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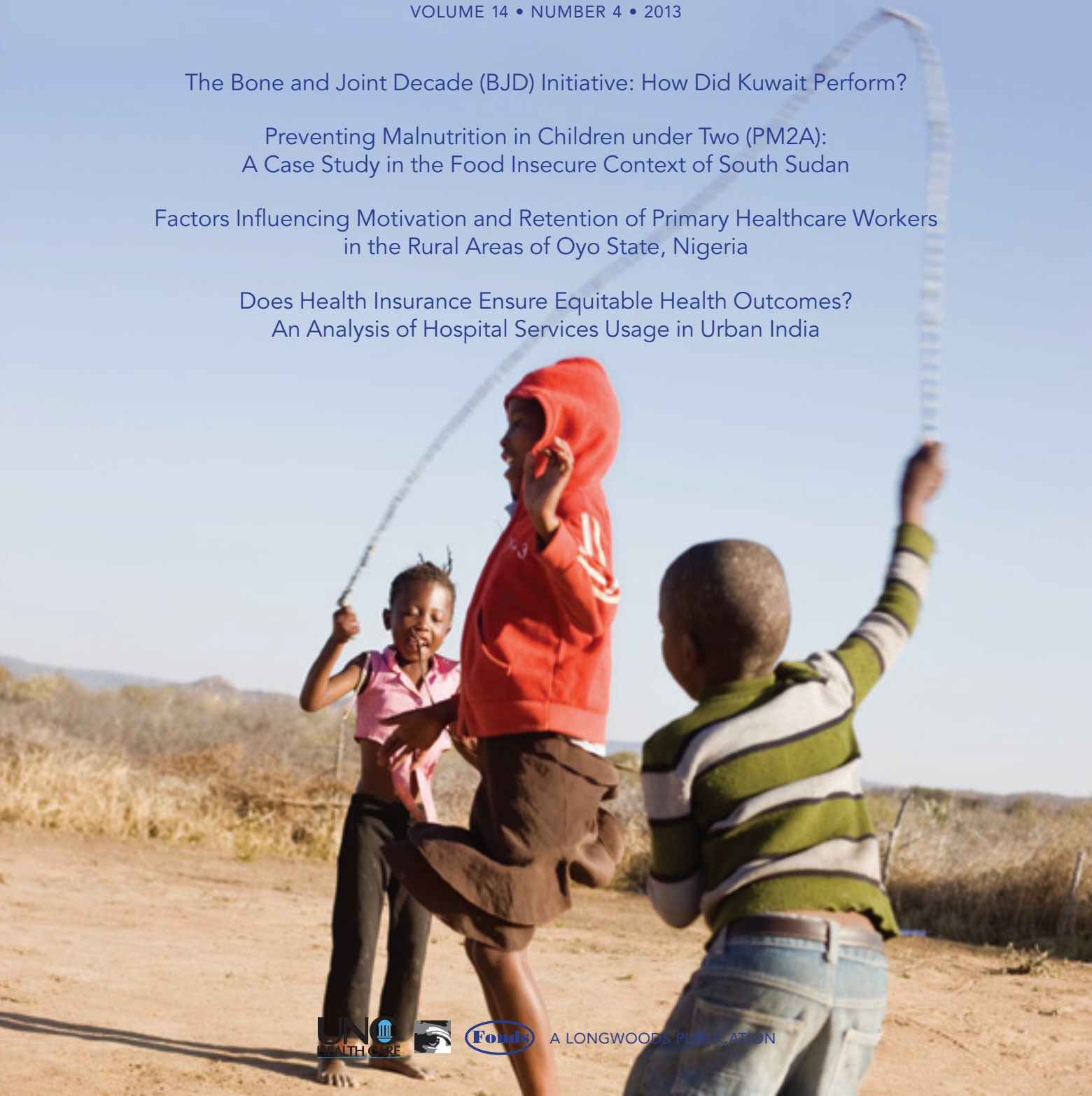
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The Bone and Joint Decade (BJD) Initiative: How Did Kuwait Perform?

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A Case Study in the Food Insecure Context of South Sudan

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in the Rural Areas of Oyo State, Nigeria

Does Health Insurance Ensure Equitable Health Outcomes?
An Analysis of Hospital Services Usage in Urban India



3 From the Editor-in-Chief

John Paul

Commentary

5 The Bone and Joint Decade (BJD) Initiative: How Did Kuwait Perform?

Elham Hamdan, Fawzi F. Bouzubar and Michel D. Landry

Original Research

12  **Preventing Malnutrition in Children under Two (PM2A): A Case Study in the Food Insecure Context of South Sudan**

Shannon Doocy, Hannah Tappis, Amy Paul, Rolf Klemm and Sonya Funna

23  **Factors Influencing Motivation and Retention of Primary Healthcare Workers in the Rural Areas of Oyo State, Nigeria**

Ayodele S. Jegede, Prisca Adejumo and Boniface Ayanbekongshie Ushie

38  **Does Health Insurance Ensure Equitable Health Outcomes? An Analysis of Hospital Services Usage in Urban India**

Mousumi Dutta and Zakir Husain

52 Thank You to Our Reviewers



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From the Editor-in-Chief

This issue of *World Health & Population* presents a commentary and three original research papers that should be of interest to our readers. The papers have all been published online by WHP during the last quarter and are selected here as representative of recent outstanding contributions to the journal.

The first paper in this issue is an update on the progress of Kuwait in meeting the objectives at the country level of the 2000 World Health Organization-decreed Bone and Joint Decade (BJD). Although the Millennium Development Goals (MDGs) have consumed much of the world's attention over the last 10 years, it is important to remember that there are many other health issues facing us, in particular those concerned with chronic diseases such as the musculoskeletal issues addressed by the BJD. Elham Hamdan, Fawzi Bouzubar and Michel Landry report on the achievements of one country, Kuwait, on meeting BJD objectives for that country. Performing a straightforward and useful gap analysis, the authors conclude that much remains to be done in this area, although the goals are reachable. This kind of "final report" on a program at the national level is very helpful for holding ourselves accountable and preparing the groundwork for the next initiatives.

"Preventing Malnutrition in Children under Two (PM2A): A Case Study in the Food Insecure Context of South Sudan," by Shannon Doocy, Hannah Tappis et al., brings us back to thinking in terms of the MDGs. Doocy and colleagues describe a relatively new, integrative and holistic approach, called PM2A, that has been adopted by the United States Agency for International Development (USAID) to improve the effectiveness of non-emergency food aid programs. The comprehensive PM2A approach includes health education and food rations for families as well as avoiding diversion of the specific rations for mothers and infants. The authors conducted a mixed-methods study of PM2A implementation in South Sudan in 2011–2012 and concluded that the approach, although undeniably helpful, was insufficient to fully address household food insecurity. The extraordinarily difficult issues faced by the newly emerging nation of South Sudan may overwhelm the designs of all assistance programs; however, efforts, aid and adaptations need to continue. Doocy et al.'s analysis and evaluation is very helpful in moving us in this direction.

In our third paper, Ayodele Jegede, Prisca Adejumo et al. examine factors influencing motivation and retention of primary healthcare workers (PHCWs) in rural Nigeria, using a survey approach based on qualitative interviews. They found that PCHW motivation and retention are based on multiple critical factors, and no one magic bullet exists. Both financial and non-financial incentives are important. Issues around human resources for health (HRH) are critical for all countries in the world, but are particularly challenging in resource-constrained settings and in light of the transition from a focus on acute, infectious disease-based primary care to more chronic and prevention-oriented services. *World Health & Population* published a theme issue on HRH in 2011 (WHP 13:2, December 2011). Jegede et al.'s paper in this issue continues the HRH theme and focus.

"Does Health Insurance Ensure Equitable Health Outcomes? An Analysis of Hospital Services Usage in Urban India" is the subject of the fourth paper in this issue. Economists Mousumi Dutta and Zakir Husain analyze survey data on socio-economic status (SES) and health insurance status in terms of utilization of in-patient care. The analysis is restricted to the urban sample of the extremely large India-wide Morbidity and Health Care Survey of 2005–2006. In the urban sample alone, only 2.86% were covered by insurance; for the rural sample, insurance coverage was essentially zero. Econometric models examined both moral hazard and adverse selection,

concluding that SES factors, more than health insurance status, determine hospital utilization. Health insurance coverage by residents of India, already a rare attribute, has yet to make an impact in significantly increasing use of hospital-based care.

We hope that you find the papers in this issue interesting and worthwhile, and that you will also consult others recently released online at www.worldhealthandpopulation.com. We would also like to take this opportunity to thank our reviewers for the last year. Their names, so far unknown to our contributors, appear at the back of this issue. Their anonymous observations, comments and suggestions immeasurably improved the quality of the papers submitted to our journal and made the editor's job possible. Thank you very much.

In summary, WHP remains committed to its mission to provide a forum for researchers and policy makers worldwide to publish and disseminate health- and population-related research, and to encourage applied research and policy analysis from diverse global and resource-constrained settings. WHP is indexed on MEDLINE and is accessible through PubMed. We look forward to continued enthusiastic submission of manuscripts for consideration, peer review and publication. Finally, please note that the editors and publishers of WHP are always interested in any comments or suggestions you might have on the papers or about the journal and our mission. Please feel free to call, write or e-mail us.

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The Bone and Joint Decade (BJD) Initiative: How Did Kuwait Perform?

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Abstract

Background: The World Health Organization proclaimed the period between 2000 and 2010 as the Bone and Joint Decade (BJD). The BJD initiative set out to raise awareness regarding increasing incidence of musculoskeletal (MSK) conditions. The objective of this study was to assess the degree to which the BJD goals were met in Kuwait.

Methods: A gap analysis methodology was used to identify differences between the ideal state, defined as achieving the BJD goals, and the current state, defined as the extent to which BJD goals were achieved.

Results: Our gap analysis indicated that the majority of the BJD targets were not met in Kuwait; however, given the rising assumed incidence and prevalence of MSK disorders in Kuwait, it is critical to outline mechanisms for moving forward.

Conclusions: The BJD goals are reachable in Kuwait. Attaining them requires a strong and sustainable commitment at many levels of government, provider organizations and the research community.

Introduction

The World Health Organization (WHO) proclaimed the period between the years 2000 and 2010 as the Bone and Joint Decade (BJD) (BJDonline 2011). When the WHO launched this 10-year global initiative, the prevailing policy purpose was to urge governments around the world to more fully address the mounting concerns regarding musculoskeletal (MSK) conditions among populations and to seek ways to reduce the social, financial and societal burden associated with chronic and disabling conditions. Musculoskeletal disorders primarily affect bone and joints and include (but are not limited to) conditions such as arthritis, chronic back pain and traumatic injuries. These types of conditions are a leading cause of pain and disability, have tremendous impact on individuals, their families and society in general (WHO 2003), and are one of the leading variables that contribute to the global burden of disease (Brooks 2006).

The overarching public health objective of the BJD initiative, which was signed by 37 countries, was to improve the lives of people living with MSK conditions and to advance the understanding and treatment of MSK disorders through prevention, education and research. During the BJD, annual global conferences generally concluded that progress was being made toward the BJD goals. According to Choong and Brooks (2012), this decade was marked with significant advances in healthcare delivery, ranging from improved surgical techniques and advances in bioengineering to rapid introduction of biologics for rheumatoid arthritis. While assertions have been made that progress toward the BJD goals has been achieved, it is not clear that all signatory countries have achieved these desired outcomes, or even if they were in the process of identifying, collecting and analyzing relevant data. Now that the BJD has ended, it may be instructive to assess the extent to which BJD goals have, or have not, been met at the country-level across the constellation of signatory nations.

The country of Kuwait represents an interesting policy case study because while rapid social and economic development occurred during the decade between 2000 and 2010, there were also growing research-based and widespread assumptions that MSK conditions were having an increasing effect on the health and well-being of the population. For instance, Al-Awadhi et al. (2004) reported functional disabilities in almost 40% of adults living in Kuwait, with females experiencing more disability than males. Several other studies have reported that MSK disorders are common occupational health problems across Kuwait, ultimately leading to work disabilities that decrease productivity and consume excessive healthcare resources. Alrowayeh et al. (2010) demonstrated that approximately 48% of a sample of physical therapists working in Kuwait had reported a work-related MSK injury during a 12-month period. Akrouf et al. (2010) conducted a cross-sectional study of 750 bank officers in Kuwait that revealed 80% of the participants had suffered from at least one incident of work-related MSK disorders in the previous year. Al-Rayes et al. (2012) investigated 397 dentists working in Kuwait and found that almost 90% of the sample had complained of work-related MSK disorders during the past year. These studies emphasize the scope of MSK disorders in Kuwait and suggest an increase in the incidence and prevalence of MSK disorders within the country.

