad to present Volume 3, Issue 5 of the International Journal of Social Health Information Management (IJSHIM). The papers offer great intellectual contributions and epitomize our focus on broadening intellectual resources, understanding, development and exchange of ideas among global education professionals.

The Journal provides intellectual frameworks for comprehensive and methodical research on the application of clinical care delivery, public health systems and information management in medicine. The IJSHIM discusses activities and programs that empower health education, treatment and prevention of diseases, promotion of healthy life style and protection of the living environment. Procedures and programs such as Tele-Medicine, Physical Therapy, Psychopathy, Psychotherapy, Psychology and Pedagogy, Global Health Systems, Medical Informatics, Health Information Systems, Nutrition and Physio-Practices, Alternative Medicines, Biotechnology Management and Chemo-Technology treatments are highlighted. IJSHIM serves as a forum for the dissemination of accurate information and scholarly discourse on topical issues from local, regional, national to international levels. This intellectual manuscript incorporates original research studies, case studies, advanced literature reviews, procedural analyses, guideline descriptions, clinical developments and social health issues.

The goal of the International Journal of Social Health Information Management (IJSHIM) is to provide contemporary information to the business, government, and academic communities by helping to promote the interdisciplinary exchange of ideas on a global scale. IJSHIM seeks international input in all aspects of the Journal, including content, authorship of papers, readership, paper reviews, and Executive Editorial Board Membership.

I want to thank all of the Executive Editorial Board Members, Reviewers’ Task Panel, Contributing Editors and the Advisory Board for their efforts to make IJSHIM a great academic Journal. They work hard to review the many papers submitted and provide a level of consistency for IJSHIM reviews. We continue to look for individuals interested in becoming a reviewer for Intellectbase conference proceedings and Journals. Potential reviewers should send a self-nomination to the editor at IJSHIM@intellectbase.org. Reviewers may also be asked to be part of the Executive Editorial Board (EEB) after they have established a positive record of reviewing articles in their discipline.

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# TABLE OF CONTENT

**The Leadership Challenges of the Paradigm Shift in Global Healthcare**  
Kelley Conrad, Phillip Davidson, Caroline Molina-Ray, Amy Preiss, Barbara Shambaugh and Linda Wing  
1

**Analysis of Utilization and Access to Primary Health Care Services in a Rural Community**  
Joyce Pompey  
17

**Genomics Applications, Electronics Health Record and Preventive Educational Programs to Reduce the Escalating Cost of Cardiovascular Diseases in United States**  
E. William Ebomoyi  
25

**Deep Vein Thrombosis (DVT): Open Versus Closed Kinematic Chain Exercise to Prevent Post-Thrombotic Syndrome (PTS)**  
Faith Buchanan, Lauren Haley, Cristen Parsons, Kelsey Travis, and Natalie Housel  
39

**Incarcerated Women Drug Offenders in Tennessee: A Research Study**  
Chinyere Ogbonna-McGruder  
51
THE LEADERSHIP CHALLENGES OF THE PARADIGM SHIFT IN GLOBAL HEALTHCARE

Kelley Conrad, Phillip Davidson, Caroline Molina-Ray, Amy Preiss, Barbara Shambaugh and Linda Wing  
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ABSTRACT

The University of Phoenix, School of Advanced Studies invited doctoral faculty to participate in an online Content Area Meeting (CAM) to discuss the global challenges of healthcare leadership. Approximately 250 practitioner faculty attended the meeting and engaged in informed dialogue about the global challenges of healthcare leadership. The themes and patterns derived from the dialogue reflect participants’ diverse expertise as academicians, practitioners, and leaders in their fields. This article presents the results of a qualitative analysis of SAS faculty perspectives on global healthcare leadership based on a content analysis of the dialogue. The themes derived from the dialogue aggregate to a vital few topic areas. Amongst the many discussion points better international scholarship, global leadership education, and international interdisciplinary studies arose as opportunities for further examination. These areas can serve as catalysts for further discussion, future research, and initiatives to advance the teaching and learning experiences for doctoral learners and faculty. Doctoral learners and educators worldwide can use these discussion points to consider the implications of these themes and patterns as they design research initiatives; create novel responses to research questions for better understanding, and contribute to the healthcare field for better results globally.


INTRODUCTION

Healthcare leaders face complex global challenges. The healthcare industry is in continual flux. In Europe, collaboration between the public and private sectors has prompted competitive healthcare markets replacing government as the leading healthcare provider. In China, a quarter century of financial reform has prompted a gradual shift toward privatization. Globally, patient populations and the demographics of disease have changed. In developed countries with sophisticated healthcare systems,
the demographics of disease are moving from acute to chronic illnesses. The wide availability healthcare literature has transformed the average patient into an educated healthcare consumer. In many countries of the world, there exists a shortage of healthcare.

Healthcare leaders have become increasingly aware they must meet the numerous challenges of health care delivery and provide exceptional, coordinated clinical care across broad patient populations. Many of these leaders have realized the benefits of collaborating with colleagues to address emergent challenges (Nembhard, Tucker, Horbar, & Carpenter, 2007). Nembhard et al. (2007) noted collaboration and dialogue between healthcare educators and practitioners offers renewed understanding of pertinent issues and challenges.

The University of Phoenix, School of Advanced Studies (SAS) promotes informed conversation within the faculty community to increase collaboration and learning. The SAS faculty community is comprised of scholar-practitioners who hold leadership positions in their fields. Each quarter SAS holds a three-day Content Area Meeting (CAM) to engage faculty in topical discussions relevant to contemporary academic, practice, and leadership issues. During a recent CAM, approximately 250 faculty engaged in online dialogue about the global challenges to healthcare leadership. This dialogue was prompted by discussion questions eliciting an engaged and informed conversation and provided excellent qualitative data about the issues. The data were constrained by the fact that all participants were SAS faculty who participated voluntarily. The responses were prompted by the primary discussion questions and designed to expand on systems and experiences the participants had already experienced. The focus was not evaluative but rather was exploratory. Participation had to occur during the one week while the discussion forum was open. This article presents the results of a qualitative analysis of SAS faculty perspectives on global healthcare leadership and proposes implications and conclusions from the research.

The Healthcare Labor Shortage

The healthcare labor shortage is well documented. The Millennium Development goals approved by the United Nations set targets to be achieved by 2015 (Sachs & McArthur, 2006). To raise awareness of the shortages, the World Health Organization proposed a minimum of 2.3 health professionals per 1,000 people but many countries cannot achieve this (WHO, 2006). Based on this goal, WHO estimated a shortage of six million health care workers. According to Vacancies for Nurses (2007) some hospitals are offering large sign-on bonuses to recruit experienced nurses. Lafer (2005) reported that 89 percent of hospitals have vacant RN positions and 75 percent of hospitals are unable to recruit qualified nurses. The nursing shortage has made it difficult for patients to receive quality care. Less publicized, but equally important, is the shortage of other healthcare professionals. Hospitals nationwide report unfilled positions for pharmacists, radiology technicians, laboratory technicians, and housekeeping and maintenance staff (Natabaalo, 2008). These shortages result in substandard, even dangerous, patient care in the United States and throughout the world.

According to the World Health Organization (WHO), there are approximately 4.3 million fewer healthcare workers than needed to provide necessary healthcare in understaffed countries (Glauser, 2008). Lewis (2008) noted that for every 1,000 people, there should be a minimum of 2.3 doctors, nurses, and midwives. Worldwide, 57 countries are below this threshold; 36 of these countries are in sub-Saharan Africa. This critical labor shortage has a devastating impact on global health status, life expectancies, and quality of life (WHO, as cited in Natabaalo, 2008). The global workforce shortage is a
concern for healthcare leaders in the 21st century—in both developing and industrialized countries (Krisberg, 2008).

**Healthcare Economics**

Health care spending consumes a large portion of the gross domestic product. According to Poisal (2007), the United States spent $2.3 trillion on total healthcare or $7600 per person in 2007. This total comprised 16 percent of the gross domestic product (GDP). Poisal stated that U.S. health care spending is expected to reach $4.2 trillion in 2016, or 20 percent of GDP. Peterson and Burton (2007) found vast differences between health spending in the United States and in other developed countries. In 2006, the average expenditure of 33 nations including Mexico, France, South Korea, Germany, and Australia was 8.9% of GDP. The highest figures were the United States with 15.3% of GDP, Switzerland 11.3%, and France 11.1%.

Arora and Banerjee (2008) noted that low and middle income countries which contain 84 percent of the population globally endure an excessive share of the global disease burden compared with higher income countries. Yet these countries receive a disproportionately low share of funding for healthcare. Most funding for these developing countries comes from treating “travelers’ diseases,” diseases such as Hepatitis A, which could directly affect visiting travelers (and, by extension, the country of their origin). While a market-driven model is core to healthcare in the United States, and while more and more countries add market-driven features to their healthcare services, according to the Commission on Social Determinants of Health (2008), public financing seems to be inevitable.

Bossert and Ono (2010) proposed an alternative approach which suggested instead of using the average number of health care workers from all countries, that targets use, “the lower average number from more efficient countries that achieve the coverage objective with far fewer workers” (p. 1378).

**General Agreement on Trade in Services (GATS)**

The General Agreement on Trade in Services (GATS) was established in 1995 by the World Trade Organization to expand service delivery including health related services. While GATS has not had a major effect on the American healthcare market, it could potentially change how the United States delivers care because of international obligations under this agreement. According to Arnold and Reeves (2006), GATS could “open markets for telemedicine, promote off-shoring of healthcare services and healthcare jobs, and subject HMOs, health insurers, and professional licensing and qualification standards to ‘necessity tests’ that limit domestic regulatory powers” (p. 327).

One of the more challenging aspects of GATS is that members of the World Trade Organization cannot discriminate against member countries. Therefore, a World Trade Organization member could provide market access (as the United States has done with radiology and telemedicine), and cannot impose barriers to trade in these areas (Fried & Harris, 2007). GATS permits a member to violate its obligations in extreme circumstances, but members must meet specific requirements to violate agreements

**Medical Tourism**

One of the side effects of the GATS treaty is medical tourism; patients leaving their home country for treatment in other countries. For American patients, medical tourism permits obtaining treatment in a foreign country at significant cost savings. In addition, patients often recover in private, comfortable
settings (frequently in five-star hotels). According to Smith and Forgione (2007), as a cost saving measure, some employers are contemplating medical outsourcing as an option for employees.

York (2008) acknowledged the ensuing debate over the quality of care in foreign countries, but noted many international healthcare workers were trained in the United States, and American health care institutions often sponsor international organizations. For example, Harvard Medical International is opening a hospital in Dubai, with the primary goal of expanding the medical tourism business. In addition, the Joint Commission on Accreditation of Hospital Organizations (JCAHO) has started an international sub-group (Joint Commission International). In 2007, an estimated 500,000 United States citizens traveled to foreign countries to seek medical treatment and the trend is growing (York, 2008).

**METHOD**

Recently, the University of Phoenix, School of Advanced Studies (SAS) held an online Content Area Meeting (CAM) to engage faculty in dialogue about global healthcare and related issues. This dialogue was prompted by the following discussion questions: What leadership principles might governments use (or develop) to address the current shortfall in the global health labor supply? How might these leadership principles apply to other complex global problems? What policies might leaders develop to ensure the equitable distribution of healthcare resources worldwide? How might these policies apply to the distribution of other (non-healthcare) resources? How might the Scholarship-Practice-Leadership model of the University of Phoenix SAS provide a guide for developing a collaborative global healthcare model to accommodate foreseeable contingencies such as climate change, pandemics, and overpopulation?

The discussions were conducted in online forums posted on the University of Phoenix classroom servers. Following the discussion, the content was collected and imported into NVivo8 for content analysis. The text was also content analyzed manually. The following themes were derived from approximately 250 scholar practitioner healthcare faculty who shared their perspectives as healthcare educators, practitioners, and consumers.

**MAJOR THEMES IN GLOBAL HEALTHCARE LEADERSHIP**

The dominant theme derived from CAM participant discussions was global social policy reflected in the political will of national and international governments and organizations. Participants addressed many dimensions of this theme. These dimensions are diagrammed in Figure 1 and succinctly captured in the comments of one participant, who posted:

*I think governments should promote leadership style that entails the ability to see the big picture, to think and plan strategically, to share a vision with others, and to marshal constituencies and coalitions for action. It is key to improving the translation of existing knowledge about the prevention and control of disease and risk factors into policies that lead to longer and healthier lives (Coye et al., 1994). Public health leadership is the key to achieving the national health objectives, which constitute the core of health policy and practice at the local, state, and federal levels.*
Figure 1: The paradigm shift in global health care: A conceptual map of emerging trends identified in the University of Phoenix School of Advanced Studies Global Health Care Leadership Discussion held online in May, 2008.
While many participants shared this view, one participant expressed an opposing view:

I suggest leadership should consider more free market principles when developing shortfalls in the global health labor supply. It seems the ASSUMPTION is made that the solution should originate from the government – why? Practically all the empirical evidence of national health care programs (Medicare, Medicaid, as well as socialized medicine around the world) indicates there are significant drawbacks to government run health care. Might it be time for governments to re-examine this assumption and consider letting free market principles play a greater role? [Emphasis by original participant]

Participants discussed many dimensions of global social policy and political will. These dimensions included: global versus national focus in policy development; the role and values of large healthcare organizations; the effects of internationalization on recruiting, quality of life, and licensure and certification issues.

Global versus National Focus in Policy Development

The range of comments about global and national policies was extreme. Many comments addressed the following issues:

The number of people who are uninsured

“We frequently throw the numbers of some 43 million people underinsured or uninsured for healthcare, These two individuals [sic] represent a group of people (about 1/3 of that 43 million number) who voluntarily do not select healthcare insurance, and who only carry catastrophic insurance (thereby making them "underinsured" and thereby falling into the famous Kaiser Family Foundation numbers).”

The differences in approaches taken by different countries

Some medical education institutions have learned that supplying healthcare workers to help fill the growing global demands can be productive and profitable in a country which cannot easily provide jobs for all the graduates that its schools can prepare. For example:

The Philippines view nursing education as a product to be sold. The country educates nurses for the sole purpose of exporting them to other countries. It is an interesting "industry" when you think about it. Other countries are not educating the numbers of healthcare workers they need. Medical institutions in these countries are transitioning to international searches and recruiting efforts to attract talent.

One participant noted:

There are many controls to keep the non-US physician from practicing here. But, there is also a growing US shortage of physicians and that might make it possible for more foreign physicians to become certified.

The lack of a global social policy and the frustrations and conflicts created by political will were summarized by two participants who noted:

There are no common leadership goals by state, by region, or by nation in the U.S. With the inability of states to agree on standards, it seems the vision to unify standards across the globe might be beyond our grasp at this point in history.
The dilemma of the world's healthcare workforce is quite challenging. To be perfectly honest, I am torn between the competitiveness of soliciting workers globally and the acumen of educating a workforce as if it were a profitable business. Healthcare workers are being "stolen" from underdeveloped countries (such as Cameroon, Africa) because of the inability to be competitive in regards to salaries. Yet, there are other countries that can educate an oversupply of workers that help fulfill shortages around the world. So, what truly needs to happen is for worldwide healthcare leaders to work collaboratively and openly, perhaps through the World Health Organization, to develop a world wide economy that analyzes supply and demand to meet the global needs for the healthcare workforce.

Leadership role and values of large healthcare organizations

Two leadership alternatives discussed entailed having an international organization (WHO or the UN) to provide leadership or to consider allowing international for profit organizations provide leadership. The following comments summarize these views:

I see this approach working (sort of) as the World Health Organization (WHO) has begun the slow and tedious process of standardizing healthcare information systems. That seems a bit presumptuous as well developed countries such as the USA and UK do not have standardized healthcare information systems. However, I applaud WHO in this effort as setting standards even before such systems exist may circumvent a lot of variability that plagues other national healthcare systems.

WHO's plan is to get all the countries to agree on the most basic system needed to provide the tools for a national healthcare system (NHS). Sounds like that should be do-able. There are only a limited number of systems specifically designed for this purpose (about 12 manufacturers), so some consensus should be possible. Consensus costs nothing in and of itself, so I think most countries will be willing to go along with this idea.

Some participants, however, had concerns about the political implications of having an international organization provide leadership. For example:

I have worked a bit with WHO and I suspect some of them would like the idea of being in charge of healthcare education at the international level. WHO is a very political organization at some levels and would love that type of control, which is probably exactly why other countries would fight such an idea.

And:

I would advocate ground rules among countries that essentially all actions and discussions be on the "up and up" before discussion even begins about health care issues. It would be a very morality-based procedure similar to some of our honor codes we see in academia.

Internationalization in recruiting

An interesting issue identified was the licensure and certification issues involved in international recruiting. One participant noted:

The issue of physicians trained in other countries coming to the USA and finding they cannot practice without additional education and internship time is an old problem. This is a global
issue. Doctors from the USA cannot go to France or Germany and begin practicing medicine right away either.

About four years ago an American healthcare recruiting company went into South Africa looking for pediatric nurses. The response was so positive from the S. A. pediatric nurses that several hospitals had to close their pedi-AIDS intensive care units. There is a tendency to take what we need, but we do not have a plan for education, retention, and development of nurses.

One participant asked, “I would also ask that if a tiered healthcare system is created globally, is that ethically right? Should not every global citizen have access to the same level of healthcare? I am sure there will be as many different opinions as there are different countries.”

Although no answer emerged, the discussion was summarized by the comment, Dr. Ramos' eloquent tome, *The New Science of Organizations: A Reconceptualization of the Wealth of Nations*, identified vulnerabilities and proposed strategic solutions: "However, today the expansion of the market has reached a point of diminishing returns in terms of human welfare" (Ramos, 1981, p. 23). Not every idea works . . . but the underlying principle endures: *Hope springs eternal* as long as there are individuals willing to invest intellectual and psychic energy into conceptualizing solutions.

**Healthcare Trends – Pack Your Bags**

The second major theme identified was emergent trends in healthcare. This theme included subthemes describing the commodification of healthcare delivery and world-wide technological developments. Participants compared the strong impact of commodification to a two-edged sword, and noted that on one edge, commodification delivers care to select individuals who can afford the expense. On the other edge, commodification results in wasted medical and natural resources.

**Commodification of Healthcare**

A significant emerging trend discussed was that some patients actively seek care from preferred providers in preferred locations worldwide. This trend has broadened to include medical tourism and other mechanisms like training healthcare workers and exporting them (a trend evident in the Philippines and India), offering special incentives to recruit foreign nationals to migrate to host countries (a trend evident in the United Kingdom and the United States), and funding certain subgroups to obtain and guarantee care. Some participants viewed commodification as the personal extension of the governmental problem of each country looking out for itself. Participants emphatically expressed that commodification is affecting access to resources, creating healthcare tourism, increasing competition, and changing funding.

**Access to Resources**

One participant viewed free markets in healthcare, even international free markets, as problematic as evidenced by the following statement:

However, we have so many examples of market failure in healthcare, both because of violation of classic market assumptions, and because of regulatory and industry restrictions that are placed on the market. Certificate of need would be a classic example. These failures have prevented the labor market from working like it should.
Healthcare Tourism

Healthcare motivated travel has become a significant trend. By extending the free market beyond state or national boundaries, some individuals have obtained the best care at the best prices by traveling abroad. One participant noted:

One can travel to India and obtain normally expensive procedures at a high level of quality and a fraction of the domestic [US] cost. This, of course, has spawned an entire industry in global healthcare tourism. Where is the logic in this? In a resource (and carbon) constrained world, does it really make sense from a global perspective to have (mostly wealthy) patients jetting around the globe seeking less expensive (or better) care?

This same participant then asked:

Why is clinical labor in these other countries not migrating towards more lucrative locations to practice (e.g. the US)? One reason would be artificial restrictions put on the mobility of that labor, both in government policy (immigration) and in credentialing and professional restrictions. In short, those who are vested in the current system create barriers to entry of labor from outside the US.

Another participant wondered, “Should we even encourage clinical labor to migrate?”

Competition for Healthcare Resources

In a very real sense healthcare facilities and personnel are scarce resources, and there is fierce competition for these resources. This competition is evident in “the global brain drain, or emigration of healthcare professionals to Western countries,” the financial competition for patients, and for access to funding. One participant commented,

I work in Europe and the UK, Swiss, and German systems also differ, although the differences are not quite the same type of differences we see in the USA. They have very few differences at the basic levels of healthcare. The biggest differences appear when the patient has extra money."

Another participant echoed this idea:

You just found the one universal health care trend--the patient with the most money gets what he wants!

Closely related to medical tourism and free market issues is that a global market in health care provides care that might otherwise not be available or affordable in the recipient’s home country. One participant noted several advantages:

I should note, however, that the idea of traveling to another country, having a medical procedure, and seeing a different culture is not limited to the wealthy. It appears to be attracting a large number of small business people who find this an effective means of dealing with prohibitive healthcare in the USA. I know two people who have taking this medical offshoring route. One individual traveled to India to have a coronary bypass. His protocol cost 1/10th the going price in the USA, his recovery was in a five star hotel, and his surgery was conducted by US trained physicians in one of the best hospitals in India. Another friend went
to South Africa (which does have some great hospitals) to get back surgery she could not afford in the US.

Related Issues: Technology – Treatment – Supply of Trained Professionals

Other health care trend issues mentioned but not discussed were; access to and influences of medical technology, treatment of acute and chronic diseases, developing a consensus of medical opinion on the topics and direction of healthcare, and the supply of trained doctors and nurses.

EMOTIONAL NATIONALISTIC RESPONSES

One unexpected thematic component was the pronounced undercurrent of nationalism. Participants expressed their views on nationalism indirectly via the mood and tone of their postings. Some participants observed that “everybody is taking care of themselves,” “there is a bias favoring local natives over health care professionals who have immigrated,” “some countries have adopted policies that disallow health,” “there is bias in healthcare education where faculty give preferential treatment to native students,” and “there is not integrated plan for leadership development of nurses or healthcare leaders.”

THE ROLE OF GOVERNMENT

Participants discussed 16 themes on the role of government in healthcare. One cluster of these themes focused on comments about how the current systems are not addressing the problems. One participant summed up the frustrations expressed by many, “... the prevailing leadership culture is predicated upon a flawed faith in new blood solves all problems. In other words, retention and motivation of existing staff are low priorities.”

Governmental Restrictions

Although participants expressed mixed feelings about the current role of government in healthcare, there was some consensus that the current approaches are not working well and that more leadership is needed. There was also consensus that leadership should consider more than the specific needs of a given country and include a global perspective. Some issues included:

Reducing healthcare access and services

Participants discussed how government actions sometimes reduce healthcare access and services. For example,

In my experience as a practitioner, I’ve observed how government regulations often result in the conscious decision by health care providers to REDUCE services. For instance, I know of one physician who retired early because he could not make enough money off Medicare/Medicaid reimbursement (which was his primary source of income).

The market pressures are worth watching on a global level. Most countries with national healthcare systems are now encouraging those with more money to avail themselves on services outside the system. I know that this is true in the UK, Switzerland, Sweden and Denmark. I suspect it is happening elsewhere as well.
However, some apparently “restrictive” governmental policies can have very positive effects. For example, one participant noted the following:

I taught in Australia from 1992 - 1995 and was able to do that because the policy of the Australian government was to approve work visas only for those occupations that could not be filled by residents. At the time, nurses, university professors, and telecommunications experts were among the few occupations allowed. This makes all the sense in the world to me. It’s called a ”win-win.” A win for the host country as well for as the migrating employee. If we cannot fill our healthcare vacancies domestically, I’m sure there are many candidates worldwide.

Other governmental issues

In addition to country-specific examples, participants discussed the various influences on governmental policies resulting from the mix of insured and uninsured patients in countries, differences in the recruiting policies for MDs and allied healthcare workers, licensure and certification variations, and the involvement of international large healthcare collaborations. One participant provided a cogent summary of the government’s role:

Barclay et al. (2008) make a terrific case for blending the disciplined, synthesizing, creating, respectful, and ethical ‘minds’ when problem-solving. When reflecting about this question, the CREATING and RESPECTFUL dimensions seemed particularly relevant.

Creating is important because the current system is failing. Despite leaders’ best efforts, things are getting worse not better. If there ever was a time for leaders to think creatively, it’s now. Keep doing what you’re doing, keep getting what you’re getting.

Respect is important because people often have pre-existing agendas that they defend. Politicians in particular are notorious for advocating a solution – rather than objectively analyzing data that might support a different option. IMO, the respectful mind suggests that we must be OPEN-MINDED, willing to consider alternative points of view (even if they are contrary to our personal beliefs).

Some participants noted the lack of effective healthcare leadership and management worldwide. For example:

Should we wait to help the developing countries until we get our own act together? That could be a very long time and I have to say that the devastation I am seeing right now in Africa (some parts) really makes me want to do something now.

Several participants offered encouraging remarks. One noted, “Healthcare providers are hard working professionals with bills as well. They have families to feed and bills to pay. The challenge facing governmental leaders is how to BALANCE the needs of both providers and patients.” While another participant cited a germinal work:

Dr. Ramos’ eloquent tome, *The New Science of Organizations: A Reconceptualization of the Wealth of Nations*, identified vulnerabilities and proposed strategic solutions: "However, today the expansion of the market has reached a point of diminishing returns in terms of human welfare" (Ramos, 1981, p. 23). Not every idea works . . . but the underlying principle endures.
Hope springs eternal as long as there are individuals willing to invest intellectual and psychic energy into conceptualizing solutions.

EMERGENT GLOBAL SOCIAL POLICY

Topics relevant to global social policy included country-specific political will and the lack of common leadership goals at the global level. One participant observed, “There may be a common goal towards health, but our own national priorities often seem to mediate that goal.” From the review of incentives of several kinds emerged the awareness, “A problem with offer incentives is that those countries who need the help the most are the least able to offer incentives. One could make the argument that other, richer countries could provide the funding for the poorer countries so they could offer programs to keep workers, yet that would frequently work at odds with the richer countries who are offering financial and other incentives to come to their countries.”

Political Will

As an expression of political will, participants identified licensing difficulties particularly in the United States. One participant noted:

There are a number of learners in doctoral programs who are physicians from other countries. Many have left good positions to come to this country only to find they can't get certified for positions comparable to the ones they left. They get into [a US] doctoral program to get a doctorate in leadership so they will have the credentials to head up a department related to their area of specialization rather than worry about how to get certified to practice in their area of specialization in this country.

Another perspective focused on MDs:

This also is reflected in that MDs in some countries are entering nursing programs, receive their degree, and come to the US. The Philippines is the country that I am aware of.

Contrast between Developing Nations and the Third World

In this discussion the participants recognized, “there are other countries that can educate an oversupply of workers that help fulfill shortages around the world” and, “I work in Europe and the UK, Swiss and German systems also differ, although the differences are not quite the same type of differences we see in the USA. They have very few differences at the basic levels of healthcare. The biggest differences appear when the patient has extra money.” However, one participant expressed concern about the disparity between developed and developing nations.

The recent Current World Health Report (WHO, 2008), Primary Health Care: Now More than Ever, reinforced this concern and the disparity that continues to exist. The report noted, “Globalization is putting the social cohesion of many countries under stress, and health systems, as key constituents of the architecture of contemporary societies, are clearly not performing as well as they could and as they should.”

The director-general of WHO, Dr. Chan, summarized the “four sets of reforms that reflect a convergence between the values of primary health care, the expectations of citizens and the common health performance challenges that cut across all contexts.” (p. ix). The reforms identified as important to narrowing “the intolerable gaps between aspiration and implementation” (p. ix) were
universal coverage reforms that ensure that health systems contribute to health equity, social justice and the end of exclusion, primarily by moving towards universal access and social health protection;
service delivery reforms that re-organize health services around people’s needs and expectations, so as to make them more socially relevant and more responsive to the changing world, while producing better outcomes;
public policy reforms that secure healthier communities, by integrating public health actions with primary care, by pursuing healthy public policies across sectors and by strengthening national and transnational public health interventions; and
leadership reforms that replace disproportionate reliance on command and control on one hand, and laissez-faire disengagement of the state on the other, by the inclusive, participatory, negotiation-based leadership indicated by the complexity of contemporary health systems. (p. ix)

Participants had mixed feelings about the World Trade Organization and its plans. On the positive side, several participants noted:

*I see this approach working (sort of) as the World Health Organization (WHO) has begun the slow and tedious process of standardizing healthcare information systems. That seems a bit presumptuous as well developed countries such as the USA and UK do not have standardized healthcare information systems. However, I applaud WHO in this effort as setting standards even before such systems exist may circumvent a lot of variability that plagues other national healthcare systems.

The World Health Organization’s plan is to get all the countries to agree on the most basic system needed to provide the tools for a national healthcare system (NHS). Sounds like that should be do-able. There are only a limited number of systems specifically designed for this purpose (about 12 manufacturers), so some consensus should be possible. Consensus costs nothing in and of itself, so I think most countries will be willing to go along with this idea. The problem is that WHO then plans on approaching countries with money (like the USA and UK) to ask them to buy the systems for the poor and underdeveloped countries. That will slow down the process.

HEALTHCARE LEADERSHIP NEEDS

The final theme identified in the analyses of the text addressed healthcare leadership needs. One participant stated:

*Three leadership principles come to mind: consensus building, participative style of leadership, and the integration of technology with healthcare systems. Consensus building is relevant to bringing together the best minds to focus on the problem from a global standpoint. This also means encouraging leadership that fosters participation from the level of individuals representing the local context, the organizational milieu, and international agencies. Consensus building and a participative style of leadership have already produced a trend toward integrating medical procedures with technology whereby some health conditions can be identified and treated accurately through international health screening techniques.

Participants recognized that, “These leadership principles might also apply to other complex global problems by connecting global leaders on a common problem, providing opportunities to think about
problems collectively, displaying global answers to local problems and then acting collectively to solve the problem.” Participants felt that, “. . . to act requires enlightened leadership--leadership that can articulate the problem and a solution and sell the importance of intervention to 300m largely self-interested citizens. Thus far such leadership has been in short supply, but hope is on the way.” Coupled with this was some concern that we, “have a difficult time understanding why poor management in healthcare is tolerated. Shouldn't their positions and/or pay be jeopardized if they can't control the turnover problem?”

One avenue of potential help indentified was higher education. Participants noted:

> These leadership principles have universality and could be effectively applied to other complex global problems, such as food and medical shortages. Doctoral learners have explored this topic extensively and offered innovative strategies for addressing the current shortfall in the global health labor supply.

The best solutions may be, “Rather than worrying about the whole thing, attack it a small piece at a time. In the end, hopefully you will have a workable coherent solution.” Additionally, academic institutions in the U.S. may need to provide special programs to help foreign nationals, “to help them find opportunities that give them more help than they seem to feel they have currently.” This would help correct the situation of foreign nationals being “in position of not getting certified to practice here [and] very discouraged about their situation and [frustrated by] not knowing how best to use their previous training.”

A recent book edited by Penman and Roy (2009) presents some interesting perspectives on economic development by focusing on first-person accounts of the importance of gender, of “franchise” agreements that support rural medical providers, and ways of promoting health and development in ten countries.

**SYNOPSIS OF CAM PARTICIPANT DISCUSSION**

Content Area Meeting (CAM) participants identified an emerging paradigm shift in worldwide health care. Participants concurred that many governmental policies are parochial and nationalistic creating personnel and resource shortages. Participants expressed hope that the United States, the World Health Organization, or the United Nations might provide leadership.

Participants agreed that lack of leadership results in the marketplace driving the development of health care and recognized the increasing influence of the affluent who travel the world to obtain the best and most cost-effective care. Participants noted the economic factors attracting trained professionals to developed countries prompting the view that health care worker training is an export industry. A related trend noted was health care tourism where patients with sufficient financial resources travel to obtain the best care at the best price. This commodification of health care is proceeding in spite of governmental efforts to limit and control it.

Participants felt these trends had important implications for teaching in healthcare related fields. Foremost was the need for developing stronger leaders with broad based international health care planning and delivery expertise. Another was the importance of extending scholarship beyond national boundaries. Participants recognized that scholars studying world-wide health care should make better use of the international databases like those available from the United Nations and World Health
Organization. Finally, at the practitioner level, the discussants expressed the need for less emotionality and more commitment to seeking a consensus of medical opinion including interdisciplinary and international sharing.

CONCLUSION

The themes and patterns derived from the CAM participants provided good evidence to suggest that effective healthcare delivery depends on the ability to generate, analyze, and interpret data (Ferlie & Shortell, 2001). The World Health Organization (WHO) provides extensive and detailed data banks on health conditions and populations in virtually every country on earth. However, without scholarly methods to analyze and interpret the data, practitioners, and leaders are unable to translate the available information into knowledge and action. Research-based analysis and application can also assist in both the formulation of labor policies and the implementation of practical solutions to the healthcare workforce shortage (Brusco, 2008). These include the application of appropriate theories and leadership principles for addressing complex issues, including setting international standards for the recruitment, training, and distribution of qualified health workers worldwide.

Ryan (2008) defined the central dilemma of 21st-century healthcare as the inability to regard healthcare simultaneously as both an economic commodity and a basic human right. Global healthcare leaders face the challenge of creating ethical frameworks for instituting policies and structures that promote an equitable distribution of healthcare resources while maximizing global access to necessary and appropriate care.

REFERENCES


ANALYSIS OF UTILIZATION AND ACCESS TO PRIMARY HEALTH CARE SERVICES IN A RURAL COMMUNITY

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ABSTRACT

Access to health care for Americans has been well documented and widely studied in the literature. Numerous strategies and interventions have been offered to solve the problem of limited access to health care. Despite this vast amount of information and research in the literature, the problem still exists. According to the 2000 United States Census Bureau, approximately 46.9 million Americans are currently uninsured, and there continues to be limited availability of health care providers in rural areas (US Census Bureau, 2000). Twenty percent of Americans live in rural areas and only nine percent of health care providers practice in these areas (Health Care Disparities, 2005). Barriers such as limited access and inadequate health insurance can significantly affect the health and wellness of a community. Community assessments can provide valuable information for the development of evidence-based interventions to improve access to health care. These assessments can also be a tool to identify areas of inadequate health care coverage. By using community assessments and being aware of the factors related to inadequate health care, advanced practice nurses can play a pivotal role as primary health care providers and as facilitators of change to address some of today’s issues and challenges in order to improve health care outcomes for those rural populations.

Keywords: Community Assessment, Health Care Services

PURPOSE

The purpose of this project was to conduct a community health assessment of a small rural town in South Carolina in order to identify the primary health care needs and analyze access and utilization of primary health care services in the community. An additional purpose of the project was to determine the feasibility of developing a local advanced practice nurse practitioner (APNP) managed faith-based clinic.