The effect of growing rates of MSK disorders has also produced negative socio-economic impacts (Akrouf et al. 2010; Al-Rayes et al. 2012; Alrowayeh et al. 2010). However, surveillance and/or epidemiological data about MSK conditions are mostly unavailable, and there is little publicly accessible regional information regarding the impact of the impairments, activity limitations and participation restrictions associated with MSK conditions. The primary objective of this study was to conduct a gap analysis to assess the extent to which Kuwait achieved the BJD by identifying the difference between the current status and desired outcomes. Ethics approval for this study was obtained through Kuwait University.

Methods

The gap analysis methodological framework has been used successfully by other researchers (Al-Enezi 2012; Carollo et al. 2012; Conklin and Liotta 2005; Fryer et al. 2010; Rootman and Ronson 2005). The four phases of a gap analysis methodology are described below.

Phase 1: Articulate a Desired Future State

The first step in a gap analysis is to identify the desired status, or the best case scenario. In this study, the desired state was Kuwait achieving the BJD goals. For example, as summarized in Table 1, the first goal of the BJD was to facilitate national and international consensus on strategies for prevention of the major musculoskeletal disorders. As such, this goal served as the definition of the desired future status. This process was used to identify the desired state across all five BJD goals.

Table 1. Overall goals of the bone and joint decade (BJD)

Goal #1	Promote prevention of MSK disorders and empower patients through education campaigns.
Goal #2	Advance research in prevention, diagnosis and treatment of MSK disorders.
Goal #3	Improve diagnosis and treatment of MSK disorders.
Goal #4	Influence the medical schools' training programs to include at least six months of training on MSK disorders, with the aim to improve the general practitioner diagnostic skills and institute similar programs for other medical groups.
Goal #5	Reduce the burden of MSK disorders.

MSK = musculoskeletal disorders.

Phase 2: Describe the Current State

The process in the second phase of this gap analysis was to more fully describe the current status according to each of the specific BJD goals. In this phase, we assessed the extent to which the five BJD goals were met by triangulating outcomes from a review of the literature and through a series of key informant interviews.

A review of the peer-reviewed literature was conducted in this phase, using the following search terms, with limits set of English language and year of publication (1998 to 2012): *Kuwait, musculoskeletal, musculoskeletal disorders, diagnosis, treatment, bone and joint decade, chronic disease, disability, dysfunction, impairment, activity limitation, participation restriction, arthritis, muscle and bone disease, patient education, prevention, medical training, and burden of disease*. A broad search was conducted to include all research published within that time period. The resources our search identified were categorized according to the five BJD goals.

Also within this phase, a series of qualitative key informant interviews were conducted to assess perceptions and opinions regarding the extent to which the BJD objectives had been met. These interviews were conducted with individuals in four broad categories: (1) health professionals, (2) health administrators, (3) government officials, and (4) patient advocacy groups. In the first category, health professionals ranging from physicians to physical therapists and nurses were included in the interview process to gain a perspective of MSK conditions from those who work directly in the field. In the second category, health administrators from hospitals and community sectors were included, to access their knowledge and experience from an administrative and operations perspective. In the third category, government officials who occupied senior-level management or consulting positions in the healthcare field at the time of the study were interviewed to gain a global perspective from those working outside the healthcare field. In the final category, the study explored the perspectives of patient advocacy groups in Kuwait. We used a convenience sample strategy in the study, which began by creating a list of 10 potential informants in all categories. Then, a member of the research team telephoned each informant to gauge his or her interest in participating in the study. If the individual expressed an interest, a mutually convenient time for a face-to-face interview was arranged. At the time of the interview, the study purpose was again described and reviewed by the interviewer, written consent was obtained, and participants were asked for permission to audio-record the session. A snowball sampling technique was also employed in order to identify other key informants.

Using this procedure, key informants were interviewed until saturation was reached. For the purposes of this study, the Strauss and Corbin (1990) definition of saturation point was applied. It included two conditions: (1) when no new individuals or groups are identified through the snowball technique, or (2) when no new information obtained from the interviewees alters the data collected to that point. An interview guide was created a priori and included a series of 20 questions to explore each of the five BJD goals (Appendix A available online at [http://www.longwoods.com/content/23493*](http://www.longwoods.com/content/23493)). Interviews were conducted face-to-face in Arabic and then transcribed and translated into English; each interview lasted approximately 30 minutes.

The transcribed interview data were entered into a qualitative data analysis software package (NVivo 2.0®) for systematic coding and content analysis. Content analysis, or qualitative description, has been reported as useful when the description of phenomena is desired (Pope et al. 2000). Identified themes were based on informants' collective perceptions and experiences relevant to the issues being explored in the study. Once the transcripts had been coded, reports were generated so that the research team could analyze the data according to the research objectives.

Phase 3: Examine the Internal and External Issues That Must Be Addressed to Progress from the Current to the Desired Future State

Once the data analysis from the first two phases of the study was complete, the research team was in a position to assess the difference between desired (Phase 1) and actual status (Phase 2). The extent of the difference between the desired and actual state defined the gap. Assessing the difference was accomplished through discussions and debate among the research team and through triangulation of the literature review.

Phase 4: Delineate Strategies and Tactics That Will Ensure the Gap between the Current and Future State Is Narrowed

During this final phase, the research team used the gaps identified from the previous phase as a baseline, and used data sources collected in this study to develop strategies or mechanisms that might minimize the gap. This was accomplished through discussion and debates among the research team.

Results

A total of 1,057 articles were found. For the purpose of this study, articles that were included focused on musculoskeletal disorders, including obesity, diabetes, joint pains, and general health research concerned with musculoskeletal injuries. After reading through article titles and abstracts, we selected 77 articles as relevant to the BJD goals. The full results of the literature review and the key informant interviews will not be fully outlined here; however, the full study report can be accessed online at <http://www.fsrikuwait.org>.

A total of 14 study participants (seven health professionals, four health administrators, two government officials and one member of a patient advocacy group) participated in Phase 2 of this study. All informants who agreed to participate also agreed to have the interview audio-recorded. Participants' years of work experience in their field ranged from two months to over 30 years. Initial findings indicated that 79% (11 out of 14) of participants were not aware of the BJD initiative, while the others had found out about it through the Internet, their current workplace or by participation on a sports team.

Overall, given the goals of BJD (Phase 1: The desired future state) and the current status of the goals in Kuwait (Phase 2: The current state), we have assessed that there are important gaps (Table 2). There were three areas, or gaps, in particular that the research team identify as noteworthy: (1) advocacy for prevention of MSK disorders, (2) consistent clinical practice guidelines to address MSK disorders, and (3) epidemiological and clinical research to drive practice. Moreover, from a structural perspective, there appears to be little or no infrastructure designed to address BJD goals, either during the years 2000 to 2010 or at the time this research was conducted.

Table 2. Outline of gap between the ideal and current state

Ideal state	Current state in Kuwait
Goal #1: Promote Prevention of MSK disorders and empower patients through education campaigns.	<ol style="list-style-type: none"> 1. Campaigns to increase public awareness were created but were short-lived and did not have appear to have an impact on public health. 2. There is no evidence of a National Action Network (NAN) that would empower the work of patient or patient advocacy groups. There is limited support for MSK educational campaigns and limited resources for printed materials. 3. There is no national consensus on strategies for prevention of the major MSK disorders. 4. There are few if any guidelines for patients with an MSK condition to enable them to participate actively in their own care and to manage their MSK disorders more effectively.
Goal #2: Advance research in prevention, diagnosis and treatment of MSK disorders.	Little funding is available for research (especially for MSK conditions), and there are barriers to application to the funding process. There appears to be minimal depth and breadth of clinical and epidemiological researchers within the country who are interested in and/or have dedicated time for conducting research.
Goal #3: Improve diagnosis and treatment of MSK disorders.	There has been an overall improvement in approaches to diagnosis and treatment of MSK disorders. However, the extent to which multidisciplinary health teams exist in clinical practice is unclear, and the level of access to effective diagnostics and treatment approaches is unclear too.
Goal #4: Influence the medical schools' training programs to include at least six months of training on MSK disorders with the aim to improve the general practitioner diagnostic skills and accurate referrals and institute similar programs for other medical groups.	There is no clear evidence that this goal has been achieved. However, patient safety is a growing area of research and practice in Kuwait.
Goal #5: Reduce the burden of MSK disorders.	The BJD target within the goals was to reduce by 25% expected osteoporosis fractures, joint destruction in joint disease, severe injuries and indirect costs for spinal disorders. There are no available data to substantiate these targets, and key informants suggested that it is not clear at all if Kuwait has achieved these targets, based on lack of data and research.

MSK = musculoskeletal disorders

Our results showed that a number of issues are preventing Kuwait from progressing toward the BJD targets. However, a critical overarching issue was a lack of national strategy, or a national representative task force, to assume responsibility for the BJD initiative. Many factors contributed to this absence of representation, ranging from lack of interest among the community to lack of a champion within government who was willing to assume the lead on the initiative. Our results indicate that some attempts were made to address increasing advocacy for MSK disorders, but it is not clear that they were directly related to the BJD initiative, and ultimate outcomes were judged to be minimal. Since many more Kuwaitis have trained abroad and returned to practice in Kuwait in the last decade, there have been important advances related to local medical and health systems. However, the treatment approaches related to MSK disorders are inconsistent. This may be related to many variables, including different training experiences, hesitation to change the status quo, and lack of a national approach, including incentives, or repercussions for lack of adherence to protocols.

Treatments for MSK disorders are most likely to be effective when a multidisciplinary team approach is used, and growing evidence suggests that the combined effort of physical therapists and orthopedic surgeons can reduce the physician burden of care and improve outcomes as therapists educate patients about effective management strategies. However, multidisciplinary approaches are not common in Kuwait, and therefore advances in integrating these teams will be a critical step forward. Although there is an increasing body of research conducted in Kuwait, the pace of epidemiological or clinical research may not be sufficient to direct service provision. Injuries of the spine, joint diseases due to obesity, and foot and arm injuries were among the

most common clinical priorities mentioned by key informants. However, the extent to which the goal of reducing the burden of MSK disorders has been addressed is not clear, owing to a lack of national data.

Discussion

The achievements made in the BJD in MSK healthcare during the period 2000–2010 have been reported extensively in the BJD 10-year report, which highlighted country-specific goals and activities from 26 participating National Action Networks (BJDonline 2011). These countries have centred their activities on creating awareness campaigns and on public education across all age groups, adding arthritis and other MSK issues to national health policies, hosting related BJD conferences, and increasing funding and awareness for projects related to the BJD goals. At the 13-year mark of the BJD, there is still a scarcity of statistical data for Kuwait's progress published in the literature. This made it difficult to assess the BJD's impact. For example, information on Kuwait briefly describes the orthopedic meeting in February 2000, followed by a 20-minute presentation on the Kuwait TV news, with the BJD highlighted during the scientific meeting. The link lists one organization as part of the BJD: the Kuwait League against Rheumatism and Autoimmune Disease.

Given the unique nature of this gap analysis, it is difficult to compare our findings with those of other nations, as no such data exist in Kuwait. Although the majority of participants in this study were health professionals and health administrators, most were not aware of the BJD initiative or its goals. Study participants believed that MSK campaigns were short-lived in Kuwait and felt there was a lack of funding for research projects geared toward MSK and chronic pain. This funding is substantiated by the limited amount of research found in Kuwait. Public education strategies were judged as ineffective, and participants spoke of the challenges they faced while trying to reach out to the Kuwaiti population. Based on our data and previous literature, the increase of MSK disorders across age groups and the lack of adequate training in graduate programs will significantly increase the demand for health services.