REVIEW OF LITERATURE

A broad search using CINAHL, Medline, OVID, Nursing Collection, ProQuest and Cochran databases was conducted to review the literature related to access to health care, community assessments, and faith-based clinics. The literature search was limited to the past ten years in which this study was conducted in order to obtain the most recent information relevant to the topic studied. All studies conducted outside of United States territories were excluded from this review.
ACCESS TO HEALTH CARE

A vast amount of literature was found related to access to health care in all databases that were searched. Most of the literature was descriptive studies that primarily examined factors contributing to decreased access to health care (Sinay, 2002) and effects of limited access to health care on specific populations (Paris & Hugh, 2006; Fitzpatrick, Powe, Cooper, Ives, & Robbins, 2004; Himmeistein, Lasser, McCormick, Bor, Boyd, Woolhandler, 2007; Neri & Kroll, 2007). The results indicated that many factors can contribute to decreased access to health care and support that minorities, disabled patients, and people in rural areas are at greater risk for limited access (Parish & Huh, 2006; Sinay, 2002). In addition, the consequences of limited access to health care can be social, psychological, physical, or economic (Neri & Kroll, 2007).

COMMUNITY ASSESSMENTS

A limited amount of literature was found relating to community assessments from the databases. The majority of research were descriptive studies relating to rationales for conducting community assessments (Byrne, Crucetti, Medveski, Miller, Pirani, & Irani, 2002; Gandelman, DeSantis, & Rietmeijer, 2006), information that should be included in a community assessment (Anderson & McFarland, 2000; Byrne, Crucetti, Medveski, Miller, Pirani, & Irani, 200; Rowley, 2005), and different types of community assessment tools (Anderson & McFarlane, 2000; Corso, Wiesner, & Lenihan, 2005; Keller, Stochschein, Lia-Hoagberg, & Schaffer, 2004). There were also results of multiple community assessments that were conducted in various locations with specific populations. The literature supports that community assessments can help identify community health problems and can also be instrumental in developing interventions to improve the overall health within a community. Some of the key factors that should be included in a community assessment, as cited in the literature, include demographic and ethnic data, a description of the physical environment of the community, and health and social services present within the community.

One type of community assessment tool found in the literature was a windshield survey, which provides a snapshot of a community at a certain point in time. This type of survey is conducted by making observations about the community while traveling through the community either on foot or by car. The windshield survey also includes a history of the community and demographics (Anderson & McFarlane, 2000).

Another community assessment tool found in the literature was a survey developed in collaboration with the National Association of County and City Health Officials and the Centers for Disease Control through MAPP (Mobilizing for action through Planning and Partnerships). This survey contained quality of life questions and community health assessment questions. The windshield survey and a revised version of the community assessment survey developed through MAPP were utilized in this research project (Corso, Wiesner, & Lenihan, 2005).

FAITH-BASED CLINICS

When completing the literature search on faith-based clinics a systematic review was found in the Cochran Database and also a meta-analysis on religion and health was found. The systematic review and the meta-analysis support the connection between faith and health (Chatters, 2000; Simone, 2006). Both positive and negative outcomes from this connection were reported. Positive outcomes included better health outcomes for persons with physical and mental disabilities and lower levels of high risk
behaviors. Some of the negative consequences included inappropriate use of health care services and social pressures to conform to institutional religious expectations (Chatters, 2000). Zahner and Corrado (2004) examined the effectiveness of partnerships between faith-based agencies and local health departments. The findings indicated that partnerships were successful and effective to produce the desired results from health promotion interventions.

METHODODOLOGY
A windshield survey was first completed on foot and via car of the community. Data was also collected using census reports, vital statistics, interviews with key informants within the community, and other community resources. A revised community assessment survey adapted from MAPP (Mobilizing for Action through Planning and Partnership) and NACCHO (National Association of City and County Health Officials) was utilized to collect data related to the identification of the health care needs in the community and access to primary health care.

DATA COLLECTION
After obtaining Human Assurance approval, 326 community assessment surveys were mailed to community residents along with their water bills. Businesses and property owners who were nonresidents of the community were excluded from the mailings. Stamped, self-addressed envelopes were included with the mailings for return of the surveys. Two-weeks were allowed for return of the surveys based on the due date of the water bills. Interviews were conducted with the mayor of the town and the local dentist. Several attempts were made to obtain an interview with the primary health care provider at the local clinic, but were unsuccessful.

DATA ANALYSIS
Descriptive statistics and frequency data were utilized to analyze the perceived overall health of the community and demographic characteristics of the respondents. Chi-square calculations were computed to determine if there were any associations between race, gender, or marital status and satisfaction with the health care in the community. Cross-tabulation summaries were tabulated for data regarding access and utilization of primary care services and the area of residence. This identified which of the survey respondents resided inside the town limits but did not utilize the local primary health care facility. Finally, responses were tabulated to identify the most important health problems in the community and the most important high risk behaviors in the community. Data from these questions were not ranked, but totaled to determine the most frequently reported responses. All data from the community assessment surveys were entered into the SPSS program version 12.0 for analysis.

RESULTS
Interviews were conducted with the town mayor and local dentist. Both interviewees rated the overall health of the community as unhealthy and identified substance abuse as one of the major high risk behaviors in the community. Other concerns included the high school dropout rate and the high number of teenage pregnancies in the area. In relation to health care, the mayor and dentist discussed the need for another primary health care facility since there was only one located in the town. Lack of public transportation for access to health care providers and a high turnover of physicians in the local primary health care clinic were identified as reasons for dissatisfaction with the current health care system and a decrease in utilization of the local clinic. Assets of the community verbalized included a strong
religious commitment by the residents, an additional fully equipped health care clinic available for use, and the ability of the residents to work together for the betterment of the community.

The observations made through the windshield survey revealed a great deal of information about the community. There was one main street in the town with no traffic lights. Past the main street were acres of farmland and peach orchards. There was one restaurant on the main street and several other small shops, but no grocery store. In relation to health care, there was one primary health care clinic, one drug store, and one dentist office. The people seen were primarily from the African-American or Caucasian race, and they were either going into the stores, dentist office, bank or post office on the main street. The closest acute care and long-term care facilities were located approximately 35 miles away.

COMMUNITY HEALTH ASSESSMENT SURVEY RESULTS

Ninety-seven surveys (29.7%) were returned. The respondents were primarily Caucasian females ranging from 21 to 90 years of age. The majority of the respondents had at least a high school diploma or GED (86%) and had health care insurance (53.6%).

Seven quality of life questions on a five-point likert scale, followed by five community health assessment questions were included on the survey. The residents were asked to select whether they agreed or disagreed with each of the seven statements on the Community Health Assessment Survey. The minimum value on the likert scale for each question was one and the maximum value was five. The higher the point value reported on the seven likert scale questions, the better the perception of community life by the residents. The question that received the highest mean (4.33) was question number six which stated, “The residents can help make the community a better place” (Table 1). Eighty-eight percent of the respondents agreed with this statement. The question that received the lowest mean (2.67) was question number two which stated, “I am satisfied with the health care system in the community” (Table 1). Forty-three percent of the respondents disagreed with this statement. No significant differences based on demographic data were found in relation to satisfaction with the community’s health care system.
**Table 1: Descriptive Statistics for Survey Questions**

<table>
<thead>
<tr>
<th>Survey Questions 1-7</th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I am satisfied with the quality of life in the community.</td>
<td>92</td>
<td>3.24</td>
<td>1.063</td>
</tr>
<tr>
<td>Strongly disagree or disagree</td>
<td>24 (26%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neither agree nor disagree</td>
<td>29 (32%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strongly agree or agree</td>
<td>39 (42%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I am satisfied with the health care system in the community.</td>
<td>92</td>
<td>2.67</td>
<td>1.120</td>
</tr>
<tr>
<td>Strongly disagree or disagree</td>
<td>43 (47%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neither agree nor disagree</td>
<td>28 (21%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strongly agree or agree</td>
<td>21 (21%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. The community is a good place to raise children.</td>
<td>93</td>
<td>3.57</td>
<td>1.057</td>
</tr>
<tr>
<td>Strongly disagree or disagree</td>
<td>13 (14%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neither agree nor disagree</td>
<td>23 (25%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strongly agree or agree</td>
<td>57 (57%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. The community is a good place to grow old.</td>
<td>96</td>
<td>3.30</td>
<td>1.110</td>
</tr>
<tr>
<td>Strongly disagree or disagree</td>
<td>14 (14%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neither agree nor disagree</td>
<td>19 (20%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strongly agree or agree</td>
<td>63 (66%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. The community is a safe place to live.</td>
<td>96</td>
<td>3.59</td>
<td>1.091</td>
</tr>
<tr>
<td>Strongly disagree or disagree</td>
<td>15 (16%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neither agree nor disagree</td>
<td>18 (19%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strongly agree or agree</td>
<td>63 (65%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. The residents can help make the community a better place.</td>
<td>96</td>
<td>4.33</td>
<td>.991</td>
</tr>
<tr>
<td>Strongly disagree or disagree</td>
<td>6 (6%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neither agree nor disagree</td>
<td>6 (6%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strongly agree or agree</td>
<td>84 (88%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. There is mutual trust among community leaders.</td>
<td>93</td>
<td>3.00</td>
<td>1.2007</td>
</tr>
<tr>
<td>Strongly disagree or disagree</td>
<td>28 (30%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neither agree nor disagree</td>
<td>25 (27%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strongly agree or agree</td>
<td>40 (43%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In addition, fifty percent of the residents who reported living in the town limits rarely or never utilized the local health care facility (Table 2).
Table 2: Cross-tabulation of Area of Residence and Utilization of Local Health Care

<table>
<thead>
<tr>
<th>Area Residence</th>
<th>Never Used</th>
<th>Rarely Used</th>
<th>Occasionally Used</th>
<th>Often Used</th>
<th>Always Used</th>
<th>Totals N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Town Limits</td>
<td>22 (38%)</td>
<td>7 (12%)</td>
<td>18 (31%)</td>
<td>7 (12%)</td>
<td>4 (7%)</td>
<td>58 (64%)</td>
</tr>
<tr>
<td>Outside Town Limits</td>
<td>7 (31%)</td>
<td>4 (18%)</td>
<td>8 (36%)</td>
<td>3 (13%)</td>
<td>0</td>
<td>22 (24%)</td>
</tr>
<tr>
<td>Within County</td>
<td>3 (30%)</td>
<td>3 (30%)</td>
<td>4 (40%)</td>
<td>0</td>
<td>0</td>
<td>10 (11%)</td>
</tr>
<tr>
<td>Another Town/City</td>
<td>0</td>
<td>0</td>
<td>1 (1%)</td>
<td>0</td>
<td>0</td>
<td>1 (1%)</td>
</tr>
</tbody>
</table>

In the survey the residents were also asked to identify three of the most important health problems and the three top high risk behaviors in the community. The primary health problems in the community identified by the community residents were high blood pressure, cancer, and age-related changes. The primary high risk behaviors included drug abuse, alcohol abuse, and being overweight.

DISCUSSION

Community assessments are worthwhile endeavors that can produce vital information about a community. They can provide a starting point when planning for new health care facilities or developing strategies to meet community health care needs. One purpose of this project was to conduct a community health assessment in order to assess access and utilization of primary health care in the area. The residents of the community shared a wealth of valuable information relating to the health care needs of the community and access and utilization of primary health care. They reported their lack of satisfaction with the present health care system in the community as well as limited utilization of the primary health care facility in the area. Additional research needs to be conducted to determine specific reasons why there is limited use of the primary health care facility in the area and reasons for dissatisfaction with the community’s current health care system.

Another purpose of this project was to determine the feasibility of the development of a faith-based clinic managed by advanced practice nurses. There was some evidence to support an additional primary health care facility in the area; however, only limited information was obtained from the surveys as to specific reasons why the current health care facility was not being utilized by more of the community residents. While completing this research project, the Department of Health and Environmental Control (DHEC) began a program in the county targeting faith-based organizations to promote health and wellness and to reduce the risk for diseases within rural churches. Therefore, the outcome recommendation for this project was to partner with this DHEC initiative.

STUDY LIMITATIONS

There were, however, some limitations to the study. One limitation was that the demographic characteristics of the sample did not match the reported US Census Bureau demographics of the town. According to the 2000 US Census data, the racial make-up of the population of the town was 63.9% African American and 33.9% Caucasian, but the population sample responding to the survey was 58.4% Caucasian and 38.2% African American. The difference in demographic characteristics could be based on the fact that a convenience sample was obtained from only the people who purchase town water, but other residents who reside outside of the town limits and who have well water were not included in the convenience sample.
Another limitation to the study related to the written community health assessment survey. Additional space for anecdotal comments on the survey was not included. Even though there was no designated area for additional comments, several of the respondents wrote comments relating to other concerns and needs of the community. These comments included the need for a grocery store, another restaurant, and limited transportation.

RECOMMENDATIONS AND CONCLUSIONS

The purpose of this project was to conduct a community health assessment of this small rural town in order to identify health concerns of the community and determine the feasibility for developing a local faith-based primary care clinic managed by advanced practice nurse practitioners (APNPs). The community survey was valuable for identifying the community’s perceptions regarding health care issues and concerns. The information that was obtained could be utilized to develop strategies to improve the overall health in the community. However, this community assessment only served as a foundation for further analysis of the health care of this community. Additional health care assessments should be conducted in other rural communities and with minority groups to identify and address the primary health care needs of these groups and to improve the overall health of communities that may be at risk for health care disparities. Advanced practice nurses can function in multiple roles for improvement of community health. Through their advanced skills, they can provide direct primary care to communities who have barriers to access to healthcare, they can collaborate with community leaders and existing health care systems, and can conduct ongoing research to identify health care issues and develop interventions to improve the overall health of community residents. In conclusion, a community assessment should be the beginning of the process for identifying and analyzing community health needs which can lead to improving the overall health of residents in these underserved areas.

REFERENCES


GENOMICS APPLICATIONS, ELECTRONICS HEALTH RECORD AND PREVENTIVE EDUCATIONAL PROGRAMS TO REDUCE THE ESCALATING COST OF CARDIOVASCULAR DISEASES IN UNITED STATES

E. William Ebomoyi
Chicago State University, USA

ABSTRACT

This project investigates the existing weaknesses associated with the United States current health care services. It identifies the contributions of those preventable leading causes of death which escalate the cost of health care services. This paper, also explores specific public health mechanisms to eliminate those risk factors which are of singular importance in the early onset of death from heart diseases. An attendant preventive medicine approach, is the innovative- P4 Medicine which consists of predictive, preventive, personalized and participatory. The adoption of this state-of –the-art intervention from genomic technology, addresses how some deleterious genes can be silenced, and how the early precursors of complex diseases as cardiovascular disease can be detected at their incipient stages and prevented. Public health genomics has created the scientific opportunities to contain the spiraling cost of health services through prompt and early intervention. Through social engineering, the public can be encouraged to avoid lipids, abstain from tobacco and engage in regular exercise so as to reap the benefits of being protected from deadly diseases, such as cardiovascular diseases. The cost-saving measures of electronic health record and the limitations were discussed. Preventive education programs can contain not only the escalating cost of health care services, but also maximize health benefits for the public.

Keywords: Cardiovascular Diseases, Genomics, Bio-Informatics, Electronic Health Record, P4-Medicine, Preventive Public Health Intervention, Epidemiologic Intervention, and Exorbitant Cost of Management of Cardiovascular Diseases.

INTRODUCTION

The issue of escalating cost of United States national health care delivery system has become an intractable abattoir to political and health care administrators nationwide. Compared to other developed nations, United States can boast of having the most sophisticated technology, unsurpassed by any other nations on this planet. However, our current technologically-driven health care delivery system is very costly, limiting access to a narrow stratum of the most affluent patients. Medical errors inadequate management of heart diseases contribute significantly to this exorbitant cost of health care.
MEDICAL ERRORS ASSOCIATED WITH UNTIMELY DEATHS

Based on CDC’s report (2009), the ten leading causes of death in the United States were: Heart Disease 616,067 (25.4%) Cancer 562,875 (23.2%) Stroke 135,952 (5.6%) Chronic Lower Respiratory Diseases (Lung Diseases) 127,924 (5.3%) Accidents 123,706 (5.1%) Alzheimer's Disease 74,632 (3.1%) Diabetes 71,382 (2.9%) Influenza and Pneumonia 52,717 (2.2%) Kidney disease 46,448 (1.9 percent) and Septicemia (infection of the blood) 34,828 (1.4 percent).

In fact, Dr. Barbara Starfieds\(^2\), has augmented other etiological frequencies of death in the nation as 7,000 deaths which occur annually due to medication errors in the hospitals, 12,000 deaths also occurs annually due to unnecessary surgery, 20,000 deaths which are recorded each year due to other hospital errors, 80,000 deaths each year due to nosocomial infections in hospitals and 106,000 deaths which occur annually due to adverse effects to properly prescribed medications. Some of the etiological agents, if summed up and characterized as iatrogenic diseases could be ranked as third just above stroke frequency of 13595.

Although the affluent groups in the society are able to afford living in a very congenial environment, and receive state-of the –art technologically driven medical care, their impoverished counterparts, on the other hand are exposed to chronic and degenerative diseases from sordid environment and other health scourge due to poverty. Most of them periodically end up in the emergency rooms where they have medical history which is usually problematic to establish. This chaotic –point-of –death use of medical services augment the escalating cost of national health care services.

To create an understanding about the contributions of the interventions of genomic medicine, bioinformatics technology, nanotechnology and preventive education programs in reducing the cost of health care; succinct definitions of these terminologies will be provided.

The Institute of Medicine\(^3\) defined genomics as the study of the entire human genome. A major distinction is between proteomics and genomics. The former investigates the end-products of genes. The latter not only explores the actions of single genes but the interactions of multiple genes with each other and with the environment\(^4\).