Based on our gap analysis, Kuwait did not meet the BJD targets. However, Kuwait has undergone massive infrastructure and cultural development in the last quarter century, and it may be that if the BJD were to begin now, the infrastructure would be much more accepting of gathering momentum to meet the targets. As an example, Al-Razi hospital has the largest orthopedic facility in the country and now has an orthopedic surgeon whose full-time responsibility is to provide and orchestrate clinical education for the hospital. Moreover, a decade ago, the focus of the Ministry of Health was heavily weighted toward acute medical interventions, but as with many countries around the world, there has been a migration of ideology to be more accepting of the continuum of care, which includes the prevention of MSK disorders.

In discussions and debates related to the identified gap, three possible strategies and tactics were discussed that could help reduce the gap in the following priority areas. First, advocacy for MSK disorders is pivotal. In our opinion, and based on our research, the two specific ways to increase this advocacy are the creation of patient coalitions and partnerships between government and private sectors to seek consistent media attention. Second, the development of clinical practice guidelines that are feasible and implementable in Kuwait represents an opportunity to streamline the delivery of care and to manage the expectations of the population. These guidelines need to be evidence-based, and adherence would need to be monitored. The most effective way to create guidelines would be to begin with the clinical conditions that are most frequent. Third, more epidemiological and clinical research is needed in Kuwait to assess the prevalence of MSK disorders and track the progress of the delivery of care. Improving access to research funding, increasing the standard of research training at the student level, introducing community-based participatory research, opening access to available data sources, and creation of national research steering committees will be critical steps forward to advancing research on MSK disorders in Kuwait.

Conclusion

Overall, we assessed that Kuwait has not met the BJD goals. However, there was some support for the notion that Kuwait would be in a much better position to address these goals and objectives if the BJD were to begin now. In particular, external support should be sought to implement programs such as virtual train-the-trainer programs with mentors in Kuwait, since such global programs are rare in this country. Despite the fact that the BJD goals were not met, there is large scope to continue the quest to reduce the burden of MSK disorders, irrespective of the termination of the BJD. Working collaboratively to achieve these goals among multiple stakeholders is a challenge that Kuwait must face if the country it is to address the epidemic of MSK disorders.

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Preventing Malnutrition in Children under Two (PM2A): A Case Study in the Food Insecure Context of South Sudan

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Abstract

Prevention of malnutrition for children under two (PM2A) is a new approach being used by the United States Agency for International Development (USAID). Since 2010, PM2A has been adopted on a widespread basis in food assistance programs with the aim of preventing chronic malnutrition (stunting) in non-emergency settings. This case study uses mixed methods to document household food sources, insecurity and ration receipt within the context of a multi-year health and nutrition program implemented in South Sudan. Evidence from the program, which included a PM2A component in addition to health, empowerment and household agricultural interventions, indicates that household food security remained poor despite ration receipt. While PM2A is a relatively new strategy and efforts are under way to evaluate outcomes, more evidence is needed to determine the appropriateness of the PM2A approach in highly food insecure contexts and to establish the range of contexts in which PM2A is a choice approach for food assistance programs.

Introduction

The Preventing Malnutrition in Children Under 2 Approach (PM2A) integrates maternal and child health and nutrition programming with food assistance, and is a central component of many Title II non-emergency food aid programs.¹ Core components of PM2A include conditional food rations (based on participation in behaviour change interventions) for pregnant and nursing women and children under two years of age, behaviour change communication, and preventive and curative health and nutrition services for women and children according to national protocols. In addition, the PM2A package often includes a household ration to supplement the household food supply, prevent sharing of targeted rations, and/or incentivize participation in preventive program activities such as clinic visits and growth monitoring. PM2A is implemented in areas with chronic food insecurity and malnutrition, and targets pregnant and breastfeeding women and children zero to twenty-three months of age because they are the most nutritionally vulnerable (Food and Nutrition Technical Assistance II Project [FANTA-2] 2010).

Targeted nutrition education and food supplementation programs for children of six to twenty-three months and their caregivers have been shown to improve child nutrition status both as individual and combined interventions in food secure contexts (Bandhari et al. 2004; Dewey and Adu-Afarwuah 2008; Roy et al. 2005). The PM2A intervention package was shown to be more effective in reducing the prevalence of stunting, underweight and wasting than recuperative nutrition interventions alone (e.g., therapeutic feeding for acutely malnourished children) within the context of a Title II food aid program in Haiti. (Ruel et al. 2008). However, several shortcomings in this study have been noted, including lack of a control group, failure to examine implementation differences as a potential explanation for underperformance of the recuperative model, and that the ongoing debate on the relative importance of behaviour change, and communication and food assistance as means of reducing child undernutrition, was unaddressed (White 2008). Additional studies of PM2A in Guatemala and Burundi are currently ongoing (Bergeron 2011; Swindale 2010).

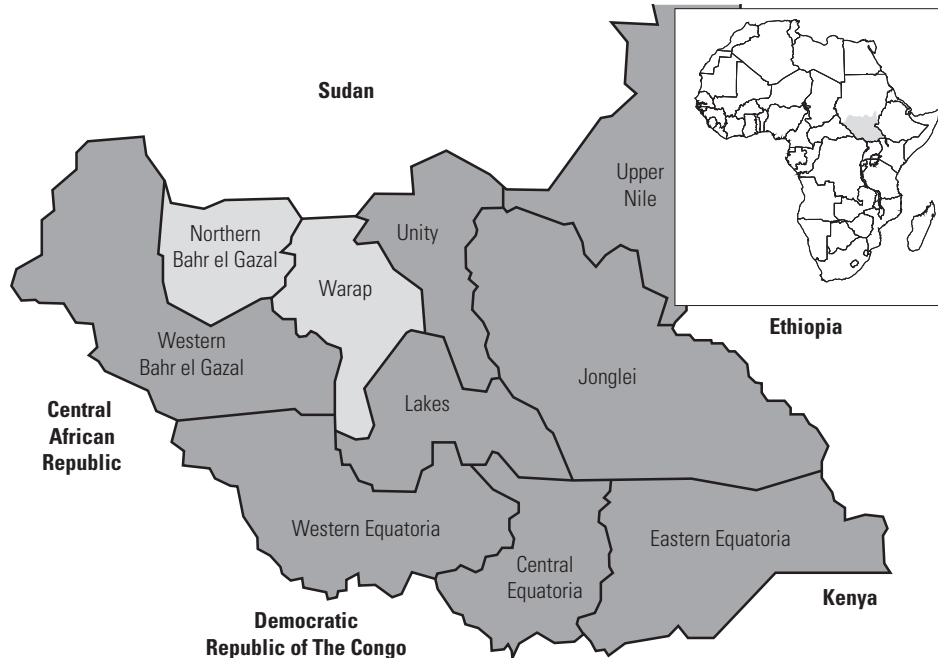
The Haiti study, which served as the basis for widespread adoption of PM2A in USAID food aid programming, was conducted in the context of moderate stunting (37%) and low levels of acute malnutrition (4–5%); food security was not assessed. Although the US Office of Food for Peace has specified PM2A as the preferred maternal and child health and nutrition approach for its development programs in food insecure environments (Webb et al. 2011), there is a paucity of evidence suggesting the approach is effective in acutely and chronically food insecure environments.² Furthermore, little guidance is available on how to determine the appropriateness of PM2A in a given context, or where and why other program models may be a preferred approach. This case study describes household food sources, including rations, and program implementation challenges in South Sudan to inform policy makers and health program practitioners about the potential advantages and disadvantages of the PM2A approach in the food insecure context.

Methods

A concurrent exploratory mixed methods study was conducted in January 2012 as part of the first USAID-funded Title II Food Aid Multi-Year Assistance Program (MYAP) implemented in South Sudan. The South Sudan Health, Nutrition and Empowerment (SSHINE) program was implemented by the Adventist Development and Relief Agency, Concern Worldwide, Food for the Hungry and Malaria Consortium in Northern Bahr El Ghazal and Warrap states of the newly independent Republic of South Sudan, including distribution of PM2A food rations beginning in mid-2011 (Figure 1). Data collection methods included structured interviews with 80 mothers of children aged six to twenty-three months who had benefited from SSHINE food ration distributions, and ten focus group discussions with SSHINE program staff and beneficiaries. Sample sizes were identified based on anticipated saturation (i.e., no new information being discovered), length of the questionnaire and logistical considerations. Data collection was conducted six months after the initiation of ration distribution and within the month following the final

distribution of the full ration package. Data collection was timed so that beneficiaries had the maximum exposure to the PM2A intervention; consequently, the study was conducted during a period of relative food security, where the typical lean season begins in May and continues through August.

Figure 1. Map of South Sudan project and assessment areas



Communities in each state that were designated as PM2A areas (as compared to locations that were benefiting from other SSHiNE activities or where food distribution was not occurring) were selected for inclusion in the sampling frame based on security and access considerations and similarities to communities benefiting from the SSHiNE project. Of the communities in the sample, the research team randomly selected four (two in each state) for the final sample. The selected communities were in the payams (roughly equivalent to sub-districts) of Kuach North (Gogrial West county) and Toch East (Gogrial East county) in Warrap State and in Ariath (Aweil North county) and Gojuer Centre (Aweil West county) in Northern Bahr el Ghazal State. Community selection was conducted without involvement of program staff to eliminate potential selection bias (where SSHiNE staff may have recommended communities in which program performance was perceived as especially good).

In each of the four study areas, 20 adult female beneficiaries (pregnant women and/or mothers of children under two years of age) were interviewed using a structured questionnaire that incorporated validated and widely used instruments to assess household food sources, ration receipt and ration use (Bilinsky and Swindale 2010; Coates et al. 2007; WHO 2010). Communities were segmented to ensure geographic distribution of the sample, and within each area potential respondents were sampled by convenience. Approximately half of the mothers were recruited from the centre and half from the outskirts of the community. Beneficiary status was assessed by visual confirmation of the mother's ration card. In addition, two focus groups were conducted in each study area with six to ten mothers of children six to twenty-four months of age who received SSHiNE food rations (a total of eight focus groups). There was no overlap between interview respondents and focus group participants. Finally, two focus groups were conducted with six to ten SSHiNE program staff to gain a more qualitative understanding of available food sources, ration use and the challenges faced during program implementation.

All interviews and focus groups with community members were conducted in Dinka by SSHiNE program staff; interviewers were selected who did not have regular contact with project beneficiaries to reduce the risk of reporting bias. Interviewers were trained on interview techniques, focus group facilitation and the data collection tools, and participated in pilot testing and finalizing the questionnaire. Focus group discussions were conducted by two program staff: one facilitator (facilitating in Dinka) and one note-taker (writing notes in English). Immediately following the focus group, the facilitator and note-taker wrote detailed summaries of responses to questions to ensure reliability and confirmability of results. Focus groups with SSHiNE program staff were conducted in English by members of the research team from Johns Hopkins School of Public Health. Focus group data were analyzed using qualitative techniques of content analysis and close readings of summary texts to understand main themes or participant responses. Structured questionnaires were analyzed using descriptive statistics with STATA 11. Oral informed consent was obtained from each participant prior to initiation of the interview or focus group. Permission to conduct the interviews was obtained from the South Sudan Ministry of Health and local authorities and/or community leaders. The study was approved by the Institutional Review Board at the Johns Hopkins Bloomberg School of Public Health.

Results

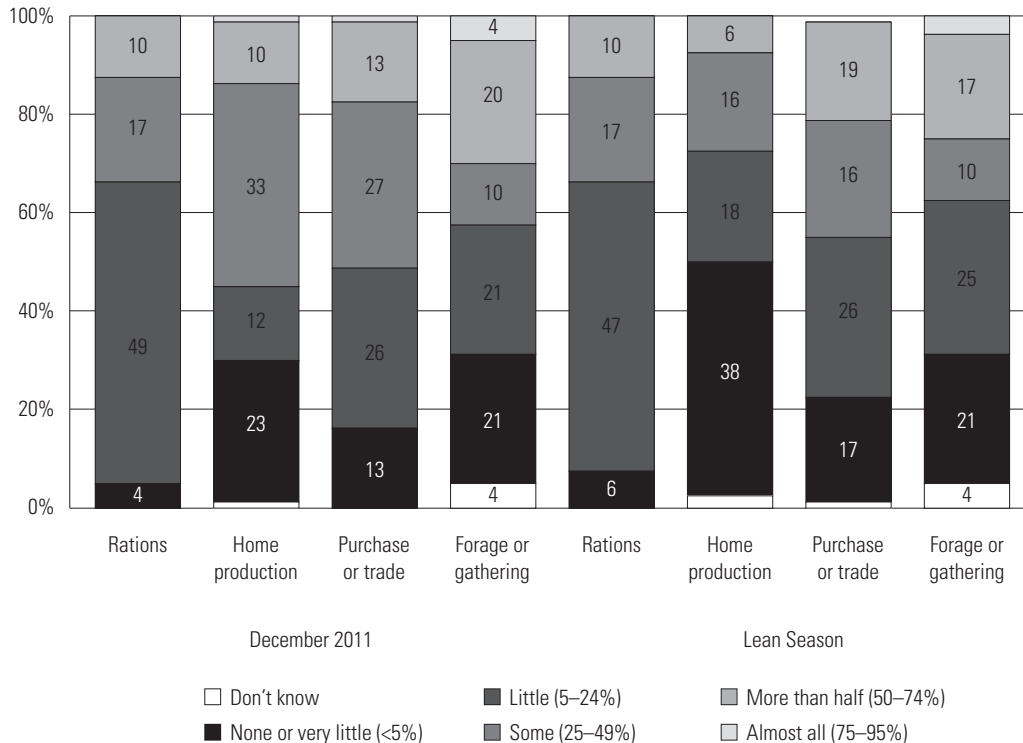
Interviews were completed in 80 households in four communities in the states of Warrap and Northern Bahr el Ghazal. Among households surveyed, household size was larger in Warrap (mean 11.2, median 10, range 6–20) than in Northern Bahr el Ghazal (mean 8.7, median 8, range 5–17). Children under two years of age, the primary target group for PM2A programs, were present in 73% of households; older children in the two-to-five- and five-to-seventeen-year age groups were present in 83% and 96% of households, respectively. The average household had 2.3 children under five years of age and 3.1 children five to seventeen years of age, with similar composition in terms of number of children among households in both states. The average number of children aged the two to five and five to seventeen was greater in Warrap than in Northern Bahr el Ghazal.

In December 2011, the month preceding the study, the primary sources of food included home production, purchase or trade, and foraging or gathering (Figure 2). Home food production was nearly ubiquitous (95%), and the most common foods produced included vegetables (79%) and grains (75%); gathering, foraging or fishing (69%) and animal husbandry (53%) were also common (Table 1). Crops grown were primarily sorghum and maize, as well as beans, okra, pumpkin and millet. The extent to which communities relied on home agriculture varied, and differences were attributed to 2011 drought conditions and lack of established community ties and land for growing. During the 2011 lean season, which was April through August, there was a noticeable decline in home production; in the lean season 56% of households reported that less than 25% of household food was produced at home compared to 35% in the month preceding the survey. In general, most foods produced in the home were also consumed; the major exception was in Warrap, where 10% of households did not consume animal [products] they produced. More than half of households reported selling livestock to purchase less costly staple foods.

Foraging and gathering were prevalent throughout the year and accounted for more than half of food consumed in 25% to 30% of households both prior to the survey and in the lean season. Consumption of gathered foods was significantly more common in Warrap (83% of households), compared to Northern Bahr el Ghazal (55% of households; $p = .002$). Common wild foods that households relied on included a green leafy plant called thou and small fruits and berries known as akour. Markets and trading were also common food sources, and 91% and 51% of households, respectively, reported using them at least once per month. Among items purchased from the market, sorghum and maize flour were the main staples, and to a lesser extent dried okra, beans, dry meat (typically fish) and occasionally oil. In order to purchase food from the market, most

households had to engage in some kind of work, typically cutting grass or gathering firewood, or, if there was no grass to cut or no one able to physically work, households would sell a cow or goat to purchase sorghum.

Figure 2. Food sources during December and the 2011 Lean Season (April to August)



All households surveyed in Warrap and Northern Bahr el Ghazal received food aid from SSHiNE in 2011. SSHiNE food distributions began in June 2011 and continued through December 2011, with monthly coverage rates between 75% and 98% in the two states in all months except July, when distributions were not planned because of independence. Households received an average of 5.3 distributions in 2011, with 83% reporting receipt of a ration at the most recent distribution (Table 2). No households reported receiving rations from the World Food Programme (WFP) or other sources during the time period rations were received from SSHiNE. In PM2A programs, ration receipt is conditional on participation in behaviour change interventions, in this case Care Groups³, which are essential for behaviour change and information dissemination (Davis et al. 2013; FANTA-2 2010). The majority of households in each state (78% in each state) had participated in Care Groups. Of Warrap participants, 39% had participated in two or fewer Care Group meetings, 55% in three to five meetings and 6% in six to eight meetings. In Northern Bahr el Ghazal, 29% had participated in two or fewer Care Group meetings, 61% in three to five meetings and 10% in six to eight meetings. Of those who had participated, 48% in Warrap and 35% in Northern Bahr el Ghazal attended their first Care Group meeting less than two months before the study and after a majority of food distributions.

For the most recent ration distribution in December 2011, the planned ration included 3 kg of fortified corn-soya blend (CSB) and 0.3 kg of oil for each pregnant woman, mother of a child zero to five months and a child six to twenty-three months of age; as well as 14.0 kg of bulgur, 1.5 kg of lentils and 1.0 kg of oil for each targeted beneficiary's household. Households reported receiving an average of 14.9 kg of bulgur, 2.1 kg of lentils, 1.86 kg of CSB and 1.27 kg of oil. Sales of food from the most recent distribution were not reported by any household, and the ration accounted for less than 25% of food consumed by the household in nearly two-thirds of

households. There were no significant differences between Warrap and Northern Bahr el Ghazal with respect to receipt of rations. At the time of the study, households in Warrap had less food remaining than those in Northern Bahr el Ghazal, which is likely a result of larger household sizes. At the time of data collection, very few households had any rations remaining. The main foods in homes were grains (primarily sorghum and maize flour), and some households had okra, pumpkin leaves and wild foods. When rations ended, focus group participants indicated they would rely on foraging, agricultural production and sales of livestock and other assets in order to buy food – the same coping mechanisms that are employed whenever food is scarce. In focus group discussions, expansion of gardens was a possibility for only a minority of households because of a lack of resources, in particular tools and technical knowledge, and because many families were new to the area and did not feel settled. Focus group participants felt challenged by the combination of living in communities that were not well established and where drought conditions effectively made the entire year a lean season. There was enthusiasm about home garden projects and growing food if adequate rains came; however, there was also fear that famine would return because of an inability to raise crops in the face of poor rains and because many households had few livestock or assets to sell.

Table 1. Household food sources in Warrap and Northern Bahr El Ghazal

	<i>N</i>	Warrap	<i>N</i>	NBG	<i>p</i> -value
Household food production (past year)					
Sorghum, millet or other grains (%)	26	65%	34	85%	.07
Cowpeas, bambara or other beans (%)	2	5%	0	0%	.49
Vegetables (e.g., okra, pumpkin, greens) (%)	30	75%	33	83%	.59
Animals (e.g., cows, goats, chickens) (%)	23	58%	19	48%	.50
Foraging or gathering, including fishing (%)	22	55%	33	83%	.02
Any home production (%)	37	93%	39	98%	.62
Consumption of food produced at home					
Sorghum, millet or other grains (%)	26	65%	34	85%	.07
Cowpeas, bambara or other beans (%)	2	5%	0	0%	.49
Vegetables (e.g., okra, pumpkin, greens) (%)	30	75%	33	83%	.59
Animals (e.g., cows, goats, chickens) (%)	19	48%	19	48%	1.00
Foraging or gathering, including fishing (%)	22	55%	33	83%	.02
Consumption of any food produced at home (%)	37	93%	39	98%	.62
Frequency of market as a food source (past month)					.25
Never	6	15%	1	3%	–
Once per month	11	28%	12	30%	–
1–3 times per month	19	48%	22	55%	–
Once a week	3	8%	5	13%	–
More than once a week	1	3%	0	0%	–
Frequency of trade as a food source (past month)					.38
Never	21	53%	17	43%	–
Once per month	10	25%	7	18%	–
1–3 times per month	6	15%	12	30%	–
Once a week	0	0%	1	3%	–
More than once a week	2	5%	3	8%	–
Don't know	1	3%	0	0%	–

NBG = Northern Bahr el Ghazal.

Table 2. Household ration receipt in Warrap and Northern Bahr el Ghazal

		Warrap	NBG	p-value
2011 ration distributions	Mean	5.4 (1.1)	5.2 (1.5)	.51
	Median	6	6	–
	% with > 1	100%	95%	
	% with ≥ 6	73%	75%	
December 2011 ration distribution	% receiving	85%	80%	.77
Foods received at the last distribution		Warrap	NBG	p-value
Bulgur (% received)		100%	100%	1.00
Amount received (mean, kg)		15.05 (3.74)	14.74 (2.49)	.66
Amount remaining (mean, kg)		1.43 (3.45)	0.15 (0.96)	.03
Households with any amount remaining (%)		38%	5%	.00
Lentils (% received)		100%	100%	1.00
Amount received (mean, kg)		1.81 (0.74)	2.45 (4.03)	.32
Amount remaining (mean, kg)		0.06 (0.26)	0	.19
Households with any amount remaining (%)		15%	3%	.11
CSB (% received)		65%	70%	.81
Amount received (mean, kg)		1.86 (1.34)	1.85 (1.33)	.97
Amount remaining (mean, kg)		0	0	1.00
Households with any amount remaining (%)		0%	0%	1.00
Oil (% received)		100%	100%	1.00
Amount received (mean, L)		1.24 (0.31)	1.29 (0.35)	.46
Amount remaining (mean, L)		0	0	1.00
Households with any amount remaining (%)		0%	0%	1.00
Foods received at the last distribution	Planned rations			Reported total amount received by households
	Children [†]	Women [†]	Household	
CSB	3.0 kg	–	–	1.9 kg
Bulgur	–	4.5 kg	14.0 kg	14.9 kg
Lentils	–	1.2 kg	1.5 kg	2.1 kg
Oil	0.3 kg	0.6 kg	1.0 kg	1.4 kg

CSB = corn–soya blend; NBG = Northern Bahr el Ghazal.

[†] Targeted beneficiaries include pregnant women, mothers of children < 6 months, and children 6–23 months.

Discussion

During the SSHiNE implementation period, food insecurity in South Sudan was driven by below-average harvests; conflict; increased demand for food and services due to the growing internally displaced person, returnee and refugee populations; reduced imports from Sudan; and high cereal prices. Both Warrap and Northern Bahr El Ghazal states were considered key areas of concern where food insecurity was likely to continue to deteriorate (Famine Early Warning System Network 2012). Poor agricultural production, widespread use of coping mechanisms such as assets and livestock sales, and dietary adaptations including reductions in consumption and dependency on wild foods reported among SSHiNE beneficiary households indicate that despite food assistance, the prevalence of food insecurity remains high. Beneficiaries generally regarded rations as helpful but insufficient to provide the majority of the household diet, and a poor 2012 growing season and potential for the return of famine conditions were major concerns.

In this context, several issues related to the appropriateness of the PM2A approach come to light, including targeting and coverage, fidelity to the intervention and the ability to meet caloric needs of targeted beneficiaries.

One important consideration is targeting, where guidance indicates that PM2A programs should target the most food insecure districts and that linkages should be formed with existing health services. Community selection was a challenge, given the widespread needs and the absence of community-level information that could be used for comparison purposes. Prevalence of global acute malnutrition⁴ was estimated at 31% in Warrap and 26% in Northern Bahr el Ghazal around the time of community selection, which is reflective of widespread food insecurity and poverty (Liverpool Associates in Tropical Health 2010). Poverty rates in Warrap and Northern Bahr el Ghazal states are estimated 64% and 76%, respectively (South Sudan National Bureau of Statistics [SSNBS] 2009). In the case of the SSHiNE program, three payams were selected in each state as SSHiNE program areas, but only a sub-set of communities within these payams received PM2A rations because of budget constraints. Community selection was driven largely by access and logistical considerations and community size. Because PM2A guidance recommends 100% coverage and beneficiaries were disbursed across different administrative units, the population of the different payams selected had to align with the program budget. Other factors included availability of functional health services and presence of other food, agricultural and health programs. An evidenced-based approach to community selection where the most vulnerable communities are identified and targeted is not required in MYAPs, presumably because of the cost and time required to conduct assessments; instead, it is assumed that because target communities are within food insecure states, that by proxy, food insecure communities will be selected. However, it is reasonable to assume that levels of food insecurity may vary within states and that a more nuanced understanding of local conditions might lead to selection of the communities that are most in need of food assistance. Given annual US government funding for MYAPs awarded in 2011 and 2012, estimated at \$161 million and \$50 million, respectively, mandating a more rigorous selection process based on rapid community-level assessments might improve targeting of programs to those in greatest need and most likely to benefit from program activities (USAID 2010, 2011).