Nanotechnology involves the technique which creates or manipulates materials at nanoscale. In genomics, biotechnology and industries, nanotechnology exploits novel properties associated with matter in minute sizes to produce novel medical and diagnostic products, and more effective bio-products. Nanomaterial can deliver radioactivity, nanocapsules, and magnetic particles for detoxification applications and nanoporous electrode materials for artificial retinal implants among other medical interventions\(^5\).

Bioinformatics is the application of information technology to the field of molecular biology. Bioinformatics involves the creation and advancement of databases, algorithms, computational and statistical techniques. Bioinformatics theory can be applied in solving formal and practical problems arising from information management. Bioinformatics uses information and communication technology and high speed computers, including wireless graphic high speed computers, health informatics, electronic-commerce high speed computers and quantum computing and human-computer interface high speed computers\(^6\).
As a result of the escalating cost of the national health care system, and the associated limitations in the delivery of health care services, this project was designed with the following cardinal objectives:

- Identify the current weaknesses of the United States health care services;
- Identify preventable cardiovascular diseases as contributors to the escalating cost of health care services;
- Assess the strategies to reduce the escalating cost of cardiovascular diseases in the national health care system;
- Identify the role of electronic health care techniques in reducing the cost-prohibitive national health care services; and
- Design an eclectic logic model to facilitate the implementation of technologically-driven approach to enhance the current national health care services.

**WEAKNESSES OF THE UNITED STATES CURRENT HEALTH CARE SYSTEM**

Among the technologically advanced, industrialized nations, it is only the United States that does not provide universal health care services to its citizens. Today, 45.7 million Americans are uninsured. Data derived from census report revealed 37.3 million people lived in poverty during the year 2007, of which 13.3 million were children. The poverty level for a family of four was $21,203 per year, and seniors had the lowest poverty indicator of 9.7%. Children experience the highest rate of poverty (18.0%). The frequency of uninsured people is higher in 2008, compared to the statistics of poverty eight years ago. As a result of privatization in our capitalist system, Sade reported that over much of the twentieth century, health care delivery endorsed the philosophy “medical care is neither a right nor a privilege: it is a service that is provided to patients by physicians and others to people who wish to purchase it.”

However, in 1965, the federal government adopted the Medicare and Medicaid programs, which assure a basic level of health care for elderly and the indigent groups in the United States society. Although Medicare has provided consistent coverage for the elderly, the Medicaid program has experienced much financial shortfall in the services to the impoverished group. Today, Medicare and Medicaid fill some of these gaps, but the enabling legislation, drafted long before genomics was developed does not provide for genomic medicine under the program. Moreover, Medicaid intended to provide health care for the poor is chronically underfunded. Uwe Reinhardt indicated that “Americans have … decided to treat health care as essentially a private consumer good of which the poor might be guaranteed a basic package, but which is otherwise to be distributed more and more on the basis of ability to pay.”

The multiple reasons given for the expensive health care services in the United States are the state-of-the-art medical technology, privatization of most health care system, ineffective funding of primary preventive programs, massive disparities in health care delivery systems and the utilization of Medicare and Medicaid, the legal ramifications of medical insurance rates for physicians and physician-extended personnel. The other prominent reasons include: lack of comprehensive knowledge and hands-on experience in the utilization of electronic health record, the efficient utilization of genomic science, primary preventive techniques and the lack of knowledge in the applications of bioinformatics techniques to ease the utilization of preventive and curative medical services.

If these contributors of this ever-growing health care cost remain unchecked there could be major economic catastrophe for the over 158 million working Americans as their combined family insurance premiums have risen from about $6,000 in 1999 to $13,000 in 2008.
U.S. annual healthcare expenditure has risen over 2 trillion as of 2009, but by 2016, it has been projected to be well over four trillion dollars. This amount which was 18% of the GNP on health healthcare in 2006 has also been projected to be between 25% and 30% by 2015. According to the congressional budget office, health care spending has increased astronomically from about $700 billion in 1985 to approximately $2 trillion in 2005. The U. S. Bureau of Labor and Statistics estimated that the bulk of average annual healthcare expenditure is used principally by those over 55 and the average for every American was about $26,000.

**COST OF MANAGING CARDIOVASCULAR DISEASES**

Report from American Heart Association (AHA) revealed that CVD, principally heart disease and stroke constitute the leading cause of death for both men and women in the U.S. and one million Americans die each year from this disease and the cost of management of this disease is 274 billion each year, including health expenditure and lost productivity, and the 1999 cost is estimated to be 286.5 billion and the financial burden continues to grow each year as the population ages. By 2009, the AHA and the U.S. National Heart, Lung and Blood Institute (NHLBI) estimated the cost of cardiovascular diseases and stroke to be $475.3 billion. This amount includes both direct and indirect cost. Direct costs consists of the cost of physicians and other professionals, hospitals and nursing home services, the cost of medication, home health care and other medical durables. The indirect costs include lost productivity which results from illness and death.

**PREVENTABLE HEART DISEASES AS CONTRIBUTORS TO THE RISING COST OF U.S. HEALTH CARE SERVICES**

The major contributors to the spiraling cost of United States health care services, are, medical technology, aging population, and the high cost of prescription drugs, medical litigations and reliance on costly physicians. The exponential growth in the development of medical technology and high-tech medical procedures increase the cost of health care in the United States. These innovative, but expensive medical technologies includes: computer tomography (CT) scanners and magnetic resonance Imaging (MRI) which enhance the invasive procedure for the management of arthroscopic and laparoscopic surgery and cardiac catheterizations.

A few years ago, cardiologists had access to only stethoscope as their major tool for diagnosing heart-related diseases, but today a litany of equipment exists including electrocardiogram which scans the heart and record electrical impulses, thereby regulating human heart’s pumping action. At present, there is the nuclear stress testing whereby the physician injects a radioactive substance into the blood and gamma-rays cameras are used to monitor blood flow through the heart. This test which takes up to five hours, inadvertently introduces minute quantities of dangerous radiation into the patient. This procedure exemplifies the exposure of unsuspecting patients to the incipient onset of iatrogenic cancerous agent.

In the same vein, echocardiogram (ECHO) involves the use of harmless ultrasound waves directed at the chest which bounces off the heart walls and valves. A micro- computer analyzes the size, shape and routine movement of the structure within the heart to determine where the abnormal valves exist, and the areas which are not receiving enough oxygen. The coronary angiogram is applied to view the arteries that nourish the heart. This procedure called “cardiac catheterization” involves the insertion of a
catheter through an artery in the leg and carefully winding it into the heart. A special dye is sent through the tube that shows the arteries clearly under x-ray and exposes any blockage over the years\textsuperscript{16}.

The positron emission tomography (PET) and computer tomography (CT) are heart scanners that provide structural and functional information about the heart in one scanning bout. Physicians use this medical technique to physically locate narrowed regions along the arteries, and then apply PET to identify narrowed regions along the arteries, and those areas that are deficient of oxygen. Of all the medical technologies summarized, PET appears to be the most expensive\textsuperscript{17}. Finally, the Magnetic Resonance Imaging (MRI) is also expensive, sometimes with questionable efficacy and cost benefits. MRI is a strong magnetic device which creates a field that sets off nuclei of atoms in the heart cells vibrating. The oscillating atoms emit radio signals which are converted by micro-computers into either stationary or moving 3-D images. This process is a plaque filled spot in the arteries. The scanner shows the amount of fat surrounding the pericardial portion of the heart\textsuperscript{17}.

These devices which are quite expensive, but effective in the diagnosis and treatment of heart-related diseases have made United States the medical Mecca of the world! Also, these medical technologies and biomedical engineering feats have created so much allure, attracting patients at the advanced stages of their cardiovascular problems to United States for state-of-the-science medical interventions as their life savers.

The other category is the large number of foreign-trained medical graduates who migrate to the United States for their advanced post-graduate medical training. These medical technologies which are also available in other advanced industrialized nations; however, are less frequently used so as to contain cost and democratize the provision of routine medical services at an affordable cost to insurance companies and the general public.

**GENOMICS AND EDUCATIONAL INTERVENTION**

For over 69 years, cardiovascular diseases (CVD) continue to be the leading cause of death in the United States. However, CHD is the leading cause of death worldwide because of the associated risk factors which occur ubiquitously. This being so with individuals who have neither accepted responsibilities for their own health nor for those of others in their habit of tobacco use, alcohol abuse and overeating. The attendant consequences of obesity, stressful and sedentary lifestyles, and family history periodically result in cardiovascular disease. Public health interventions which yielded positive epidemiological outcomes have been 1) abstaining from tobacco, 2) health promotion initiative prohibiting smoking in public places across the nation. 3) education of the public about diet modification, 4) encouragement of physical activities and 5) avoidance of excessive alcohol. Of the ten leading causes of death in United States, nine of them are associated with genetic etiologies. Although there is no evidence that accidents have genetic link, the major causes of death in United States, continue to be heart disease, cancer, cardiovascular disease, chronic lower respiratory disease, diabetes, pneumonia/influenza, kidney disease and septicemia (Table1). Genetic susceptibility, the environment, immune status and behavioral patterns play major role in the onset of many leading causes of death in United States\textsuperscript{18, 19}.

**PUBLIC HEALTH GENOMICS**

In *Genomics and the Public's health in the 21st Century*, the Institute of Medicine (IOM) defined Genomics as “the study of the entire human genome”\textsuperscript{20}. The expert committee at IOM also echoed the
potential benefits of genomics in improving the health of the public and by differentiating genomics from genetics. The latter deals with the study of functions and effects of single genes while the former explores not only the actions of single genes, but also the interactions of multiple genes with each other and with the environment\(^\text{20}\).

In the same vein, Hartwell et al\(^\text{21}\) carefully explained genomics as the study of the whole genome. This branch of biological science focuses on the development and application of more effective mapping, sequencing and bio-informatics computational tools. Scientists with profound background in genomics apply large scale molecular techniques for linkage analysis, physical mapping, and the sequencing of genomes to generate detailed data which are subjected to analysis using high-speed computer facility. The new international tools of genomics include the high-throughput DNA sequences, and the large scale DNA arrays (DNA chips). These scientific tools have the capacity to analyze thousands of genes promptly and accurately. These devices can be used to study cells of virtually all living organisms. A typical genome is the entire collection of chromosomes which are present in the nucleus of each cell of an individual organism\(^\text{22}\).

**RELEVANCE OF USING FAMILY HISTORY**

Although the Human Genome Project (HGP) raised so much hope for the possibility of using specific genes to detect a subject’s disease risk, and identify high-risk subgroup; the identification of genes with a high attributable risk and high relative risk has not been most successful\(^\text{22}\). Even with more genes identified, that are linked to cardiovascular disease CVD, most of these genes demand rigorous clinical confirmation before their official recommendation is provided.

Therefore, the use of family history techniques by qualified epidemiologists and other clinical scientists has been recommended. Family history technique is not only inexpensive, and a cost saving measure, but it has been used successfully to assess the risk of CVD in both high school subjects and the elderly. However, the older cohort was not more at risk for CVD than the general population unless they had at least two family members who had been affected and diagnosed with cardiovascular disease. Also, family history of disease is germane to primary prevention because, it is an independent predictor of future disease incidence, and defines the relatively small subset of families in the population that account for most cases.

**PUBLIC HEALTH GENOMICS AND P4 MEDICINE**

The philosophical construct underlying P4 medicine; pertains to the paradigm shift in medical science whereby instead of disease management the focus will be on preventive, predictive, personalized and participatory medical and public health approaches. The key benefits of P4 medicine to healthcare consumers and national health care systems include:

- Reduction in cost, time and failure rate of clinical trials for new therapies.
- Detection of disease at an earlier stage when it is easier and less expensive to treat effectively.
- Classification of patients who cohorts that could ease the selection optimum pharmaceutical products.
- Improvement of the selection of new biochemical targets for drug therapy and shift the emphasis in medicine from reactive to preventive and strategies from diseases to wellness and health maintenance.
Intuitively, biomedical scientists, genomic epidemiologists and clinicians have perceived the scientific breakthrough in genomics as creating golden opportunity to reduce the escalating cost of healthcare. Genomics enables scientists to identify the susceptibility to disease even at molecular level (Figure 1). This process could facilitate the identification of lethal and disfiguring alleles of genetic diseases, drug response based on genetic and personalized profile and therapy for disease prevention.

**Figure 1: Natural History of Disease in the Age of Genomic Science and P4 Medicine: Predictive, Preventive, Personalized and Participatory.**

![Natural History of Disease in the Age of Genomic Science and P4 Medicine](image)

Detailed genomic information would lead to a reduction in health care cost and increase longevity and improve the process of enabling humans to age gracefully. It could enable consumers to make informed decisions about the ethical, social and legal implications of specific tests. At national, state, and local levels, genomics could improve the development of key policies and uses of genomics in medical and non-medical therapeutic medicine. Identification of the relationships between genomics, ethnicity and the implications of exploring these relationships and become cognizant about the consequence of revealing the genomic contribution to human traits and behavior.

According to the out-going Director of NIH, Dr. Elias Zerhouni, NIH “is strategically investing in research to enhance our understanding of the fundamental etiologies of diseases at their earliest molecular level (proteomic and genomic stages)”. While being cognizant that individuals react differently to environmental conditions, based on their genetic endowment and their own behavior. The promise of genomics research is to enable us predict how, when and in which patients, a disease will develop. Within the natural history of specific diseases, scientists will be able to precisely target treatment on a personalized basis to those who need it and withholding treatment to those who do not want it (Figure 1).

**GENOMICS, WARFARIN AND ATRIAL FIBRILLATION**

With cardiovascular disease as the leading cause of death worldwide, the significant scientific breakthrough in genomics has been exemplified in the genetic testing when physicians prescribe the...
anti-blood clothing agents warfarin (Coumadin). This drug which was prescribed to well over thirty million patients in the United States alone, had mixed therapeutic benefits. The intended uses were to prevent the following conditions: deep venous thrombosis, pulmonary embolism, blood clots associated with heart arrhythmia (atrial fibrillation), blood clot associated with artificial heart valve replacement and recurrent myocardial infarction. With the recent innovations in genomics physicians are now able to titrate the patient’s specific warfarin dosage on the basis of the International Normalized Ratio (INR) to determine values which reflect the patient’s blood tendency to clot. If the INR is found to be too high, this indicates a high risk of bleeding and if too low, the drug is not exerting enough anticoagulant effect. From these clinical findings and other genomic and anthropometric data, the dosage will be adjusted upward to enhance efficacy.

This pharmacogenomic intervention enhances patient’s safety. Scientific studies have revealed that the variants in two genes account for about one-half of the differences in warfarin metabolism in patients. The outcome of this clinical study has conferred tremendous health benefits for the large number of patients who suffer from atrial fibrillation which is among the lethal form of heart diseases (Figure 1). The individualized approach will allow us to preempt diseases before they occur by utilizing the participation of individual or communities. This will occur at the incipient stages to the endpoint of a disease process.

TECHNOLOGY FOR P4 MEDICINE

Today, an improvement in the technology for biochemical analysis of patients’ specimen has enhanced the knowledge about the incipient signs of diseases, diagnosis, treatment and prevention of these diseases. The recently developed technologies most relevant to genomics science include 454 life sequencers, manufactured by Roche Diagnostics (Brandford, CT), chromatography and electrophoresis, gene amplification, capillary analysis, polymerase chain reaction tests, micro array sequencing and iso-electric focusing. These innovative technologies and bio-informatics have the potential to provide relevant insights into the disease manifestation in individual patients and the clinical differences at molecular level. It is such knowledge that will enable the physician to tailor treatment to the precise needs of patients. After the accomplishment of the human genome sequencing (HGS), personalized medicine could include testing for variations in genes, gene expression, proteins and metabolites. In more sophisticated comprehensive patient’s assessment, the results of the patient’s HGS will compliment anthropometric data which are likely to correlate with drug response, disease state, treatment prognosis, including patient’s behavioral lifestyle such as exposure to stressful lifestyle, use of tobacco, alcohol and her nutritional habits.

Realistically, use of these comprehensive tests and use of molecular assessment and the inevitable ability of these composite test results to predict susceptibility to disease implies that personalized medicine has the potential to significantly transform not only the United States national health care system but also the democratization of services so as to enhance the quality of life and elongate the human life-expectancies (Figure 1).

PHARMACOGENOMICS IN PERSONALIZED MEDICAL CARE

Pharmacogenomics: - is the science that investigates how individuals react to medication. Although the recent sequencing revealed the 99.9% semblance of the human DNA make-up, the 0.1% single
nucleotide polymorphism is about 1.4 million cells. Herein lies, the existing variability in the way humans react to medication, inherited allergies and environmental toxins. For example, an identical cancer drug may create distinct and variable side effects in different patients. One patient may experience life-threatening side effects while the other could just exhibit mild side effects. Some cancer medications could shrink a tumor in one patient whereas in another patient, the same drug might be without any therapeutic benefit. These vagaries in medical treatment have increased patients’ non-compliance with chemotherapy. Some become so frustrated and they are compelled to seek treatment from traditional healers or herbalists. The United States Department of Energy and NIH sounded the optimism about pharmacogenomics as the discipline that blends pharmacology with genomic potentials; and that over 100,000 people die each year from adverse responses to medications that benefit some patients but do harm to others. Besides, they reported that 2.2 million individuals experience serious side-effects while others do not respond to the therapeutic benefits of many drugs. Therefore, DNA variants in genes involved in drug metabolism, specifically, the cytochrome P450 multi-gene family are the focus of the current investigation in pharmacogenomics. Inadvertently, comprehensive genomic data and technology are expected to make drug development cheaper, faster, and more efficacious.

In “individualized medicine”, pharmacogenomics presents the potential to identify medications which are tailored to the specific needs of patients, based on their genetic profiles. There are professional caveats; to establish a patient’s comprehensive genetic profiles, there are multiple measurements required: They include, family history, socio-demographic characteristics, anthropometric data, molecular gene tests, assessment of biomarkers, sequencing of individual’s genome and routine blood tests, and the packed cell volume among others.

Dr. Elias Zerhouni in his “new strategic vision for medicine” has emphatically remarked “that the shift from a late curative paradigm to an early preemptive one is becoming increasingly possible.” By 2002, they knew only one important gene for diabetes but in 2007, researchers had uncovered seven new genes or genetic regions that provide new clues to how these diseases may develop. We now can see a clear path to what we call “the P4’s medicine that will be more predictive, personalized, preemptive and participatory”.

**ELECTRONIC HEALTH RECORD TO REDUCE THE ESCALATING COST OF UNITED STATES HEALTH CARE**

Electronic health record (EHR) has been defined by many scientists, adopting different perspectives. The Loeuring group explained HER as “a repository of electronically maintained information about individual’s lifetime health status and health care, stored such that it can serve the multiple legitimate users of the record”. An EHR also implies an individual patient’s medical record in digital format. Electronic health record is a subset of Health Information Technology (HIT) which illustrates how any computer-based electronic gadget enhances the delivery of health care services.

In his joint address to US congress in 2009, President Barack Obama stated that:

“Our recovery plan will invest in HER and other new technology which will reduce the medical errors and bring down the spiraling cost of healthcare and ensure the privacy of patient records and save lives.”
The 2009 economic stimulus package (HITECH) act passed by the US congress proposed providing incentives to physicians to adopt HER. On the one hand, the act created financial incentives to physicians who adopt and use “certified EHRs.” On the other hand, the intent was to reduce Medicare payment to erring physicians who will not comply with using HER. To ensure that physicians receive EHR stimulus money, the HITECH act (ARRA) demands that physicians provide evidence of meaningful use of an EHR system.

Before the election of Mr. Barack Obama, as president of United States, Mr. George W. Bush, the 43rd President of United States had developed the framework for the establishment of EHR at national level. In fact by 2004, he has encouraged and insisted that most health care facilities gradually set up the mechanism to start using EHR. President Bush proposed several resolutions to enable both private and public sectors to make smooth transition to utilizing electronic medical record.

- He called for the completion and adoption of standards that will follow medical information to be stored and shared electronically while assuring privacy and security...

- He requested that Health and Human Services (HHS) to negotiate and licensed a comprehensive medical vocabulary and make it available to the public at no cost. Owing to his intervention and leadership three other resolutions were made:
  1. A patient’s X-Ray can be sent electronically from one laboratory or hospital and can be read by patient’s physician in his office.
  2. Electronically, laboratory results can be sent electronically to the physician for immediate analysis, diagnosis and treatment and can be entered into a patient’s HER if one exists.
  3. Prescription can be sent electronically to patient’s pharmacist. This process expunges illegible handwriting of many physicians.

The two leaders have demonstrated their commitment to implementing the EHR because they seem to be aware of the multiple advantages of this communication technology. They are also aware of the capacity of EHR in allowing multiple uses to operate independently. They can simultaneously have access to health record in hitherto rural and medically isolated communities. There is easy retrieval of patient’s medical record and updating of patients records.

The other ancillary benefits of EHR include access to various decision-support tools and reduction in medical errors due to illegibility of physician handwriting. The major cost saving advantages is workforce reduction, due to the elimination of medical clerks, analysts, abstracters who are usually involved in cumbersome paper work. These personnel can be redeployed to other sections of the hospitals.

REDUCTION OF ESCALATING HEALTH CARE COSTS

The administration of Medicare and Medicaid programs for eligible consumers is currently an accounting nightmare. Medical imaging is one of the rapidly growing costs of health care. Medicare part B increased from 6.80 billion in 2000 to 14.11 billion in 2006. By implementing the HER, access to patients’ images using HER will automatically eliminate duplication of expensive imaging.
The nation’s health care system can save over 11 billion annually if all our medical payment transactions were handled electronically via direct deposit. The other serendipitous benefits are fast access to medical literature and the proliferation of incessant improvement in healthcare efficacy and reduction of medical errors because of their access to decision support\(^{50}\).

**LIMITATIONS**

Existing disadvantages of EHR is the cost of initial establishment and implementation of electronic system. Physicians need extra time away from their clinical duties to learn the new technology. Vast majority of health care transactions in the U.S. still operate using the paper format with illegible physician prescriptions. This obsolete process has been inexistence for well over 50 years.

By 2004 when former President George Bush laid the groundwork for the establishment of the HER, $10 billion was earmarked annually for the project. But by 2009, President Barack Obama continued with the same initiative to computerize the nation’s health care system in five years. The challenges had become very obvious as only 8% of the nations’ 5000 hospitals and 17% of its 800,000 physicians currently use the version of common computerized record keeping system. Existing drawbacks that are quit problematic consist of the dearth of IT workers, and the engineers to develop and implement the system\(^{51}\).

Several independent studies conducted by the Harvard Rand Group and the Commonwealth Fund have revealed that Obama’s proposal could cost at least $75 billion to $100 billion over ten years for hospitals to aggressively implement the plan. However, as a component of the 2 trillion a year health industry, a full-fledge EHR system will necessitate spending over 100 billion.

Brailer\(^{51}\) has estimated that a fully functioning computerized HER, could eventually, save the national health care industry between $200 to $300 billion a year. The U. S. Veteran’s administration’s HER system is one of the most advanced in the world. This network of computerized EHR which operates in 155 hospitals and 800 clinics represents one of the most integrated systems in the nation. It relies on a single HER called the Veteran’s Health information System and Technology (VISTA). This system has been in operation for many decades. There are at least 25 competing vendors outside of the VA’s electronic health record system. The major problems regarding the sale of their software are the incompatibility with other electronic companies in the nation and the lack of inter-operability. The latter problem creates barrier and informal educational nightmare for physicians and other health workforce.

**CONCLUSION**

The initial investment and the process for the implementation of the HER nationwide could be very expensive; researchers have predicted that the accomplishment of this project could save the nation upward of $77 billion annually. The commitment of IT engineers, administrators, physicians and other health workforce will expunge the ills of waste, medical errors, contain cost and associated inefficiencies. The other mechanisms of reducing the spiraling cost of health care will necessitate the adoption of public health interventions to eliminate preventable causes of death and disabilities such as heart diseases, cancers, and other chronic and degenerative diseases.

Through the use of social engineering, mostly elderly can be provided specific incentives to exercise on a regular basis, young people of child-bearing ages must be educated about the risk of endogamous and consanguineous marriage as precursors for the propagation of lethal genetic diseases. Clinical
pharmacists have significant role to play in monitoring the drug prescriptions to senior citizens in the various nursing homes in the nation. Physicians and other health personnel must collaborate in understanding the role of pharmacogenomics in personalized and participatory medicine so as to maximize health benefits and minimize harm while treating the public.

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ABSTRACT

Deep vein thrombosis (DVT) is the formation of a blood clot or thrombus in one of the deeper veins of the human body. It is the third most common vascular disease (after coronary artery disease and stroke), affecting 1 per 1000 adults annually, and typically occurs after common conditions such as surgery, cancer treatment, pregnancy, and hospitalization. Even after the thrombus resolves, the patient is often left with the long term symptoms of edema and pain, known as post thrombotic syndrome (PTS). Historically, patients diagnosed with DVT have been placed on bed rest for fear that the thrombi would dislodge. This is still the case, but this long term bed rest can lead to other disabling problems, such as pressure ulcers and pneumonia. Recent studies have shown that an exercise regimen incorporated with other medical interventions and close supervision, can improve functional mobility without increasing negative risk factors for individuals with PTS, but there is still concern regarding weight bearing (closed chain) exercise after recent DVT. The purpose of this research was to determine the safety and effectiveness of open chain (non-weight bearing) exercise versus closed chain activities for the treatment of patients with recent DVT in an effort to prevent PTS.

Keywords: Post-Thrombotic Syndrome (PTS), Deep Vein Thrombosis (DVT), Exercise, Long-Term Effects, Closed-Chain, Open-Chain, Compression, Ambulation.

INTRODUCTION

Deep vein thrombosis (DVT) affects 1 per 1000 adults annually (Cushman, 2007; Prandoni, Lensing, Cogo et al., 1996) and is currently the third most common vascular disorder after coronary artery disease and cerebral vascular accident (Douketis, 2005). DVT occurs more frequently in men than in women, and is often associated with race and genetics. Modifiable risk factors include recent surgery, trauma, cancer treatment, pregnancy, hospitalization, immobilization greater than 4 days, and obesity (Cushman, 2007; Gregory, Lennox, and Kuhlemeier et al., 2005). DVT can be a complication of prolonged immobilization and remains a common problem among hospitalized patients (Pruett, 2006). Although the above risk factors may seem harmless or uncontrollable, the development of DVT is a potentially life-threatening situation as a thrombus can dislodge and become a traveling clot called an embolus. Emboli can then travel to the lungs resulting in fatality. This explains the serious nature of DVT development and the importance of the precautions taken by a physician to avoid complications. Even if treatment is initiated immediately, the recurrence rate of DVT has been found to be as high as 21.5% over the next five years after a first time DVT, and 27.9% for a second incidence of DVT.
Deep Vein Thrombosis (DVT): Open versus Closed Kinematic Chain Exercise to Prevent Post-Thrombotic Syndrome (PTS)

Moreover, the chronic symptoms of vascular disease can be debilitating, interfering with a patient’s quality of life (Cushman, 2007; Gregory, 2005). The increased rate of recurrence over time and the health consequences limiting independence has brought DVT to the attention of patients, doctors, and researchers working to find an effective treatment protocol and improved prevention efforts. Yet, despite the best efforts of the medical profession to decrease the pain and functional limitations of people with DVT, an estimated 40% of patients with DVT will develop post-thrombotic syndrome or PTS. Patients with PTS experience a continuation of DVT symptoms including edema and pain in the involved extremity. Physical therapists frequently treat patients who have a history of DVT or PTS as a co-morbidity, but therapy is less frequently requested soon after acute DVT diagnosis.

There is a vast amount of research on pharmaceutical intervention during acute DVT, but conflicting results are found when it comes to exercising patients with recent DVT. Acute DVT is widespread among the inpatient population. The previous school of thought concerning DVT has been to immobilize patients for several days or even weeks for fear of the thrombus dislodging and resulting in pulmonary embolism (Partsch and Blattler, 2000; Aldrich and Hunt, 2004). However, more recent research has found that after a patient has received the standard anticoagulant treatment and is monitored in the acute stage (Douketis, 2005; Harrison, 1998), the apparent dangers of early ambulation might not be as imminent as was previously thought (Ciccone, 2002; Aldrich and Hunt, 2004). The "old school" mindset has recently been replaced with a newer mindset that involves exercise in combination with compression. Although it is agreed upon by the medical community that vigorous exercise is contraindicated during acute DVT, it is still unclear in the literature when a person may begin weight bearing (closed chain) exercises or non-weight bearing (open chain) exercise following anticoagulant therapy for recent DVT, and how these exercises can be used to prevent PTS. Currently, no standard protocol is in place for activity progression; however present treatment options in the acute stage includes anticoagulant therapy, surgical insertion of vena cava filters, mechanical pressure garments, gentle exercise, early ambulation, or combination of these interventions (Aldrich and Hunt, 2004; NIH, 2010). This research seeks to conclude whether open or closed chain exercises are the more effective plan of care for patients following recently treated DVT in an effort to maintain patient safety, and to prevent the complications of PTS.

Three questions were considered in the development of a treatment plan for patients with recent DVT, and the information collected was organized using these questions to make an evidence-based decision. The first question focused on the inherent benefits of exercise over prolonged bed rest. The older protocols recommended strict bed rest, yet this type of immobility offers its own potential complications. The research was reviewed to find the pros and cons of each and make a determination.

The second question addressed the type of activity that is the safest and most effective for the improvement of function for patients with recent DVT in an effort to decrease the incidence of PTS. For instance, ankle pumps (open chain) are considered “standard protocol” after surgery and are recommended as a good exercise for those who are pregnant and/or traveling for an extended length of time (Rodriguez, 2009). In addition to an open chain exercise such as ankle pumps, closed chain activities such as early ambulation after surgery, during pregnancy, and in between long trips is recommended to increase blood flow and prevent stagnation (CDC, 2010). The question ultimately becomes whether there is a difference between the effects of open versus closed chain exercises, and which one would be the most appropriate to include into a plan of care for a patient with recent DVT. Answering this research question would require a review of current literature to understand the
physiological changes that occur with closed kinematic chain activity (weight bearing) versus open kinematic chain activity (non-weight bearing) activities when a patient has had a recent diagnosis of DVT.

The third question addresses the added benefits of compression devices and garments. Alone they have found to be beneficial for vascular and lymph-associated inadequacies. Do they, however, have an effect in combination with exercise on the symptoms of recent DVT, to decrease pain and edema and prevent future PTS? Ankle pumps (open chain) during pneumatic compression have been combined, but range of motion and mobility with devices and garments are often limited to some extent. Exercise without the addition of compression may increase compliance of home exercise programs, and exercise combined with compression may have additive benefits or potential dangers, making it a valid discussion for this paper.

**Operational Definitions**

Kehl-Pruett (2006) defined *deep vein thrombosis (DVT)* as a form of venous thromboembolism and a complication of prolonged immobilization in hospital patients. Venous thromboembolism results from a combination of venous stasis, vein injury and increased coagulation otherwise known as Virchow's triad (Makin, Silverman, and Lip, 2002). *Venous stasis* occurs when patients are immobile and blood pools in the extremity. Vein injury can be the result of surgery, intravenous therapy, and phlebotomy. Increased coagulability is seen in inflammatory condition and some infectious disease processes (Kehl-Pruett, 2006). *Post Thrombotic Syndrome (PTS)* is defined by Kahn, Shrier, and Kearon (2008) as a period of months after the resolution of acute DVT during which the patient experiences leg heaviness, swelling and cramping. The definition of *open kinematic chain (OKC) exercises* according to Beutler, Cooper, Kirkendall, and Garrett (2002), is movement of the upper and/or lower extremity in non-weight-bearing. An example of this is long arc quadriceps exercises of the lower extremity or bicep curls of the upper extremity. The same authors refer to *closed kinematic chain exercises (CKC)* as having the upper and/or lower extremities in a fixed or weight-bearing position; examples are lower extremity squatting exercises or push-ups. According to Houtermans-Auckel, van Rossum, Teijink, et al. (2009), *compression stocking* can be defined as a graduated pressure garment of the foot and lower extremity, with more pressure distally than proximally, used to that help prevent the formation of DVT and edema by improving the circulation in the leg. They also defined *intermittent pneumatic compression* as a device used on patients who are bedridden, that inflates a boot worn over the foot and calf, providing rhythmic distal to proximal pressure. This prevents the blood from pooling and forming behind the valves in the veins.

**DATA COLLECTION PROCESS**

This evidence-based paper focuses on open versus closed chain exercises in the treatment of patients on anticoagulant therapy after acute DVT. The Academic Search Premier, Pub Med, Medscape, and Google Scholar search engines were used to scan existing resources and choose peer-reviewed articles for inclusion. The American Physical Therapy Association webpage was also accessed for relevant journal articles and courses. The key words for the search were *deep vein thrombosis (DVT)*, *post-trombotic syndrome (PTS)*, *exercise, long-term effects, closed-chain, open-chain, compression, and ambulation*. The Boolean indicators of “AND” and “OR” were utilized during the search. The search was limited to articles published in peer-reviewed journals within the past 25 years, written in English, and addressing deep vein thrombosis, and/or physical therapy for peripheral vascular disease. Articles chosen for inclusion were based upon the Level of Evidence on the Oxford scale (from the Center for
Evidence-Based Medicine [CEBM, 2009]), a system that categorizes research into various study designs. Articles were also chosen based on reference to DVT, open and closed chain exercises, and/or reference to physical therapy intervention for patients with peripheral vascular disorders. Out of the 94 articles reviewed, 16 articles were chosen for this paper because they met the criteria for inclusion.

RESULTS
The following results are organized into sections pertaining to the above three questions. A Table (1) to summarize the findings has been provided following the narration.

Question #1: What are the benefits of exercise over prolonged bed rest?

Inactivation of the calf and sitting motionless for prolonged periods can lead to compromised blood flow and ultimately potential thrombogenesis. Endothelial cells make up the tunica intima or innermost layer of a vein. These cells separate the platelets and clotting factors from the underlying connective tissue. They create ADP which is a platelet aggregator, but they also make prostaglandin to prevent clotting factors from sticking to the tunica intima (Ciccone, Riddle, Tepper, and Wells, 2010). The platelets and clotting factors are there to prevent blood loss. When there is damage to the endothelial cells, and clotting factors touch the underling collagen, thromboplastin will develop, creating a clotting agent known as thrombin. This leads to the production of fibers called fibrin. Fibrin is made of an insoluble protein that creates a meshwork in an effort to aggregate platelets and prevent blood loss (Farlex, 2007). Plasmin circulating in the blood is there to hold this process in check. When the plasmin is working to breakdown this meshwork, the threads dissolve producing a substance in the blood that will provide a positive d-dimer test; a blood test that’s believed to help detect the presence of a dissolving clot (Philbreck and Heim, 2003). Plasmin that breaks down clots causes the endothelial cells to release prostacyclin (Kelton, and Blajchman,1980), and thrombin will cause the platelets to release thromboxane (Reilly and Fitzgerald, 1987). During normal blood flow, there is a balance or homeostasis of these substances, but when thromboxane exceeds prostacyclin, clots may begin to form (Ciccone, Riddle, Tepper, and Wells, 2010).