Targeting households for the PM2A intervention package is another important issue. The current PM2A criteria provide rations to all members of households with pregnant or lactating women and children under two in the target community, including adequately nourished children and adults, while vulnerable households not meeting these criteria receive no rations. Thus, households consisting of returnees, disabled individuals, female-headed households, and those with acutely malnourished children between 24 and 59 months of age are not eligible for PM2A rations. PM2A guidance does indicate that adequate access to treatment for severe acute malnutrition must be available, and that acutely malnourished children from non-PM2A households be referred to community-managed programs for outpatient treatment of malnutrition. However, in many settings these services are not readily accessible for a significant portion of households. At the time of SSHiNE program implementation, acute malnutrition rates had persisted at emergency levels for an extended period. Resource shortages, including low availability of ready to use foods (RUFs) and human capacity for nutrition screening and recuperative program implementation, restricted coverage of services in Warrap and Northern Bahr el Ghazal both in terms of capacity and geographic scope. While the PM2A approach can be seen as both preventive and recuperative because it includes beneficiaries with and without acute malnutrition, it can also be argued that the prioritization of chronic malnutrition prevention over the treatment of acute malnutrition in settings such as South Sudan is ethically questionable, in particular because rations designed for prevention of chronic malnutrition may be calorically inadequate for treatment of acute malnutrition and because without timely access to recuperative services, children with acute malnutrition face an increased risk of death. Experiences from the SSHiNE

program suggest that PM2A may not be appropriate for food insecure settings with high levels of acute malnutrition, and that programs supporting community management of acute malnutrition should be prioritized so that the needs of the most vulnerable children are addressed.

Another issue identified in the SSHiNE program was difficulty scaling-up and achieving adequate food production from home garden activities, particularly in conditions of drought and food insecurity. While PM2A is intended to be coupled with broader food assistance and livelihoods strategies, its success is also bound by their performance. In theory the household ration is intended to augment existing household food sources and the ability to meet the caloric needs of target beneficiaries; thus, preventing malnutrition is dependent on stable access to food resources. In highly food insecure contexts such as South Sudan and many other areas where MYAPs are implemented, this underlying assumption is problematic. Chronic food insecurity as well as large seasonal differences in food accessibility means that rations may serve to replace other food sources rather than augment them. While serving a critical role of meeting basic energy requirements, they may fail to achieve the stated goal of preventing malnutrition. Cultural considerations are also important to take into account – for example, in Dinka communities such as those where the SSHiNE program was implemented, the cultural system is based on egalitarianism and kinship. Food is shared in equal parts among those present (including non-household members), which greatly impacts the quantity of food available for children and makes targeting food aid difficult (Groves 2011). Current studies of the impact and cost-effectiveness of PM2A on child nutrition status are ongoing and seek to understand the implications of varying ration size, schedule and composition, and the ability of the approach to supplement diet and prevent sharing (Swindale 2010). It will be important to address both cultural and situational factors in future guidance for PM2A programs. In contexts such as South Sudan, where global acute malnutrition rates surpass emergency thresholds and food insecurity is prevalent, cultural factors may impede targeting different interventions, and modified PM2A approaches should be considered.

Limitations

Both the SSHiNE program and this research were influenced by the challenging operational context of South Sudan. Limited access to communities due to poor road conditions and the security situation, human resources, high costs and delays in commodity receipt were major problems faced by the SSHiNE program. Another limitation was the short length of the program implementation period, which precluded assessment of anthropometric outcomes, most notably stunting. It also must be recognized that food insecurity and diet are highly seasonal and that information presented represents only a snapshot in time. With respect to this research, the primary limitations of the study were the lack of a representative sample of all SSHiNE beneficiaries and the small sample size for the household interviews, which drastically limited the ability to draw generalizable comparisons and identify differences that were statistically significant.

Conclusions

PM2A is a new approach being used for Title II non-emergency food aid programs. Since 2010, PM2A has been adopted on a widespread basis in multi-year assistance programs with the aim of addressing underlying causes of chronic food insecurity in non-emergency settings such as South Sudan. Evidence from the SSHiNE program in South Sudan, which included a PM2A component in addition to health, empowerment and household agricultural interventions, indicates that household food security remained poor despite ration receipt. While the food security situation among many households would undoubtedly be worse in the absence of rations, it is unlikely that PM2A objectives of preventing malnutrition were achieved given persistently high levels of food insecurity and cultural factors that were important determinants of intra-household food allocation. An important outcome of the SSHiNE program experience in South Sudan are questions relating to the appropriateness of the PM2A approach, including targeting and coverage, ability to meet caloric needs and equity considerations. While PM2A is a relatively new strategy and efforts are under way to evaluate outcomes, cost-effectiveness and implementation strategies,

more evidence is needed to establish the range of contexts in which PM2A is a choice approach for food assistance programs.

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Notes

1. Under the Food for Peace Act of 1954, the USAID Office of Food for Peace is tasked with managing programs under Title II of the Trade portion of the Farm Bill, which provides for donation of US agricultural commodities and humanitarian assistance to meet emergency and non-emergency food needs in other countries.
2. Chronic food insecurity is commonly described as the result of overwhelming poverty indicated by a lack of assets, while acute food insecurity is usually considered more of a short-term phenomenon related to either manmade or unusual natural shocks, such as drought.
3. A Care Group is a group of 10 to 15 volunteer, community-based health educators who regularly meet together with NGO project staff for training and supervision. All of these volunteers then go out at least monthly to promote positive health practices with a small cohort of mothers and young children. They are different from typical mothers' groups in that each volunteer is chosen by the 10 to 15 of her neighbourhood mothers she serves and is then responsible for regularly visiting these mothers, sharing what she has learned and facilitating behaviour change at the household level.
4. Global acute malnutrition includes moderately and severely malnourished children, defined as ≤ 2 z-scores for weight-for-height or the presence of bipedal edema.

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**Preventing Malnutrition in Children under Two (PM2A):
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Factors Influencing Motivation and Retention of Primary Healthcare Workers in the Rural Areas of Oyo State, Nigeria

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Abstract

Background: Limited data exist on retention of primary healthcare (PHC) staff in rural areas, crippling the already fragile healthcare systems in Nigeria. This study investigated why PHC staff would or would not want to work in rural areas and how they could be retained.

Methods: Four hundred and twelve (412) health workers and caregivers, and 21 key informants were interviewed in Ona-Ara LGA. Logistic regression statistics was used to analyse quantitative data and narrative for qualitative data.

Results: There was no significant factor influencing health workers' unwillingness to work in rural areas and, relationship between their demographic characteristics and perceived reasons to do so. Combined factors influencing PHC workers' willingness to work in rural areas influenced use of PHC.

Conclusion: Financial and non-financial incentives are responsible for workers' motivation to work in rural areas. The mal-distribution of health facilities and health workers between urban and rural areas must be addressed.

Introduction

Despite the adoption and implementation of primary healthcare (PHC) in Nigeria, the levels of morbidity and mortality from preventable diseases are still high (WHO 2006). Proven effective health interventions do not reach the target population; probably due to unavailability of qualified personnel, a critical issue limiting improved health outcomes in rural areas. The question of effectiveness of incentives (financial and non-financial) to attract and retain PHC workers in underserved areas has emerged as the highest priority research question in the field of human resources for health (HRH) (Zurn et al. 2011). PHC and implementation of immunization, antenatal care, nutrition, safe water and sanitation, control of diarrhea and other strategies were adopted about two decades ago, but there is dearth of information on assessment of retention and motivation of health personnel for effective service delivery.

The global health workforce shortage is characterized by a lack of healthcare personnel and an uneven distribution of existing workers. Data suggest that the availability of health workers is a critical factor affecting service delivery (WHO 2006). Consequently, some geographic areas do not receive adequate, or in some cases any, appropriate care (Awofeso 2010; Ebuehi and Campbell 2010). Generally, fewer health professionals choose to practice in rural areas (Chen and Boufford 2005). Much of the research conducted on how to increase the numbers of rural health workers has been carried out in high-income countries (Rosenblatt et al. 2006; Thaker et al. 2008) and typically falls into two groups. One examines why healthcare professionals choose or do not choose to practise in rural or other underserved settings (MacDowell et al. 2010). The other proposes, implements and evaluates interventions designed to recruit or retain healthcare professionals in underserved settings (Chen and Boufford 2005; Chen et al. 2004; Chopra et al. 2008; Wibulpolprasert and Pengpaibon 2003; WHO 2006).

Data from the countries in which these studies were conducted noted that push and pull factors could be more complex in developing country contexts and recommended a mix of incentives to attract healthcare workers to rural areas (Chen et al. 2004). Structural factors (such as well-equipped facilities and proper sanitation), social and professional factors (opportunities for career development, educational opportunities for children and good management) and political factors (including violence or regional instability) (Chen and Boufford 2005; Chen et al. 2004; McAuliffe et al. 2013; Strachan et al. 2012; Wibulpolprasert and Pengpaibon 2003) are all likely to affect health worker preferences for location. Reviews of financial incentives found that those targeting medical student debt were somewhat successful in drawing physicians to rural areas (Munga et al. 2013; Rao et al. 2012; Thaker et al. 2008), but this was less effective when not enforced or when a buyout option was available (Chopra 2008). Creating medical schools in rural areas is another strategy tried in high- and low-income countries (Franco et al. 2002).

Strategies to address the determinants of practice, such as increasing medical school enrolment from rural areas and incorporating rural experience into medical training, have been tried with varying success rate (Franco et al. 2002). Successful policies and interventions may address multiple dimensions of the problem. Hence, this study examined the factors associated with retention and motivation of health workers in rural areas.

Research Design and Methodology

Study Design

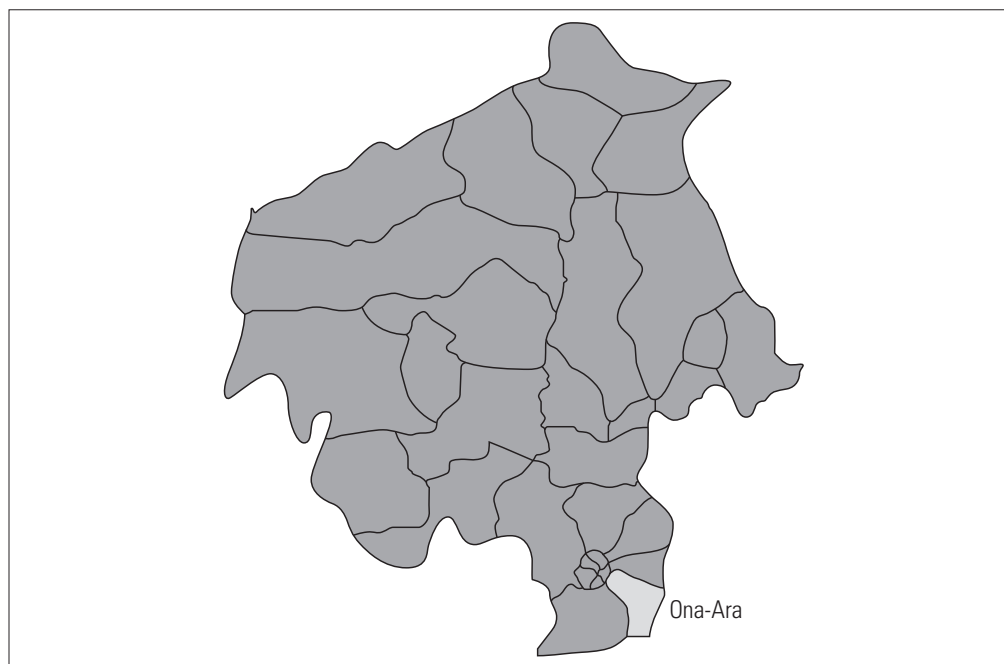
A descriptive study design was adopted using a mixed method (quantitative and qualitative). Qualitative data were collected first, and the information generated informed the draft of the questionnaire.

Study Area

The study was carried out in Ona-Ara Local Government Area (LGA), one of the 33 LGAs in Oyo State, southwestern Nigeria. The LGA was selected because it is rural, with an adequate population for PHC activities. It is made up of eight health districts/wards (two urban/peri-urban

and six rural districts). The total population is 265,059, comprising 131,471 males and 133,588 females. There are about 53,012 children under the age of five years and 10,602 infants (National Population Commission 2006). The people are predominantly Yoruba. The Yoruba are of the Negroid stock that claims a common descent from Oduduwa – their eponymous ancestor who supposedly migrated from Mecca in Saudi Arabia through North Africa and finally settled in Ile-Ife.

Figure 1. Ona-Ara Local Government Area, Oyo State, Nigeria



There are two major forms of residential units in the area. The first is found in the core city of Ibadan, family compounds serve as the basic unit. They accommodate between two and ten families that share blood consanguinity or affinal relationships. Affinal relationship is the relationship established not by blood but through association or union like that of a wife to the family of her husband. The units are usually not fenced and, therefore, tend to grow into one another, forming a sprawling and disconnected mass of mud and brick walls with brown corrugated iron roofing sheets. This residential pattern has significant implications for health, as drainage becomes a problem, especially during the rainy season. This type of residential setting also accommodates large families, which also tends to promote the spread of communicable diseases. The second form of residential pattern is found in the outer part of the city where modern housing system build with modern toilet facilities and other conveniences, fenced and well landscaped. Such residential pattern exists in well lay out environments with good accessible road networks and public facilities. They usually accommodate nuclear family with or without members of extended family system.

The extended family serves as the basis of kinship relations in part of the indigenous city where the study took place. The patrilineal structure of the society confers on the oldest male the authority to ensure the safety of other members of the family. Polygynous marriage is widely practised, thus children (especially male children) are highly valued while divorce is freely permitted.

Study Population

The study population comprised physicians, nurses, community health workers and caregivers (mothers).

Sample Size Calculation

In Ona-Ara LGA, an estimated 30% of the population are children and infants aged less than five years, who are vulnerable to PHC target diseases. Their mothers are caregivers who are more likely to patronize PHC centres. Hence, these caregivers are in the best position to answer questions on the effectiveness of PHC service delivery in the area. Therefore, the population of children and infants was taken as the estimated prevalence of the target diseases in the area, and this was used to calculate the sample size.

Formula

$$n = t^2 \times p(1-p) / m^2$$

Where

n = required sample size

t = confidence level at 95% (standard value of 1.96)

p = estimated prevalence of PHC target disease in the project area is 30% (0.3)

m = margin of error at 5% (standard value of 0.05)

$$n = \frac{1.96^2 \times 3(1-3)}{.05^2} = 3.8416 \times 21$$

$$.0025 n = 8068$$

$$.0025$$

$$n = 322.72$$

$$n = 323$$

Hence, a total of 412 caregivers were interviewed in the LGA to make room for an anticipated non-response rate.

Sampling Methods

A simple random sampling technique was used to select subjects for the surveys, while key informants and focus group discussion participants were purposively selected based on a set of criteria. Mothers (caregivers) who usually patronize PHC centres were the respondents. Samples were drawn by randomly selecting 412 households across the LGA. Eligible households were those with women who had at least one child less than five years old at the time of the interview.

Instruments of Data Collection

Questionnaire

A 21-item questionnaire covering socio-demographic information and factors influencing workers' willingness or unwillingness to stay in their duty post was developed and validated for the study through a face-validity approach. Copies of the questionnaire were given to a panel of experts for review. Suggestions were implemented before the questionnaire was finally administered to respondents. All data collection instruments went through rigorous standardization before they were used. An interviewer manual was prepared to guide the selection of subjects, give details on special instructions such as skip instructions, and remind interviewers how to administer a questionnaire.

In-depth/Key Informant Interviews

Twenty-one (11 key informants and 10 health workers) were interviewed, including a health supervisor, a PHC coordinator, one community leader in each of the eight health districts, and the director of PHC at the state level. A study guide was used to conduct the interviews, which took place at a venue approved by participants. Interviews were recorded both in longhand and electronically, with the permission of participants.

Data Analysis

Analysis of quantitative data was both descriptive and inferential due to the nature of data collected (quantitative and qualitative). Statistical Package for Social Sciences (SPSS) Version 16.0 was used to analyze the data. Univariate analysis was performed to explain the frequency distribution of variables. Also, bivariate analysis was performed to examine the association between independent and dependent variables. In addition, multivariate analysis was conducted using logistic regression. A narrative analytical approach was adopted for qualitative data. The data were transcribed and translated into English from the local language used for interviewing and were translated back to the local language for consistency and accuracy. Subsequently, data were entered into a thematic matrix, which allowed configuration of common patterns and differences, using the open-code software. Information received was presented verbatim, preserving language and concepts used. The report is accompanied by phrases used by informants, their recorded explanations. Frequently used words are emphasized either in bold type or italics, while parentheses indicate researchers' observations or clarifications. Both quantitative and qualitative data have been integrated to produce a single report. Research assistants were trained on research ethics. Research participants gave free and informed consent indicating their willingness to participate in the study.

Results

Data revealed that the majority (65.8%) of caregivers were between 20 and 39 years of age. This shows that most were still of reproductive age. Only a few (15.0%) were above 50 years; this category likely consists of grandmothers. In contrast to the age of the caregivers, the majority of health workers (58.8%) were between 40 and 49 years old, compared to only 2.9% between 20 and 29 years. Caregivers' level of education was low, with the majority having at most secondary education. A considerable proportion of caregivers (19.7%) had no formal education.

About 90% of the health workers had graduated from schools of hygiene and nursing. This may be due to the fact that these schools grant the basic qualifications to work as a PHC provider. The 5.9% of workers who had secondary education were likely to be support staff, while the same proportion who had university education were likely to be physician coordinators of PHC in the local government. The majority of caregivers were Muslims (53.9%) compared with 0.5% traditionalists, whereas the majority of the health workers (55.9%) were Christians. Most caregivers (53.9%) and health workers (61.8%) were married.

Data showed that the majority of the health workers (88.2%) were at the senior staff grade, with few supporting lower-cadre staff. Similarly, 82.4% of PHC staff had worked for between five and 24 years, compared to 2.9% who had worked for 25 years or more. This shows that most PHC staff have a lot of experience. Generally, they had large families, with 67.6% having four or more children while 11.8% had two or fewer children.

Data indicated that half of the caregivers (mothers) were traders; only 6.8% were unemployed. Generally, one fifth of the caregivers earned less than N10,000 (please give the US dollar equivalent) per month, while one third earned more. A considerable proportion (16.9%) earned no income. This has implications for the use of modern medicine, because caregivers who have no income may have to depend on their partners or husband in order to use PHC. Almost all caregivers (94.4%) had ever used PHC.

Distribution of PHC Workers in the LGA

The health facility survey reported a total of seven health facilities (PHC and maternity) in the LGA. Four were located in Aba-emu, Akanran, Araromi and Butubutu, and the three maternity homes were in Gbedun, Badeku and Olunloyo. There were a total of 48 PHC workers in the LGA (three physicians, eight nurses, 11 ward orderlies, 12 clerical staff and 14 others, such as gardeners and messengers). The average age was 41 years for physicians, 42 for nurses and 40 for orderlies and clerical staff with at least junior secondary education. The average age of gardeners and messengers was 50 years.

There were 18 beds in the PHCs and maternity homes. The PHCs were an average of 14 km from the nearest referral centre. The majority of respondents (71.4%) indicated that communities did not participate in running PHCs, compared with 28.6% who reported that communities did participate. This suggests low community participation, which is contrary to the WHO's principle of primary healthcare delivery.

On the distribution of health workers in the LGA, qualitative data revealed that although they were well distributed, the number of workers was inadequate. According to a community health officer, "They are well distributed to all available health centres but their number is not adequate. The available number of staff is affecting the performance of the PHC centres." This view was modified by the PHC coordinator, who said, "The distribution is not even because we have more health workers in the urban areas than rural areas. This is because there are not enough personnel and the level of patronage in the rural areas is low." Health workers reported that they were tired of staying in the clinic attending to only two or three patients per week. One participant argued,

Not less than 30 patients used to come to the clinic daily in the urban clinic where I worked last. Sometimes it [was] difficult to cope, especially during peak periods of the month. Life was not as boring as we have here in the rural clinics.

Table 1. Frequency distribution of primary healthcare workers' reasons for unwillingness to work in rural areas by level of education

Reasons	Respondents' level of education			Total (%)
	Secondary school	At most School of Hygiene	At least Nursing	
Lack of social amenities	2	22	9	33 (11.2)
Family problem	2	20	9	31 (10.5)
Lack of transportation	2	20	9	31 (10.5)
Selective posting of staff to rural areas	2	15	7	24 (8.1)
No incentive	2	17	8	27 (9.2)
Finance	2	14	4	20 (6.8)
Poor accommodation	2	20	7	29 (9.8)
Attitude of community members	2	18	8	28 (9.5)
Low patronage of services	1	13	7	21 (7.1)
Opportunity for career advancement	2	12	3	17 (5.8)
Opportunity to augment income	2	11	2	15 (5.1)
Opportunity for information and communication	2	13	4	19 (6.4)
Total (%)	2 (5.9)	23 (67.6)	9 (26.5)	295^a (100.0)

^a Multiple responses allowed.

Table 1 shows that the majority of the different categories of PHC health workers indicated lack of social amenities, family problems, lack of transportation, selective posting of staff, lack of incentives, poor accommodation and attitude of community members as reasons why they would not want a rural posting. Qualitative data revealed that lack of social amenities, internal politics, transportation problems and lack of access to information were major factors for health workers not wanting to work in rural areas. An official of the PHC at the LGA level discussed the problem of transportation saying,

The health facilities are far from town. The terrains of the rural areas are bad, and so getting to places of work during raining season is often difficult. The stress of going to and from their places of work makes them unwilling to work in the rural areas. They always feel very bad when they are posted to rural areas. Most people do not want to go to rural areas.

This view was corroborated by almost all informants. However, the majority of nurses and support staff did not see finance as a major problem, unlike the community health extension workers (CHEWs). Also, the majority of nurses and a considerable proportion of CHEWs did not agree that opportunities for career advancement and income augmentation, and lack of communication facilities, were reasons why they would not be willing to work in rural areas. Qualitative data revealed that PHC workers would not want to work in rural areas because of low patronage. According to one CHEW, “There is low patient patronage in the rural areas here. This will make us become redundant and forget our skills because, as they say, ‘practice makes perfect’.”

Table 2. Frequency distribution of PHC workers’ reasons for unwillingness to work in rural areas by years of work experience

Reasons	Respondents’ level of experience			Total (%)
	<5 years’ experience	5–14 years’ experience	15 years and above	
Lack of social amenities	5	12	16	33 (11.2)
Family problem	5	12	14	31 (10.5)
Lack of transportation	5	12	14	31 (10.5)
Selective posting of staff to rural areas	5	11	8	24 (8.1)
No incentive	5	12	10	27 (9.2)
Finance	2	5	13	20 (6.8)
Poor accommodation	4	12	13	29 (9.8)
Attitude of community members	5	10	13	28 (9.5)
Low patronage of services	5	7	9	21 (7.1)
Opportunity for career advancement	2	5	10	17 (5.8)
Opportunity to augment income	1	4	10	15 (5.1)
Opportunity for information and communication	1	7	11	19 (6.4)
Total (%)	5 (14.7)	12 (35.3)	17 (50.0)	295^a (100.0)

^a Multiple responses allowed.

Table 2 reveals that the majority of the workers, regardless of years of experience, indicated that lack of social amenities, family problems, transportation, selective posting of staff, lack of incentives, poor accommodation and attitude of community members were reasons why they may not want a rural posting. Qualitative data revealed that issues of promotion, career advancement and incentives were critical factors in why PHC workers would not want to work in rural areas. For instance, a community health officer, commenting on career advancement, said,

There is no time to attend school unless one gets study leave without pay. The system in the LGA health sector does not encourage people to further their education because if you acquire additional qualification it may not lead to promotion or re-designation. Everything has been politicized. One needs to lobby before something good can happen.