Normal blood flow through a vein is laminar in nature meaning that the flow is continuous and smooth flowing in parallel layers (Ciccone, Riddle, Tepper, and Wells, 2010). This smooth flow is encouraged by valves, skeletal muscle pumping, thoracoabdominal pressure, and venous diameter. According to Hitos et al. (2007) smooth blood flow is important for preserving hemostatic equilibrium. A positive increase in blood volume flow, achieved through performance of vigorous activities is likely to enhance fibrinolytic activity. In addition, the authors state that the more vigorous activities (for example, foot exercises against moderate resistance) were found to be “essential” to create an increase in blood flow during prolonged immobility (Hitos, et al. 2007, p.1894).

The concern with DVT is that the increased pressure achieved through with the musculoskeletal muscle pump provided by exercise, might produce positive blood flow that could inadvertently cause some of the thrombus to break off and travel through the right side of the heart, becoming lodged in the lungs and resulting in a pulmonary embolus (PE). Although there are risks associated with exercise during acute DVT, such as pulmonary embolism, Kahn, Shrier, and Kearon (2008) found that early exercise, when compared to the effects of bed rest, produced an earlier decline in pain symptomatology.
What is the definition of “early exercise” and when is it safe to resume vigorous exercise? Shrier and Kahn (2005) explored the potential dangers of vigorous activity one-month after DVT. They found that physical activity including a combination of both open and closed chain activities did not produce any negative effects. In fact, the increase in habitual activity did not produce any negative effects after a follow-up three-months post DVT. Aschwanden, Labbs, Engel, et al. (2001) performed a study to determine the safety of 4 hours of ambulation per day, commencing on the first day of anticoagulant therapy when compared to complete bed rest. Although the authors determined that there was no statistically significant difference in complications between the 2 groups, there was a slightly higher percentage of PE incidence in the ambulating group. Jünger, Diehm, Störiko, et al. (2006) performed a randomized controlled trial of 103 patients with proximal DVT. The mobile group was allowed to move around and ambulate on the first day of anticoagulant therapy, and the immobile group remained in bed performing light breathing exercises for 5 days. The researchers found no benefits of prescribing bed rest over ambulation; in fact, the mobile group reported fewer complications of pain and defecation than the immobile group. Kiser and Stefans (1997) utilized a retrospective case controlled study of 127 patients and recommended waiting 48 to 72 hours following diagnosis and treatment with anticoagulant therapy. Aldrich and Hunt (2004) agreed that early ambulation after DVT diagnosis and anticoagulation therapy could be indicated, but only when the following conditions are met: the benefits of mobility must outweigh the risks of bed rest, the patient should have no evidence of PE before beginning the intervention, and the patient should be able to tolerate the insult if a PE does occur. Ciccone (2002) performed an evidence-based study and after reviewing the research, recommended waiting 48 hours on anticoagulant therapy before beginning ambulation.

Question #2: Is there a difference between the effects of open versus closed chain exercises, and which one would be the most appropriate to include into a plan of care for a patient with recent DVT?

The search for a safe physical therapy exercise protocol to decrease discomfort, reduce edema, increase lower extremity circulation, and improve functional mobility in patients with recent DVT resulted in the following information about the use of open versus closed chain exercise:

**Open Kinetic Chain Exercises**

During open kinetic chain exercises (OKC), the distal part of the extremity is not fixed and is allowed to move through space during the exercise (Beutler, Cooper, Kirkendall, and Garrett, 2002). A study by Graham, Gehisen, and Edwards (1993) performed electromyographic evaluation of closed and open kinetic chain exercises of ten female college athletes. They found OKC exercises to be beneficial, but that they produced shear forces that were not as evident when the more compressive CKC exercises were utilized. Weight-bearing results in less ACL elongation compared to non-weight bearing, and CKC exercises can also allow for a more strenuous strengthening exercise without the increased shear force of OKC exercises.

In a study conducted by Hooper, Morrissey, Drechsler, Morrissey, and King (2001), OKC exercises and CKC exercises were compared to determine the level of functional improvement of the knee following anterior cruciate ligament (ACL) reconstruction. Although the CKC exercises mimicked a more functional mobility pattern, these researchers found no quantitative evidence that CKC exercises were more effective than OKC when treating ACL reconstruction. The researchers believed that the lack of a definitive difference could be because there is similarity between the muscle force activation patterns for both CKC and OKC exercises.
How does the preceding information apply to patients with chronic DVT? The benefits of the pumping mechanism with OKC exercises have already been discussed. Although there is similarity between the muscle force activation patterns for both CKC and OKC exercises, CKC exercises add an element of compressive forces to the muscular pump when the foot is in contact with the floor. Light ambulation also increases intra-abdominal pressure, another element of increased venous return (Munns, Hartzler, Bennett, and Hicks, 2004). This makes CKC exercises a more vigorous method of exercise than OKC, producing a more forceful pump to promote circulation. Will this increased force, however, lead to a greater likelihood of PE? To answer this, the literature was reviewed for the specific benefits on CKC exercise.

**Closed Kinetic Chain Exercise**

CKC exercise occurs when the upper and/or lower distal extremity is in a fixed or weight bearing position such as lower extremity squat exercises and upper extremity pushups (Beutler, Cooper, Kirkendall, and Garrett, 2002). In a collective literature review focusing on the elderly, several articles were gathered concerning the effect of exercise training on walking tolerance in those with peripheral vascular disease (PVD). Researchers found that CKC exercise training is a sufficient mode of training for patients with PVD. In the past, treadmill training has been the most common mode of training and has shown to improve walking ability, overall contributing to a greater functional ability (Parr and Derman, 2006). Although more vigorous than OKC exercises, some of the empirical evidence suggests that early ambulation of patients with DVT following anticoagulant therapy is safe and beneficial and does not significantly reduce PE incidence (Aldrich and Hunt, 2004; Ciccone, 2002). In fact, walking soon after beginning anticoagulant therapy for DVT has been shown to decrease pain and edema, chance of DVT recurrence, and long-term symptoms of PTS without increasing negative symptoms in patients with previous DVT (Jünger, Diehm, Störiko, et al., 2006; Kahn, Shrier, and Kearon, 2008).

Aschwanden, Labbs, Engel, et al. (2001) performed a randomized controlled trial with 129 DVT patients to determine the safety of early ambulation (4 hours or more per day, beginning on day-one) when compared to complete bed rest (strict immobilization for 4 days). For the patients in this trial, 10% in the immobilized group experienced PEs, compared to 14% in the ambulating group. The mortality rate was 3.9% with 3 deaths in the ambulation group and 2 in the bed rest group. All 5 people, however, were also found to have malignancies in addition to DVT. Although the percentage of PE was slightly higher for the ambulation group, the authors concluded that ambulation on the first day of anticoagulant therapy was a safe intervention. Kiser and Stefans (1997), however, recommended waiting 48 to 72 hours following diagnosis and treatment with anticoagulant therapy.

Kahn, Azoulay, Hirsch, et al. (2003), completed a study in which 41 patients who experienced DVT at least one year earlier, engaged in CKC activity on a treadmill. Participants underwent pre/post exercise measures which rated symptom severity, assessed habitual physical activity, and measured leg muscle fatigability and flexibility of both the unaffected (control) and affected leg. The authors found that CKC exercise did not exacerbate venous symptoms, calf muscle fatigability, or flexibility in subjects with PTS versus those without. Rather, the exercise improved flexibility in the affected leg.

**Question #3:** Do compression devices and garments with exercise help to further decrease pain and edema and prevent future PTS?

There are two ways to answer this question. One is to look at DVT prevention and the other is to look at treatment. Pitto and Young (2008) hypothesized that foot/ankle pumps (a type of OKC exercise) without
graduated compression stockings (GCS) would not affect the efficacy of DVT prevention. They also hypothesized that it would not increase the risk of side effects, nor increase patient compliance during postoperative management following a total hip replacement or total knee replacement when compared to foot pumps with GCS. Over 800 participants were included in this study which was conducted over a 3 year period. The researchers found that the use of foot pumps alone does not decrease the efficacy or safety of the treatment and actually increases patient compliance. These authors also found that the use of stockings does not change the appearance or amount of side effects. Ciccone, Riddle, Tepper, and Wells (2010) caution that inappropriate application of GCS can actually cause more harm than good and that patient education on proper wearing of the garments is mandatory.

The above dealt with prevention. Treatment of existing DVT is the focus of this paper. Kahn, Elman, Rodger, et al. (2003) found that well over half of the physicians in the study initiated treatment with elastic compression stockings (ECS) as soon as the patient was diagnosed with DVT, or within one month of diagnosis. The most commonly prescribed compression strength was 30-40 mmHg. Overall, most physicians believed that ECS can be beneficial in the prevention of PTS and management of venous symptoms. Conversely, several did not regularly prescribe these stockings. There appeared to be significant variation in practice regarding recommended time of initiation, duration, and ECS strength. The results showed that further study of ECS after DVT is essential (Kahn, Elman, Rodger, and Wells, 2003). Partsch and Blattler (2000) found that compression and walking decrease pain and swelling much faster compared to participants placed on bed rest alone, with no increased risk in PE. It has also been found that a combination of aspirin, exercises, and graded elastic stockings or intermittent compression devices can lower the risk for thromboembolic complications (Sarmiento and Goswami, 1999). There have been concerns about compression devices causing extra complications (i.e. bruises of the extremity, etc.), however, in a study done by Pitto and Young (2008), there was no significant difference found between the resulting secondary side effects (bruising, oozing, swelling) from either the stocking group or the non-stocking group.

**Table 1**

<table>
<thead>
<tr>
<th>Open-chain Exercises</th>
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<tbody>
<tr>
<td></td>
<td>In the first 6 weeks post ACL reconstruction, OKC and CKC exercises were found to increase functional performance without increasing negative shearing effects (Hooper et al., 2001).</td>
</tr>
<tr>
<td></td>
<td>CKC exercises are found to illicit a closer hamstring quadriceps ratio when compared to OKC exercising resulting in less anterior-posterior shear force in the knee. OKC exercises resulted in higher strength gains, so a combination of both exercises were recommended for rehab (Graham, Gehisen, &amp; Edwards, 1993).</td>
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<table>
<thead>
<tr>
<th>Closed-chain exercises</th>
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</thead>
<tbody>
<tr>
<td>Treadmill exercise did not acutely worsen symptoms in subjects having post thrombotic syndrome (PTS), rather exercise improved flexibility in the affected leg (Kahn, Azoulay, Hirsch et al., 2003).</td>
<td></td>
</tr>
<tr>
<td>Increased physical activity one month after DVT was not a cause of worsening symptoms (Kahn &amp; Shrier, 2004).</td>
<td></td>
</tr>
<tr>
<td>Early ambulation was found to be safe and beneficial, providing that the benefits of mobility outweigh the risks of bed rest, and did not significantly reduce the incidence of pulmonary emboli (PE) (Aldrich &amp; Hunt, 2004).</td>
<td></td>
</tr>
<tr>
<td>Kiser and Stefans (1997) utilized a retrospective case controlled study of 127 patients and recommended waiting 48 to 72 hours following diagnosis and treatment with anticoagulant therapy.</td>
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Deep Vein Thrombosis (DVT): Open versus Closed Kinematic Chain Exercise to Prevent Post-Thrombotic Syndrome (PTS)

**Table 1 (Continued)**

| Closed-chain exercises (Continued) | - Jünger, Diehm, Störiko, et al. (2006) performed a randomized controlled trial of 103 patients with proximal DVT, and found that the benefit of ambulation early after anticoagulant therapy outweighed those of bed rest.
| | - Ciccone (2002) performed an evidence-based study to determine intervention for a patient, and after reviewing the research, decided to wait 48 hours before beginning ambulation activity.
| | - Aschwanden, M, Labbs, KH, Engel H, Schwob, A, Jeanneret, C, Mueller-Brand J, Jaeger, KA (2001) determined that early ambulation was safe, but they began ambulation early on day one, and there were mortalities, although the patients also had malignancies.
| | - Walking soon after a DVT diagnosis was found to decrease limb pain, and lower the chance of long-term symptoms after PTS, with no increase in PE risk in patients with previous DVT (Kahn, Shrier, & Kearon, 2008).
| | - Walking ability in patients with peripheral vascular disease was shown to improve following exercise training, contributing to greater functional mobility overall. Other methods of exercise including an upper limb ergometer was found to increase walking tolerance without the discomfort of long distance treadmill ambulation in the elderly (Parr & Derman, 2006).
| | - In young athletic men and women, CKC exercises were found to improve functional mobility by sufficiently building quadriceps strength and protecting new anterior cruciate ligament (ACL) grafts (Beutler et al., 2002).
| | - CKC exercise was found to increase quadriceps strength but this did not correlate with functional performance (Wawrzyniak et al., 1996).

| Compression + OKC/CKC Exercise | - Patients treated with low molecular weight heparin are sometimes encouraged to ambulate while wearing compression stockings after being diagnosed with an acute DVT. Pain and swelling were shown to resolve at a significantly faster rate when patients ambulated (CKC) while wearing a compression stocking, without increasing the risk of pulmonary embolism (Partsch & Blättler, 2000).
| | - The use of foot pumps (OKC) after a total knee or hip replacement without compression stockings was found to increase patient compliance without risking safety and efficacy of the prophylaxis treatment. Also, there was no significant difference found between the resulting secondary side effects (bruising, oozing, swelling) from either the stocking group or the no-stockings group (Pitto & Young, 2008).
| | - It has been found that a combination of aspirin, exercises, and graded elastic stockings or intermittent compression devices can lower the risk for thromboembolic complications (Sarmiento and Goswami, 1999). |

**CONCLUSION**

DVT is the third most common vascular disease, after coronary artery disease and stroke. Historically, patients with active DVT were placed on bed rest for several days owing to the fear of pulmonary embolism. This paper looked at the safety and efficacy of open versus closed chain exercises following anticoagulant therapy for recent DVT. Both types of exercise can improve venous return and reduce venous stasis during immobilization, as do graduated compression stockings (Pruett, W. 2006). Hitos, et al. (2007) agrees that exercise provides a positive increase in blood flow, but dislodging thrombi can be a negative result, leading to concerns related to clinical decision-making. Currently, no standard
protocol is in place for activity progression. Present treatment options include early ambulation and mechanical, pharmacological, or combination therapy measures (Aldrich and Hunt. 2004).

**Clinical Decision**

We have concluded that in patients with recent DVT (48 hours after anticoagulant therapy), who offer no contraindications, CKC exercises are more beneficial than OKC exercises in reducing venous symptoms and improving functional activity such as ambulation. Most of the references cited in this paper support the effectiveness of CKC exercises. In 2003, Kahn and Azoulay's (2003) study that concluded that treadmill exercise did not acutely worsen symptoms in subjects having PTS, rather exercise improved flexibility in the affected leg. Just one year later, Kahn and Shrier (2004) found that increased physical activity one month after DVT was not a cause of worsened symptoms. Moreover, in 2003, a literature review by Aschwanden et al (2001) challenged historical approaches to appropriate timing of ambulation in DVT patients, suggesting that early ambulation is safe and beneficial, provided that the patient does not have other comorbidities such as malignancies. It has also been determined that in patients with DVT, bed rest does not significantly reduce PE incidence (Aldrich & Hunt 2004). A more recent study by Kahn, Shrier, and Kearon, (2008) found that patients who ambulated soon after a DVT diagnosis tended to have a reduction of pain and edema, and a decrease in long-term symptoms of PTS. This was not shown to increase the negative symptoms in patients with previous DVT.

Biomechanically, muscle strength acts as a significant factor in the ability to perform functional activity such as ambulation, and based on the literature (Graham, Gehlsen, and Edwards, 1993), CKC exercises increase strength and lead to functional activity participation more effectively than OKC exercises. As would be expected, walking ability in patients with PVD has shown to improve following exercise training (Parr & Derman 2006), contributing to greater functional ability overall. Parr and Derman (2006) came to an interesting conclusion that other modified CKC methods of exercise including an upper limb ergometer can increase walking tolerance without causing the uncomforting effects of long distance treadmill walking in the elderly. Several other studies focus on the impact that CKC exercises have on muscle strength and force at the knee. According to Beutler et al. (2002), CKC exercises provide a more functional approach to sufficiently build quadriceps strength and protect new ACL grafts. Graham, Gehisen, and Edwards (1993) determined that OKC exercises may lead to greater strength gains and stability when compared to CKC exercises, but there is a closer hamstring to quadriceps ratio with CKC creating less potentially damaging shear forces at the knee. They determined that a combination of exercises should be prescribed in therapy. However, Hooper et al. (2001) found that both OKC and CKC exercises have been found to increase functional performance when performed on their own without increasing negative shearing effects.

As for the timing of the CKC exercises, it appears best to err on the side of caution, and decide as Ciccone (2002) and Kiser and Stefans (1997) recommended. Waiting 48 to 72 hours after anticoagulant therapy prior to ambulation might be the best course of action. Utilizing the safety measures defined by Aldrich and Hunt (2004) will add another element of caution.

Most physicians believe that ECS are beneficial in the prevention of PTS (Kahn, Elman, Rodger et al., 2003). For patients on bed rest, graduated compression stockings can help to increase venous return and prevent pooling (Pruett, 2006). If compression is combined with walking, pain and swelling decrease much faster when also compared to bed rest, without increasing PE risk (Partsch and Blatter, 2000). However, based on the findings by Pitto & Young (2008), the addition of compression garments to both OKC and CKC exercises in patients with acute or chronic DVT contributed minimally to the
improvement in symptoms. There were also more problems with patient compliance when ECS were added to the intervention. When ECS are applied inappropriately, more problems with circulation can result. Thorough patient and family education should be conducted if ECS are to be worn by the patient.

In conclusion, patient specific intervention is the key to any successful physical therapy program. In the case of DVT, safety is the primary concern. The patient’s physical condition, comorbidities, and anticoagulant therapeutic regimen must all be taken into consideration. Working closely with the rehabilitation team and physician will help to promote functional mobility, decrease the chance of PTS, and decrease DVT recurrence.

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REFERENCES


ABSTRACT
There are striking similarities between current drug policies and the former policies of the prohibition era. As the American political climate leans towards “Get Tough” policies on drugs and crime, there has been an attendant increase in the number of tough sentences imposed on individuals charged with drug crimes, and an increasing number of women offenders are at the receiving end of the tough sentences. Research shows that there has been an attendant significant increase in the number of women incarcerated for drug offences, this increase is especially marked where African American women are concerned. There is a dearth of research that focuses or examines the processes, from the women offenders’ perspective, that led from their arrest to their subsequent incarceration. This research attempts to do that, through the interview of women at Tennessee Prison for Women that were incarcerated for drug offences. The nature and type of their drug offences are discussed as well as comparative analysis of their narratives regarding the circumstances that led to their initial contact with the criminal justice system and their subsequent incarceration for drug offences.

Keywords: Drug Policies, Drugs, Crime, African American, Women, Incarceration.

INTRODUCTION
Throughout the course of recorded history, there has been some form of restriction or prohibition of narcotic, intoxicating or psychotropic substances. Such restrictions have taken various forms, from making it difficult to acquire the restricted substance to attaching penalties to the acquisition of such products. The goals of such restrictions or prohibitions are to help ensure that the prohibited substances are unavailable for general use. In United States, drug prohibition developed as a byproduct of alcohol prohibition prior to the 1920’s. But prior to alcohol prohibition, United States Congress enacted the Harrison Act in 1914, to help regulate purchase of narcotics over the counter.

The Harrison Act was precursor to current drug prohibition. The Act, prima facie did not appear to be a prohibition law. It appeared to be a bill that would tax and regulate the marketing of small quantities of heroin, morphine and other drugs, over the counter while necessitating a physician’s prescription for larger quantities. As such, registered physicians were merely required to keep records of drugs prescribed or dispensed (Brecher, 1972). It was “an Act to provide for the registration of, with collectors of internal revenue, and to impose a special tax upon all persons who, produce, import, manufacture, compound, deal in, dispense, sell, distribute, or give away opium or coca leaves, their salts, derivatives,
or preparations, and for other purposes (Brecher, 1972)." The (a) portion of the section 2 part of the Act states, "To the dispensing or distribution of any of the aforesaid drugs to a patient by a physician, dentist, or veterinary surgeon registered under this Act in the course of his professional practice only: Provided, that such physician, dentist, or veterinary surgeon shall keep a record of all such drugs dispensed or distributed, showing the amount dispensed or distributed, the date, and the name and address of the person to whom such drugs are dispensed or distributed; except such as may be dispensed or distributed to a patient upon whom such physician, dentist, or veterinary surgeon shall personally attend; and such record shall be kept for a period of two years from the date of dispensing or distributing such drugs, subject to inspection, as provided in this Act (Public Law No. 223)."

Thus it contained a provision for physicians that included the following, "in the course of his professional practice." This clause was widely interpreted by law enforcement agents to mean that an addict could not be prescribed opiates by the doctor. The reasoning was that since addiction was not considered a disease, therefore an addict could not be considered a patient of a doctor, so when there is no doctor patient relationship, the doctor could not prescribe opiates, since according to the above interpretation, it would not be supplied within the context of "in the course of his professional practice (Brecher, 1972).." The physicians that invariably prescribed opiates to patients, were largely arrested or had their careers ruined under this interpretation and some were subsequently convicted and imprisoned (Brecher, 1972). Due to this punitive enforcement members of the medical profession soon learned that it was detrimental to their practice and profession to prescribe opiates to addicts (Brecher, 1972). This interpretation of the Harrison Act was a precursor to the "War on Drugs." Thus the Harrison Act enabled federal control of narcotics and likewise established illegality of nonmedical use of narcotic drugs.

In 1930 drug prohibition was separated from alcohol prohibition by Congress (Levine & Reinarman, 1991). This separation led to creation of the Federal Bureau of Narcotics, which became the new Federal Drug Prohibition Agency. During the 1930’s the United States government with assistance from Federal Bureau of Narcotics, wrote and gained acceptance for two international anti-drug treaties that were targeted towards suppressing narcotics and “dangerous drugs.” The then newly established United Nations (UN) made drug prohibition one of its priorities in 1948, and by 1961 the UN single convention had established the current system of global drug prohibition (Levine & Reinarman, 1991). During the course of the last 80 years, drug prohibition has been supported by just about every type of government or political party, despite the fact that drug prohibition has not statistically reduced the amount of illegal drugs within the black market (Ogbonna & Nordin, 2009). When compared with the rest of the world, United States has one of the most punitive systems of drug prohibition. For instance, within United States long prison sentences are imposed for repeated possession, use and small scale distribution of forbidden drugs (Levine & Reinarman, 1991). The prohibitory policies of other western countries pale in comparison to that of USA, but no western country and very few third world countries have forms of drug prohibition that are as criminalized nor as punitive as that of United States (Levine & Reinarman, 1991). The vast majority of drug laws in the United States preclude probation or parole or sentencing discretion by judges, leading to an unprecedented number of individuals that are incarcerated for violating drug laws (Levine & Reinarman, 1991).

Currently there are about 0.5 million individuals in prison for violating drug prohibition laws and the majority of them are poor people of color that are serving time for possession or intent to sell small quantities of illegal drugs (Levine & Reinarman, 1991). This punitive prohibition against drugs have resulted in thousands of people being arrested, prosecuted and subsequently incarcerated for drug offences each year. This trend is especially troubling when research data point out that a
disproportionate number of those arrested and subsequently incarcerated for drug offences are poor and minorities. According to the US department of Justice, the overall percentage of violent federal offenders decreased from 17% to 10% for the period spanning 1990 through 2000, but on the other hand, as an offence category, drug offenders accounted for the largest percentage inmate increase (59%) followed by public order offender (32%)(Harrison, Paie & Beck, 2001). The proportion of minority offenders that are incarcerated for drug offences is much greater than their proportion within the general population. This is demarcated clearly when examining incarceration data. For instance for the year 2004, there were 250, 900 total state prison inmates, serving time for drug offences, out of that number 53.05% or 133,100 were black, 50,100 or 19.97% were Hispanic and 64,800 or 25.83 were white(Harrison, Paie & Beck, 2001). The percentage incarceration should be contrasted with population data by race. Census data for the year 2000 show that United States population for that year was 281,421,906 and out of that number, 33,947,837 or 12.1% were black while 12.5% or 35,305,818 were Hispanic and 194,552,774 or 69.1% were white. The rest of the population about 4.5% were Native Americans and Asians(U.S. Census Bureau, Department of Commerce, 2000). Thus the above data suggest that minorities are disproportionately arrested, prosecuted and subsequently incarcerated for drug offences. That does not mean that minorities use more illegal drugs at a disproportionately higher rate than whites. In fact research data indicate that there is marginal difference between the overall percentage of use between whites and black. Survey data from 2008 showed that illicit drug use amongst persons older than 12 were 10.1 percent for blacks, 9.5 percent for American Indians or Alaska Natives, 8.2 percent for whites, 7.3 percent of Native Hawaiians or Other Pacific Islanders, 6.2 percent for Hispanics, 3.6 percent for Asians and 14.7 percent for individuals that classified themselves as ethnically two or more races(Substance Abuse and Mental Health Services Administration, 2009). Therefore, based on the above research, the difference in illicit drug use between whites and blacks is a marginal 1.9 percent. That statistically small difference does not explain the reality, whereby blacks account for the majority of arrests, prosecutions and subsequent incarcerations for drug offences. Also according to a 1998 Federal Household survey, whites accounted for 72% of all illicit drug users i.e. about 9.9 million whites, while blacks accounted for 15% or 2.0 million users and Hispanics accounted for 1.4 million or 10 percent of all users1,2. But 36.8% of all those arrested for drug violations are blacks, and they constitute over 42% of inmates in federal prisons for drug offences. In state prisons, blacks constitute about 57% of those incarcerated for drug offences, while Hispanics account for 17.2% of state incarcerations for drug offences3,4.

Invariably these data would indicate that current drug policies have a disproportionate enforcement and incarceration impact on minorities. It should also be noted that there is a disparity in sentencing specifically between cocaine possession and crack possession. The U.S. Sentencing commission adopted the guidelines that 1 gram of crack is the equivalent of 100 grams of cocaine. Thus under federal law5, conviction for sale of 5 grams of crack would result in a mandatory sentence of 5 years, while a person would have to sell 500 grams of cocaine to be meted the same punishment6. The

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2 Bureau of Justice Statistics, Sourcebook of Criminal Justice Statistics 1998 (Washington DC: US Department of Justice, August 1999). P. 343, Table 4.10, p 435, Table 5.48 and p. 505, Table 6.52
3 Beck, Allen J., PhD and Mumola, Christopher J., U S Department of Justice, August 1999)p. 10 Table 16;
5 During the “crack” Epidemics of the 1980’s, the Anti-drug Abuse Act of 1986 (Pub. L. No. 99-570, 100 Stat. 3207) was passed by Congress to try to curb the increased use of crack.
6 It should be noted that as of June 30, 2010, Congress passed a bill that increases the minimum amount of crack required to trigger a 5 year minimum sentence from 5 grams to 28 grams. The bill was signed in August 2010 by President Obama. The bill effectively reduced
current federal guidelines for first-time offence for possession of crack cocaine is five years in prison with no possibility of parole, since there is no parole at federal prisons, while possession of five grams of cocaine which is purer pharmacologically is treated as a misdemeanor. The majority of crack users are poor and minorities, since crack is a much cheaper derivative of cocaine, this fact could help explain why blacks make up less than 13% of drug users but comprise more than 44% of incarcerated drug offenders. This disproportionate incarceration impact, lends itself to breakdown in social structures for affected minority families.

This is especially important when considering current rates of drug incarceration for women and especially for women of color. Stricter drug enforcement laws have led to an increasing number of women being incarcerated for drug offenses, but this increase is disproportionately much higher where women of color or women from lower socioeconomic background are concerned. Regardless of the fact that these women have minimal to no contact with organized drug trade, yet under the auspices of stricter and more expansive drug laws they are harshly prosecuted and in a lot of cases subsequently incarcerated (Ogbonna & Nordin, 2009). The number of women incarcerated in state prisons, nationally for drug offences increased about 888% for the period spanning 1986 through 1999 and African American and lower socioeconomic women account for a greater proportion of the increased incarcerations (Chambliss, 2001). This does not mean that drug use is relegated predominantly to people of color or indigent individuals, nor does it mean that upper income women do not abuse drugs. In fact according to a 1997, National Household Survey on drug abuse, 34.3% of Caucasian women, 24.9% of African American women and 19.2% of Latina respondents, indicated that they have used illegal drugs in their lifetime. There was no significant demarcation with regards to socioeconomic strata, but the study, indicated that illegal drug use had increased amongst women, in general. One glaring fact that stands out when the “War on drugs” is examined in detail is that drug enforcement is usually focused for the most part on inner city, lower income neighborhoods. There has been a plethora of studies that indicate that focus and enforcement is staunchly focused on inner cities. According to Welch and Angulo, our criminal justice system, while prima facie neutral, is enforced in a manner that is biased against minorities and indigent individuals (Welch, Angulo & Carlos).

The “War on drugs” has fueled a growth in incarceration rates. It is important to note that from a policy perspective, this has led to increased swath of disenfranchisement amongst minorities and indigent individuals, whom are the most affected by current punitive drug policies. Policy wise, harsh punitive drug policies lead to overcrowding within prisons and attendant efforts to build more prisons to accommodate the growth. This means that federal or state funds that could have been directed towards educational or social programs are increasingly being diverted towards prison construction and management, leaving in their wake an increasing caste of drug convicts. Billions of dollars have been spent on the “War against Drugs.” The idea that current USA drug policy is a failure has been espoused by many notable policy writers. For instance author, Dr Karl Bowman noted decades ago that our drug policy is a virtual failure. He convincingly made the case for a change in drug policy (Bowman, 1958). Accordingly, he stated as follows:

“For the past 40 years we have been trying the mainly punitive approach; we have increased penalties, we have hounded the drug addict, and we have brought out the idea that any

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8. Ibid.
person who takes drugs is a most dangerous criminal and a menace to society. We have perpetuated the myth that addiction to opiates is the great cause of crimes of violence and of sex crimes. In spite of the statements of the most eminent medical authorities in this country and elsewhere, this type of propaganda still continues, coming to a large extent from the enforcement bureaus of federal and state governments. Our whole dealing with the problem of drug addiction for the past 40 years has been a sorry mess” (Bowman, 1958).

The above viewpoint is quite compelling when data relating to drug issues are analyzed. It is important to note that while United States has as a matter of policy one of the most punitive approaches to the drug problem, there is no conclusive data that would suggest that this policy as a whole has significantly impacted the availability or supply of drugs (Bewley-Taylor, 2005). Literature review data indicate that such drug policies or laws disproportionately affect people of color or indigent individuals and women are increasingly being incarcerated for minor drug offences. For instance, there was 200 percent increase in the number of incarcerated females in both state and federal institutions for the period spanning 1985 to 1995. And the majority of these women were incarcerated for non violent drug offences (Bewley-Taylor, 2005).

The social and economic effects of increased female incarceration cannot be over emphasized. Research indicates that offspring’s of incarcerated individuals have various ranging emotions regarding incarceration of their parent (Feinman, 1994). These emotions can range from guilt, shame, rejection and lack of trust as they try to process the fact of their parent’s incarceration; they also experience loss of family ties (Richards, 1992). Some of these children are impacted significantly in life by the fact that one or both their parents are incarcerated. This is especially true when considering incarceration of women with minor children. Children are impacted more profoundly and more negatively when their mothers are incarcerated as opposed to when their fathers are incarcerated (Catan, 1992). Women are usually the primary caregivers of these children and when they are incarcerated, the children would most likely experience loss of their primary caregiver, change in residence and separation from siblings as they are sent out to live with other relatives (Reilly & Martin, 2010). Since incarceration of women has increased more drastically within the past two decades, research of factors leading to such increase is called for.

METHOD

This quantitative research analyzed data pertaining to factors and circumstances leading to incarceration of women drug offenders in Tennessee. There were a total of 159 women incarcerated at Tennessee prison for women for drug offences. African American women comprised 60 or 37.7%, while Caucasian women comprised 99 or 62.3% of the inmates. The percentage data should be contrasted with the percentage population of African Americans in TN which is 17%. Thus African Americans are disproportionately incarcerated with regards to their percentage population within the state. This racial disparity is well documented in studies such as the 2008 study by King that shows that African-Americans were “3.4 times more likely to be arrested for a drug offense than whites” (King, 2008) or Blumstein who stated that there is high disproportion in incarceration rates for African-Americans versus whites (Blumstein, 1993).

Prison data for all 159 inmates showed that only one of the inmates had reportedly earned a graduate degree. Three of them had reportedly earned college degrees. All four were Caucasian women. Only 26 or 43.4% of the African American inmates had earned grade 12 education or above, while 56 or 57.8 % of the Caucasian inmates had grade 12 education or above. This data indicates that upon release,
the inmates are not generally well qualified for the job market. This is an important point, because if the inmates have neither marketable skills nor education upon release, there would be a high probability of recidivism. If better education increases the probability of garnering a viable legal employment and as such theoretically removes the necessity for sale of drugs to support oneself, the educational level of inmates becomes a determining factor with regards to incarceration or recidivism. This is especially important when considering the fact that upon release these inmates will be competing for jobs with a felony record. The prison offered a GED program as well as vocational training. There is likewise a pilot program offered at the prison that is structured in a way as to allow a very few selected inmates to take up to six classes over a two year period.

When type of offense is analyzed by race, Table 1.0, for all drug offenders at Tennessee Prison for Women (TPFW), the data shows that African-Americans at 57 or 95% are incarcerated at a rate of 1.5 times more for schedule II drugs than Caucasians at 65 or 65.7%. All of the 159 women were slated to be interviewed but during the interviewing process some of the women were either transferred, on work release or were sick or not available for the interviews. Thus a total of 60 women out of the 159 were interviewed. The summary research results and tables culled from the interview of the 60 respondent inmates are discussed in the section that follows.