Similarly, a nurse commented on incentives to staff working in rural areas, saying,

There is nothing like non-monetary incentives. In fact, what the government should do is make workers work in the rural areas for two years only and [then] post them to urban areas. They should make all staff serve in the rural areas [at] one time or the other in their career. This will make every health worker have both rural and urban experiences. It should not be [just] some people. It is frustrating.

This suggests problems of selective posting. However, a larger proportion of PHC workers, regardless of their years of experience, did not agree that the opportunity for career advancement, the opportunity to augment their income and communication were reasons why they would not be willing to work in a rural PHC.

Table 3. Frequency distribution of caregivers' perception of reasons why primary healthcare workers do not want to work in rural areas

	Responses					
	Disagree		Undecided		Agree	
	<i>N</i>	Percent	<i>N</i>	Percent	<i>N</i>	Percent
Lack of social amenities	29	7.0	11	2.7	372	90.3
Family problem	39	9.5	13	3.2	360	87.4
Lack of transportation	34	8.3	10	2.4	368	89.3
Selective posting of staff to rural areas	50	12.1	21	5.1	341	82.8
No incentive	35	8.5	16	3.9	361	87.6
Finance	29	7.0	13	3.2	370	89.8
Poor accommodation	28	6.8	11	2.7	373	90.5
Attitude of community members	55	13.3	31	7.5	326	79.1
Low patronage of services	69	16.7	74	18.0	269	65.3
Opportunity for career advancement	36	8.7	13	3.2	363	88.1
Opportunity to augment income	40	9.7	13	3.2	359	87.1
Opportunity for information and communication	41	10.0	21	5.1	350	85.0

On the contrary, Table 3 shows that more than 80% of caregivers agreed that lack of social amenities, family problems, transportation, selective posting of staff, lack of incentives, poor accommodation, attitude of community members, opportunity for career advancement, opportunity to augment their income and communication were responsible for PHC workers' reluctance to work in rural areas. Alluding to these assertions, community members revealed that the workers experienced difficulty in adjusting to rural life. For instance, a community leader shared his observation that

Health workers do not want to part with enjoyment of social amenities in the towns. They often complain of non-availability of electricity. For instance, there is no electricity and pipe-borne water in this community. In addition, transportation is a problem. How can somebody who studied in the town and lived most of his life there adjust easily to this type of life we are living? If I had my way I [would] not live in this type of place.

Table 4 shows that all categories of workers felt that the following factors and rotation of duty would make PHC workers disposed to work in rural areas: financial motivation, a fixed limited service period, availability of transportation facilities, welfare programs, accelerated promotion, regular training, community participation, effective communication with headquarters, posting workers to their localities, family and education support programs, free lunch and social support for staff (burial, marriage, etc.). Most informants agreed with these views, as indicated by a community leader who said, "Because of the special conditions of the rural areas, I think that PHC workers should be treated with a difference if they want them to be committed." Most of the health workers believed that non-financial incentives would enhance their interest and induce their motivation to stay. For instance, a nurse said,

What I know is that if there is special condition of service for rural PHC workers, people will be competing for postings to rural areas. It is because these things are not there; that is why one is feeling cheated working under harsh conditions and having the same reward [that] those in the town enjoy.

Table 4. Percentage distribution of factors influencing PHC workers' willingness to work in the rural areas by level of education

Reasons	Respondents' level of education			Total (%)
	Secondary school	At most School of Hygiene	At least Nursing	
Financial motivation	2	18	7	27 (7.8)
Fixed limited period of service in the rural areas	2	18	8	28 (8.1)
Availability of transportation facility	2	19	7	28 (8.1)
Provision of free staff quarters/accommodation	2	18	7	27 (7.8)
Provision of welfare programs	2	17	6	22 (6.3)
Accelerated promotion	2	13	4	19 (5.5)
Regular training	2	19	7	28 (8.1)
Community participation	2	21	7	30 (8.6)
Effective communication with headquarters	2	20	5	27 (7.8)
Posting people to their localities	0	9	2	11 (3.2)
Family support programs	2	13	2	17 (4.9)
Education support programs	2	14	2	18 (5.2)
Free launch	2	13	2	17 (4.9)
Social support for staff (burial, marriage, etc.)	2	13	4	19 (5.5)
Rotation of duty	2	21	6	29 (8.4)
Total (%)	2 (5.9)	23 (67.6)	9 (26.5)	347^a (100.0)

^a Multiple responses allowed.

Similarly, Table 5 shows that regardless of the number of years of working experience, the majority of the PHC workers indicated that these factors would motivate them to work in rural areas. Although both financial and non-financial incentives have been observed as factors that may induce PHC workers to stay in rural areas, some participants in the qualitative interviews did not agree that non-financial incentives were necessary. For instance, the supervisory counsellor for health indicated,

There is no special allowance or salary and promotion. Salary and promotion follow the same procedure [as] their counterpart in the town. At the point of entry, it is stated in the letter of appointment that they can be posted to work in the rural areas. They should have experience of both rural and urban areas.

Table 6 shows that the majority of the caregivers agreed that both financial and non-financial incentives are reasons why PHC workers would not want to work in rural areas. However, a considerable proportion of caregivers did not agree that community participation (13.8%), effective communication with headquarters (11.2%), posting people to their localities (25.5%) and free launch (15.0%) would encourage health workers to work in rural areas. Generally, other factors ranked higher, at about 90.0% in all cases.

Table 5. Percentage distribution of factors influencing primary healthcare workers' willingness to work in the rural areas by years of work experience

Reasons	Respondents' work experience			Total (%)
	<5 years' experience (N= 5)	5–14 years' experience (N= 12)	15 years and above (N= 17)	
Financial motivation	4	11	12	27 (7.8)
Fixed limited period of service in the rural areas	5	12	11	28 (8.1)
Availability of transportation facility	5	11	12	28 (8.1)
Provision of free staff quarters/accommodation	5	11	11	27 (7.8)
Provision of welfare programs	4	7	11	22 (6.3)
Accelerated promotion	3	5	11	19 (5.5)
Regular training	4	11	13	28 (8.1)
Community participation	5	11	14	30 (8.6)
Effective communication with headquarters	3	11	13	27 (7.8)
Posting people to their localities	1	2	8	11 (3.2)
Family support programs	1	5	11	17 (4.9)
Education support programs	1	5	12	18 (5.2)
Free lunch	1	4	12	17 (4.9)
Social support for staff (burial, marriage, etc.)	2	6	11	19 (5.5)
Rotation of duty	2	12	15	29 (8.4)
Total	5 (14.7)	12 (35.3)	17 (50.0)	347^a (100.0)

^a Multiple responses allowed.

Table 6. Percentage distribution of caregivers perception of factors influencing primary healthcare workers' willingness to work in rural areas

	Responses					
	Disagree		Undecided		Agree	
	N	Percent	N	Percent	N	Percent
Financial motivation	27	6.6	7	1.7	378	91.7
Fixed limited period of service in the rural areas	42	10.2	10	2.4	360	87.4
Availability of transportation facility	30	7.3	9	2.2	373	90.5
Provision of free staff quarters/accommodation	26	6.3	9	2.2	377	91.5
Provision of welfare programs	25	6.1	11	2.7	376	91.3
Accelerated promotion	25	6.1	11	2.7	376	91.3
Regular training	27	6.6	18	4.4	367	89.1
Community participation	57	13.8	35	8.5	320	77.7
Effective communication with headquarters	46	11.2	37	9.0	329	79.9
Posting people to their localities	105	25.5	60	14.6	247	60.0
Family support programs	30	7.3	13	3.2	369	89.6
Education support programs	29	7.0	11	2.7	372	90.3
Free lunch	62	15.0	12	2.9	338	82.0
Social support for staff (burial, marriage, etc.)	32	7.8	16	3.9	364	88.3
Rotation of duty	32	7.8	17	4.1	363	88.1

Discussion

According to Braichet and Shaw (2009), primary healthcare is

...essential healthcare based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and the country can afford to maintain at every stage of their development in the spirit of self-determination (Braichet and Shaw 2009).

Primary healthcare was accepted by the member countries of the WHO as the key to achieving the goal of health for all. However, despite the establishment of PHC in Nigeria, it is yet to achieve its purpose because many lives are still being lost to preventable diseases (Braichet and Shaw 2009). For instance, polio is yet to be eradicated in Nigeria and some other countries, despite the knowledge that immunization is the best prevention for many diseases (Bonu et al. 2003; Chandramohan et al. 2007; Clements et al. 2007; Odusanya et al. 2003; Rosenthal et al. 2004; Vincele et al. 1999). Because immunization is the principal strategy for reducing the public health burden of preventable diseases, improving childhood vaccination coverage through PHC is a key health policy objective in Africa. As the availability of vaccination increases, success will depend on addressing issues of demand and timely schedule completion (Cassell et al. 2006; Melliez et al. 2007). This can only be achieved if health workers are available to provide the services in rural areas.

This study has revealed that health workers are generally not disposed to working in rural areas. This is important for Nigeria, where morbidity and mortality rates are one of the highest in the world (UNICEF 2004). Unfortunately, the causes of these high rates are due to preventable diseases (UNICEF 2004), which fall within the purview of PHC through a well-motivated workforce. In Nigeria, the majority of the population reside in rural areas where access to basic necessities of life, including healthcare services, is limited. This contradicts the principle of primary healthcare, which assumes that through primary level care, the poor will have access to well-trained health personnel who are ready to reside in rural areas.

Several factors have been identified as responsible for health workers' unwillingness to work in rural areas. They can be divided into two major areas: financial and non-financial incentives. Financial incentives include salaries and financial remuneration for work done (Kadam et al. 2012; Rockers et al. 2012). Non-financial incentives are conditions of service that do not translate into real income, such as training opportunities, rotation of posting, accommodation, transportation, special promotion criteria and personal recognition by the organization or program administrators.

Motivating and retaining health workers in sub-Saharan Africa have been discussed extensively in the literature (Bennett et al. 2006; Dieleman et al. 2003; Dolea et al. 2010; Franco et al. 2004; McAuliffe et al. 2013). Studies (Bennett et al. 2006; Dieleman et al. 2003; Franco et al. 2004; Kadam et al. 2012; Rockers et al. 2012) have shown that motivation is influenced by both financial and non-financial incentives. Poor salary and working conditions, poor access to training, lack of recognition and social amenities were shown to be the major factors responsible for health workers' unwillingness to work in rural areas. Also, this study found that health workers have concerns about lack of training, career advancement and promotion. Similarly, inadequate infrastructure and poor accommodation and transportation systems undoubtedly affect the willingness of rural PHC workers to remain in rural areas (Agyei-Baffour et al. 2011; Dolea et al. 2012; Lori et al. 2012a, 2012b; Razee et al. 2012).

This in turn raises questions about the quality of care being provided to the rural populace. Studies (Awases et al. 2003; Karadzinska-Bislimovska et al. 2013; WHO 2004) have shown that joint problem-solving between supervisors and health workers is essential for quality improvement and job satisfaction. Some human resource management activities, such as supervision, promotion and training, are performed as mere ritual with little or no attempt to match needs, while others, such as performance appraisal, are completely absent (Manafa et al. 2009).

Health workers in this study expressed concern about lack of career progression. This is a frustrating condition for nurses, as indicated in the in-depth interviews. Nurses undergo three years' training and can progress to a specialized nursing career only by receiving training in specialty areas, a process that will be more rigorous than basic nursing training. As a result, nurses posted to rural areas feel that their posting is politically motivated, since they do not have god fathers (a political affiliate to support them) in their places of work.

A study (Manafa et al. 2009) showed that in Mozambique, the introduction of *tecnico de cirurgia* (cadre) was accepted as a temporary solution to the critical problem of scarcity of human health resources. Nevertheless, no clear attention was paid to the institutional and organizational implications of introducing a cadre playing such an important role. As a result, health workers career progression was ill-defined (Manafa et al. 2009).

The supervisory counsellor for health who participated in the in-depth interview was of the view that health staff were moderately well motivated and attributed this to their employment conditions as health workers relative to those of the teaching profession. PHC coordinators reported the main factors responsible for unwillingness to work in rural areas as the lack of facilities, a poor salary package with no difference from their urban counterparts, a slow promotion process or delays of up to five years for promotion, a high workload, and lack of basic social amenities such as basic accommodation serviced with water and electricity.