Table 1.0: Type of Offence

<table>
<thead>
<tr>
<th></th>
<th>African-American</th>
<th>Caucasian</th>
<th>Total</th>
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<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
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<tr>
<td>Schedule I</td>
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<td></td>
<td></td>
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<tr>
<td>Schedule II</td>
<td>57</td>
<td>95.0%</td>
<td>65</td>
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<tr>
<td>Schedule III</td>
<td>1</td>
<td>1.7%</td>
<td>8</td>
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<tr>
<td>Schedule IV</td>
<td>3</td>
<td>3.0%</td>
<td>3</td>
</tr>
<tr>
<td>Schedule V</td>
<td>1</td>
<td>1.7%</td>
<td>2</td>
</tr>
<tr>
<td>Schedule VI</td>
<td>1</td>
<td>1.7%</td>
<td>2</td>
</tr>
<tr>
<td>Attain Obtain Drugs By Fraud</td>
<td>9</td>
<td>9.1%</td>
<td>9</td>
</tr>
<tr>
<td>Promote Manufacture Meth</td>
<td>3</td>
<td>3.0%</td>
<td>3</td>
</tr>
<tr>
<td>Drugs - Certain Amounts</td>
<td>1</td>
<td>1.0%</td>
<td>1</td>
</tr>
<tr>
<td>Drugs: Mfg,Sale,Poss</td>
<td>1</td>
<td>1.7%</td>
<td>4</td>
</tr>
<tr>
<td>Promoting Manufacture Of Meth</td>
<td>2</td>
<td>2.0%</td>
<td>2</td>
</tr>
<tr>
<td>Simple Poss/Casual Exchange - 3rd Offense</td>
<td>1</td>
<td>1.0%</td>
<td>1</td>
</tr>
<tr>
<td>Unlawful Drug Paraphenalia</td>
<td>1</td>
<td>1.0%</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0%</td>
<td>99</td>
</tr>
</tbody>
</table>

*Note.* When type of offense is analyzed by race, for all drug offenders at Tennessee Prison for Women (TPFW), the data shows that African-Americans at 57 or 95% are incarcerated at a rate of 1.5 times more for schedule II drugs than Caucasians at 65 or 65.7%. These measures were generated from Ogbonna & Nordin, 2009.

RESULTS

This section provides summary and comparison data based on the responses of the 60 interviewed inmates. All the inmates were asked the same core questions. There were 18 African American respondents and 42 Caucasian respondents.

With regards to circumstances of the respondents’ arrest, 71.7% or 43 of the inmates interviewed have had prior drug arrests before the immediate arrest that led to their current incarceration. The rest 17 or 28.3 % had no prior arrest subsequent to the immediate drug arrest that resulted in their current incarceration. African-American respondents had prior drugs arrests at a rate of 77.8% or 14 respondents compared to Caucasian respondents at 69.0% or 29 women. When circumstances of first
drug arrests are analyzed, it shows that sale of drugs (16 or 88.9% of African Americans and 24 or 57.1% of Caucasians) was the main reason for the respondents first ever drug arrest. Drug possession came in a distant second at 2 or 11.1% for African Americans and 10 or 23.8% for Caucasians. No African American was arrested for fraud, manufacturing or prescription fraud as a first drug arrest. While for Caucasians, 5 or 11.9% were arrested due to fraud, two or 4.8% were arrested due to drug manufacturing and one or 2.4% was arrested for prescription fraud. Thus Caucasians were twice as likely as African Americans, to be arrested for possession, whereas African Americans were about 1.5 times as likely to be arrested for selling (Ogbonna & Nordin, 2009). Although drug arrests are specific to drug crimes, it is necessary and important to understand the instance of the inmate’s initial contact with the criminal justice system. This would therefore involve a comprehension of the specific violation of criminal law that led to the inmate first initial contact with police or criminal justice system. The study showed that two significant respondents’ reasons for the initial criminal justice contact were selling drugs at 51.7% and possession of drugs at 13.3%. That is a total of 78.3% relating to drug charges. Sales, manufacturing and prescription fraud are the prime reasons for the inmate’s initial contact with the criminal justice system. On the other hand, 21.7% of the inmates interviewed had their initial arrest for non-drug type offenses. This indicates that nearly three quarters of the individuals interviewed broke drug laws for their first offense and then continued to break drug laws in later crimes. It is noteworthy that 51.7% sold drugs and many of them did so to support a habit or to make a living (Ogbonna & Nordin, 2009). Selling drugs as a means of supporting a habit is indicated in various research dealing with drug offences. In fact a National 2004 study by the US Department of Justice states that “17% of state prisoners and 18% of federal inmates said they committed their current offense to obtain money for drugs,” (US Department of Justice, 2006).

The implication is that since drugs can only be purchased expensively on the black market and as such are very prohibitive to many users, the only way for a drug user to be able to afford illegal drugs is to then sell them back into the same market place (Ogbonna & Nordin, 2009). According to Boaz of the Cato Institute it is because of drug prohibition that there is a new set of economics that forces users to commit crimes to pay for the drugs they use (Boaz, 1999).

An overwhelming majority of the interviewees indicated that they also used the drugs they were selling. Ninety-one point seven percent of them abused the drugs they were selling. Thus on average, about 9 out of 10 respondents were users when they were apprehended for drug offences. A total of 41 Caucasians or 97.6% and 14 African-Americans or 77.8% abused the drugs they had for sale. This supports the premise of various researchers who postulate that women often sell drugs to support their drug consumption habit.

The question that then begs to be asked from these data results is, why do these women progress from using to dealing which led to their subsequent incarceration for drug offences? Since 71.7% of them had multiple arrests for drugs and were aware of the consequences of using and or selling drugs, it would then seem that some more effective community or prison rehabilitation programs would be more beneficial than arrests (Ogbonna & Nordin, 2009).

Various research studies have shown that females that were abused have more of a tendency to abuse drugs, than females that were not abused. It would seem that such girls that end up abusing drugs try to utilize the drugs as a panacea to their emotional hurt stemming from the abuse they had experienced. As such, abused women may turn to drugs as a means of numbing the pain of the trauma from the experienced abuse, (Chu, 1998) or they may feel emotionally numb from the experience and
Incarcerated Women Drug Offenders in Tennessee: A Research Study

subsequently engage in risk taking behaviors to feel alive again (Briere, 1996). A significant proportion of the interviewed respondents stated that they were abused as children. Thus there might be a possible relationship between these respondents’ abuse and their subsequent abuse of drugs. Kendler et. all surveyed 1411 female adult twins and concluded from his survey research that young girls who were sexually abused were four times more likely to become drug or alcohol dependent (Kendler, et al, 2008). Different other studies point to the co-relationship between abuse and increased propensity for incarceration (Frye, El-Bassel, Gilbert, Rajah & Christie 2001), (Katz, 2000). The Tennessee women’s prison survey indicated that 25% of the women respondents stated that they were abused as young children. Out of that number 22.2% or four African Americans were abused as children while 26.2% or eleven Caucasians were abused. Some of the respondents indicated that the abuse started as young as when they were 6.5 years old.

Various researches focusing on women and drugs also show that females that abuse drugs can also have an underlying mental condition. This is known as co morbidity. According to National Institute on Drug Abuse, comorbid drug abuse and mental illness can occur due to three scenarios,

- drug abuse can cause a mental illness
- mental illness can lead to drug abuse
- drug abuse and mental disorders are both caused by other common risk factors (National Institute on Drug Abuse, 2007).

According to the respondents’ responses, shown in table 1.1, 15 or 83.3% of African Americans and 24 or 57.1% of Caucasians reported no mental illness. Of those that reported having mental illness, Caucasians reported being diagnosed with depression and or bi-polar disorder at a rate that is more than twice that for African Americans. That is interesting since research studies would suggest that the number should be higher. But it should be noted that some of the respondents had not had the opportunity for consistent medical care, until they were incarcerated. Some of them stated that they were subsequently diagnosed while in prison.

Table 1.1: Percent of inmates interviewed that were treated or diagnosed as having a mental condition, depression, schizophrenia, bipolar disorder.

<table>
<thead>
<tr>
<th></th>
<th>African American</th>
<th>Caucasian</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>No mental Condition</td>
<td>15</td>
<td>83.3%</td>
<td>24</td>
</tr>
<tr>
<td>Depression, bipolar disorder</td>
<td>3</td>
<td>16.7%</td>
<td>18</td>
</tr>
<tr>
<td>Grand Total</td>
<td>18</td>
<td>100%</td>
<td>42</td>
</tr>
</tbody>
</table>

There were differing circumstances that resulted in the arrest and subsequent incarceration of the respondents. The circumstances provide an interesting insight into law enforcement strategies for apprehending drug users. Table 1.2 and 1.2i, show that the majority of respondents, 33 or 54% were arrested for selling to informants or undercover police officers. Undercover or informant sales accounted for 12 or 66.7% of African Americans arrest and 21 or 50% of Caucasian arrest. Thus African American women are more likely to be arrested by informant or undercover sales. It should be noted that informants are current drug users or dealers whom in exchange for non-penalty and payment
will turn in other drug offenders. So in essence, a part of the war on drugs, inadvertently sanctions the paying of drug offenders, or waiving of prosecution of known drug offenders, such that they can act as informants in the arrest and subsequent prosecution of other drug offenders (Ogbonna & Nordin, 2009). These informants get governmental money and can practically be assured that they do not have to serve time (despite their continued drug offences) so long as they continue to act as informants against their peers.

Table 1.2: Circumstance of Arrest

<table>
<thead>
<tr>
<th></th>
<th>African-American</th>
<th>Caucasian</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Informant -sell to</td>
<td>12</td>
<td>66.7%</td>
<td>18</td>
</tr>
<tr>
<td>Violating parole</td>
<td>5</td>
<td>27.8%</td>
<td>11</td>
</tr>
<tr>
<td>Possession</td>
<td>1</td>
<td>5.6%</td>
<td>4</td>
</tr>
<tr>
<td>Scrip fraud</td>
<td>4</td>
<td>9.8%</td>
<td>4</td>
</tr>
<tr>
<td>Undercover - sell to</td>
<td>3</td>
<td>7.3%</td>
<td>3</td>
</tr>
<tr>
<td>Prescription resale</td>
<td>1</td>
<td>2.4%</td>
<td>1</td>
</tr>
<tr>
<td>Search warrant</td>
<td>1</td>
<td>2.4%</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>100.0%</td>
<td>42</td>
</tr>
</tbody>
</table>

Note. The majority of respondents, 33 or 54% were arrested for selling to informants or undercover police officers. Undercover or informant sales accounted for 12 or 66.7% of African Americans arrest and 21 or 50% of Caucasian arrest. Thus African American women are more likely to be arrested by informant or undercover sales.

Table 1.2i: Condensed Circumstance of Arrest

<table>
<thead>
<tr>
<th></th>
<th>African-American</th>
<th>Caucasian</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Sell to inform/undercover</td>
<td>12</td>
<td>66.7%</td>
<td>21</td>
</tr>
<tr>
<td>Others</td>
<td>6</td>
<td>33.3%</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>100.0%</td>
<td>42</td>
</tr>
</tbody>
</table>

Note. It should be noted that informants are current drug users or dealers whom in exchange for non-penalty and payment will turn in other drug offenders.

Studies show that economically, more well off defendants can hire private attorney, but the majority of indigent offenders have to utilize public defenders since they can’t afford private attorneys. The majority of respondents, a sum total of 43 or 71.7% utilized the services of public defenders. Twelve or 66.7% of African American and 31 or 73.8% of Caucasian respondents’ utilized public defenders, the rest utilized the services of private attorneys. Although there is no conclusive evidence that utilization of public defender is disadvantages to the defendant’s outcome in a criminal case, anecdotal evidence would suggest that outcomes are better with utilization of private attorney.

All the inmates that were represented by public defenders stated that they opted to plea bargain with advice of their attorneys. Plea bargaining is the process whereby a defendant will opt to plead guilty of a lesser charge rather than going through trial. The expectation is that with plea bargaining the defendant will get less time than they would have gotten if they had gone through court trial. In some instances you have defendants that plea bargain even when they did not commit the crime.
When women are incarcerated for drug offences their children are usually bereft of their main guardian and parental support. Children are more negatively impacted when their mothers are arrested than when their fathers are arrested. Studies convincingly point to the fact that if these children grow up without a parent or stable home, they will more likely end up inclined to break the law (Myers, et al, 2004; Ogbonna & Nordin, 2009). In most instances the mothers provide the stability for the children and are the primary caregivers of the children. Thus the incarcerations of women, especially for minor drug offences, tend to have far reaching effects on the lives and future of their off spring. Data from Table 1.3 shows that only 18 or 30 % of the respondents reported not having children, while 42 or 70.0% of them have children. There were a total combined number of 96 children between the 42 women that reported having children. These 96 children were thus left without a primary care giver while their mothers were incarcerated. According to the inmates’ their children were being cared for or raised by aunts, uncles, grandparents or fathers. The potential impact on these children is described in a study by Myers. The author found in his research, that the change in caregivers led the children to internalize and externalize their problems and often they performed poorly at school and in a number of cases turn to eventual criminal behavior (Myers, et al, 2004). Thus according to the study, incarceration of the mothers had a negative impact on their off springs. Likewise a Bureau of Justice Study indicated that mothers’ incarceration, subsequently lead to the development of a future generation of offender as evidenced by the study research data that indicated that 70% of the juveniles in prison on a national level were reported to be from single parent families (Beck, 1987).

Table 1.3: Offspring per Inmate

<table>
<thead>
<tr>
<th># of Children</th>
<th>African American</th>
<th>Caucasian</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>0</td>
<td>5</td>
<td>27.8%</td>
<td>13</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>16.7%</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>27.8%</td>
<td>10</td>
</tr>
<tr>
<td>3+</td>
<td>5</td>
<td>27.8%</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100.0%</td>
<td>42</td>
</tr>
</tbody>
</table>

Note. Data from Table 1.3 shows that only 18 or 30 % of the respondents reported not having children, while 42 or 70.0% of them have children. There were a total combined number of 96 children between the 42 women that reported having children. These 96 children were thus left without a primary care giver while their mothers are incarcerated.

DISCUSSION AND CONCLUSIONS

Once inmates have served their time and are released on parole for completion of their sentence, it is important, that they have the necessary community foundations or rehabilitative or support services that will keep them from re-offending and subsequently being re-incarcerated. Without rehabilitative services that help wean them from their addictive and criminal behavior it will be difficult for former inmates not to reoffend once released. It is also necessary to have in place a program that would help with their successful transition back into their communities. Often transition programs are measured by whether or not the parolee or a former inmate that has served their time ends up coming back to prison or in the case of parolee, before the parole period has ended. If that happens then recidivism has occurred. Usually such parole violations are often derivatives of the same original crime. With regards to this study, there is a high percentage of parole failure, 41 or 68.3% of the inmate respondents were at one time imprisoned for parole violations. The causes for the stated parole violations were non-violent and...
they included being in a house when an arrest was made; not being able to find transportation to get to
the parole meeting, and, not passing the drug test. The cost of returning an offender to prison for this
violation may not serve the public interest or provide additional safety to society.

About three quarters of respondent inmates seem to think that prison programs have rehabilitated
them, but whether that belief will hold true when they are released remains to be seen. Although while
in the closed and controlled environment of the prison, the respondents considered the programs
effective, it is feasible that the prison programs will not be effective when they actually get back to their
respective communities, a future analysis of recidivism will indicate how effective the rehabilitative
programs offered at the prison had been in preventing recidivism. But invariably it is more prudent to
spend money on programs that will preclude behaviors that result in recidivism or breaking the law in
the first place. To that end, the focus should be on addressing the underlying issues why there has
been this unprecedented growth in the number of women, especially African American women,
incarcerated for drug crimes.

It is important to reconcile policy with research, and various research have shown that current strictly
punitive drug policies are not working. Such policies have neither stemmed the amount of illicit drugs
available nor have they had a substantial impact on addiction rates. Thus there is a need to focus on
policy initiatives that will actually have a positive impact on the drug issue in this country. Lessons can
be learned from prohibition and its attendant consequences. Most recently there has been a move by
various states to legalize marijuana and thus benefit from sales that will result from such legalization of
marijuana. There also seems to be an imperceptible softening by President Obama’s administration
with regards to Federal marijuana raids in states with legally established medical marijuana clubs.
Current Attorney General Eric Holder stated in February 2009, that there will be no more Justice
Department raids on medical marijuana clubs that were legally established under state law. And as
mentioned previously, as recently as August 2010, President Obama signed into effect a law that will
reduce sentencing disparity of cocaine versus crack from 100 to 1 to 18 to 1.

Inherent in these actions, is the subtle indication that mayhaps our once fiercely State and Federal
wide punitive drug stance is softening. But it must be noted that on Nov 2nd 2010, California voters
rejected Proposition 19, which would have made California, the first in the nation to legalize the use and
sale of marijuana. None the less in order to reconcile policy with research, it is important to focus
detailed research on the myriad circumstances leading to incarceration of drug offenders. Such
research will invariably and hopefully lead to policies that will better reflect the need as a society to
mitigate the circumstances leading to drug offences and provide effective rehabilitation for addicted
individuals especially women whom comprise a greater portion of caretakers for children.

This research was directed towards the goal of understanding the circumstances that lead to arrest and
subsequent incarceration of women drug offenders in Tennessee, but it must be recognized that there
were certain limitations of the research study. Such limitations include the fact that the interviews were
based on self report and as such there was no feasible way to ascertain the validity of the respondents’
statements regarding the circumstances leading to their incarceration. Likewise, all 159 inmate drug
offenders were initially supposed to have been interviewed, but due to study attrition, illness, work
study, or disinclination to be interviewed, only 60 drug offender inmates ended up being interviewed for
this research. It must also be noted that the Tennessee Prison for Women was not selected randomly
but chosen for convenience. It will be interesting to see if the study findings will be replicated if prisons
are selected randomly nationwide.
Future research will need to focus on the possibility of political consensus for proactive policies, such as prevention, education, treatment and rehabilitation. Further research will likewise indicate if there is political atmosphere and will for revamping current drug policies towards more treatment and rehabilitative policies. Future studies will also help indicate conclusively if alternatives to incarceration for non violent drug offences will significantly mitigate the number of incarcerated offenders as well as the number of addicted individuals.

REFERENCES


Public Law No. 223, 63rd Congress, approved December 17, 1914.


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12 point Arial Narrow bold italic font, left aligned, capitalize each word.

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12 point Arial Narrow italic font, left aligned, first word capitalized.

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