The study suggests that administrators and health workers perceive motivation differently. It is therefore important that policy makers reveal these differences as explicit, because false assumptions on the part of administrators may lead to motivational incentives that do not work for staff (Manafa et al. 2009).

Conclusion

The study examined the factors that influenced motivation and retention of health workers in Ona-Ara LGA of Oyo State. The data revealed a mal-distribution of health facilities in rural areas. Both quantitative and qualitative data showed that both financial and non-financial incentives were responsible for workers' motivation to work in rural areas. Data revealed that although financial incentives played an important role in health workers' willingness to work in rural areas, non-financial incentives were also important. For instance, it was revealed that non-financial incentives such as posting, career progression, training opportunities and availability of social amenities may enhance health workers' interest in working in rural areas. Hence, there is a need to address the mal-distribution of health facilities and health workers between urban and rural areas. Rural areas generally have worse living and working conditions, while better non-financial incentives propel health workers to migrate to bigger health facilities (provincial and national hospitals) situated in towns and cities or even to small health facilities in towns and cities.

Government should introduce national-level policies to retain health workers in rural areas and at lower levels of the health system to ensure that all areas reach minimum standards with regard to numbers of personnel per population (for example, the WHO recommended a minimum standard of 20 doctors per 100,000 patients). Also, emphasis should be placed on non-financial incentives such as improved working conditions, training and supervision, good living conditions, communication, training and educational opportunities, family welfare programs, transportation facilities, special promotion conditions and personal recognition for patriotic service delivery.

Finally, government should invest not only in the health workers, but also in the facilities by improving working conditions in rural areas.

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Does Health Insurance Ensure Equitable Health Outcomes? An Analysis of Hospital Services Usage in Urban India

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Abstract

In this paper, we examine the relationship between socio-economic status (SES) and the usage of in-patient services, and analyze the impact of introducing health insurance in India – a major developing country with poor health outcomes. In contrast to results of similar works undertaken for developed countries, our results reveal that the positive relation between usage of in-patient services and SES persists even in the presence of health insurance. This implies that health insurance is unable to eliminate the inequities in accessing healthcare services that stem from disparities in SES. In fact, insurance aggravates inequity in the healthcare market. The study is based on unit-level data from the 2005–06 Morbidity and Health Care Survey undertaken by National Sample Survey Organization.

Introduction

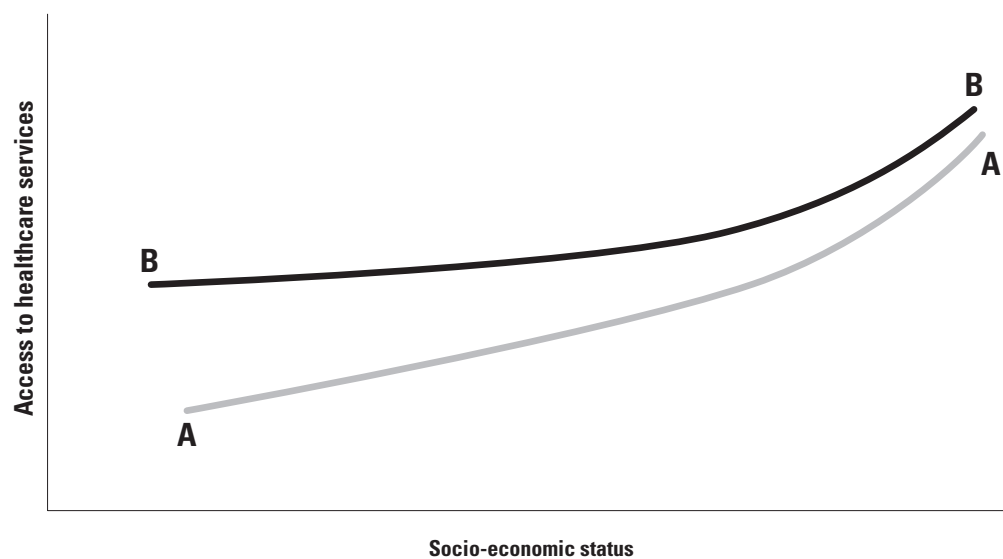
Although access to healthcare services is relatively universal in developed countries, the situation is different for developing countries. In most of such countries, the population relies exclusively on out-of-pocket (OOP) payments, which is inequitable, inefficient and less accountable than other methods of financing healthcare expenses (Visaria and Gumber 1994). The picture is no different in India, with nearly 80% of healthcare expenditure borne by individuals. A recent study estimated that healthcare-seeking behaviour led the poverty headcount ratio to increase by 3.5% in India (Shahrawat and Rao 2012). Given the positive relationship between socio-economic status (SES) and health outcomes – referred to as the health–SES gradient – government intervention is necessary to ensure equitable outcomes in the health market. Introduction of health insurance schemes are a common form of such intervention. Empirical studies of healthcare-seeking behaviour in developed countries have shown that such health insurance schemes may reduce the influence of SES on health status (Fan et al. 2012). Similar studies exploring the health–SES gradient in the presence of health insurance are lacking for India. The present study is an attempt to remedy this deficiency. The objective is to examine whether health insurance can ensure equity in the health market of developing countries. The paper uses unit-level data from a national survey on healthcare expenditure undertaken by the National Sample Survey Organization.

Materials and Methods

Conceptual Framework

In the absence of health insurance, the SES of individuals determines the extent to which they can access healthcare facilities. Given the high OOP expenses of healthcare, the relation between SES and access to healthcare is positive (AA in Figure 1), so persons with poor SES have limited access to healthcare.

Figure 1. Health–SES gradient and insurance



SES = socio-economic status.

There is a further problem with this situation: the healthcare market is characterized by information asymmetries, as the patient cannot assess the worth and relevance of the physicians' advice (because of lack of medical knowledge), while the latter is assumed to possess all relevant information about the patient. Economic theory predicts that in the presence of information asymmetries, an agent (who has entered into a contract to undertake some action on behalf of the principal) has the incentive to act according to his own self-interest at the expense of the

principal's welfare. This is moral hazard. For instance, the demand for medical care is an induced preference (Feldstein 1977), where physicians' interest and peer pressure play an important role in shaping patients' usage of healthcare services. In the presence of information asymmetries, there is a possibility that, guided by physicians, patients will undertake more expensive diagnostic tests and treatment procedures than they require or can afford. This results in catastrophic expenditure¹ and impoverishment of the patient's household.

In such situations, incorporating insurance companies in an otherwise exclusive physician–patient relationship has two positive effects:

- By paying a small monthly premium, persons from even poor SES backgrounds may protect themselves against the heavy OOP expenditure incurred from disease episodes. The impact should be to raise the bottom portion of the health–SES gradient (BB in Figure 1). This improves health outcomes and ensures equity in the healthcare market (Balarajan et al. 2011).²
- Health insurance also reduces the problem of asymmetric information between the actions of physicians and patients (Blomqvist 1991; Kim and Wang 1998; Ma and McGuire 1997; Selden 1990), leading to more efficient health outcomes.

However, the presence of health insurance means that the patient too is participating in the “production” of health. Insurance may encourage insured patients to seek treatment even when such treatment is not essential; this tendency may be encouraged by physicians, so that a double moral hazard may emerge (Bhattacharya and Lafontaine 1995; Demski and Sappington 1991). Simultaneously, as demonstrated by Rothschild and Stiglitz (1976), the presence of asymmetric information in the insurance market may lead to an adverse selection problem. Adverse selection results from an asymmetry in market information in favour of the buyer of insurance – as insurance companies cannot determine whether the insured person is behaving in a risky manner. Two consequences of asymmetric information in the insurance market are:

- High-risk individuals are more likely to buy insurance; and,
- They are also likely to buy larger amounts of insurance than low-risk persons.

This hikes up the insurance premium, reducing the number of persons covered. Typically, the result is exclusion of economically vulnerable sections of the community from insurance coverage. Empirical studies on health insurance (Cutler and Zeckhauser 2000; di Novi 2008) have confirmed these theoretical results. Both moral hazard and adverse selection may operate together, resulting in an inefficient and inequitable equilibrium (Markova 2006; Wallace 2002).

To sum up, theory fails to provide an unambiguous answer to the effects of introducing insurance in reducing inequities in healthcare markets. The answer will depend upon the contextual situation. This motivates us to examine the nature of the health–SES gradient in India, a growing developing country with poor health indicators and low per capita public spending on health, and analyze the impact of insurance on this relationship.

Database and Methodology

The National Sample Survey Organization had undertaken an all-India survey on morbidity and healthcare between January and June 2004. The survey covered 959 million individuals from 199 million households. Only the urban sample is used in this study, as the coverage of rural households under insurance schemes is negligible. In urban areas, of 132,563 incidents of admission to hospital services, only 2.86% were covered under any form of insurance and 0.99% under private insurance.

The paper uses multivariate regression analysis to derive the relationship between SES and usage of hospitalization services, controlling for socio-demographic factors, living environment³ and accessibility to hospital services (per capita hospital beds). SES is captured by per capita monthly family expenditure and household head's education, while socio-demographic control

factors include age, gender of respondent, gender of household head, occupation of household head and household size.

In India, religious and social groups constitute an important category of analysis. Based on information on religion and caste of respondent, we created a variable denoting the socio-religious identity of respondent. The sample is divided into five groups: Hindu Upper Castes, Hindu Scheduled Castes and Scheduled Tribes, Hindu Other Backward Classes, Muslims and Others (comprising of non-Muslim religious minorities). Scheduled Castes (SCs) are Hindus belonging by birth to the lowest of the four castes. They were formerly untouchables and, even now, are often economically and socially depressed. Scheduled Tribes (STs), on the other hand, are members of economically and socially depressed tribes who were also treated as untouchables. In post-Independence India, Articles 341 and 342 of the Constitution provide a list of all SCs and STs under the Constitution (Scheduled Castes) Order, 1950, and the Constitution (Scheduled Tribes) Order, 1950, respectively, to facilitate affirmative action targeting such social groups. Other Backward Classes (OBCs) is a collective term used by the Government of India for castes that are educationally and socially disadvantaged. The complete list of variables is provided in the Appendix.

The study variable is whether the respondent has been hospitalized in the 365 days preceding the survey or not (HOSP). As this is a binary variable, a probit model is used. The basic model is extended by introducing compliances. Compliances refer to health-related efforts of the patient, such as defensive expenditure, seeking insurance coverage, and so forth. This paper considers health insurance (INS). Now, health insurance policies may lead to either moral hazard (the incentive of the insured to seek more healthcare than is required) or adverse selection (the tendency of the sick to choose more generous insurance than the healthy)⁴ or both. This has important consequences for the econometric model.

In the presence of moral hazard, an existing policyholder is more likely to seek healthcare, including in-patient services, on the physician's advice because the patient does not have to bear the expenses incurred as a result of following the physician's advice. This implies:

$$\text{HOSP} = f_1(\text{INS}, V). \quad [1]$$

when V is the vector consisting of SES and control variables. On the other hand, if adverse selection exists, persons expecting to be hospitalized in the future are more likely to purchase health insurance, that is:

$$\text{INS} = f_2(\text{HOSP}, V). \quad [2]$$

In other words, we have a two-way causal relation between insurance and hospitalization. In such cases the instrumental variable method must be used. This method is based on use of an instrumental variable (z) which determines insurance but not hospitalization. This instrument is added to [2], replacing HOSP:

$$\text{INS} = f_2(z, V) \quad [2a]$$

After estimating [2a] we find out predicted probabilities of purchasing insurance (PINS) and plug it in [1]:

$$\text{HOSP} = f_1(\text{PINS}, V) \quad [1a]$$

In this paper, we have used magnitude of loss in household income due to the disease episode as the instrument. The choice of the instrument may be justified by referring to the Permanent Income Hypothesis (Friedman 1957). This hypothesis argues that consumers try to adopt strategies to protect their current consumption from falling due to income shocks (a sudden and temporary decline in income). One such strategy is to insure against income loss from temporary shocks like disease episodes (Folland et al. 2006). The decision to buy health insurance depends on the probability of suffering income loss due to a disease episode but is not exclusively related to the probability of requiring hospitalization⁵.

As noted previously, the introduction of insurance into decision making creates another infor-

mation-related market failure – adverse selection – that now affects outcome in the market for healthcare. Therefore, the decision to purchase insurance:

$$\text{INS} = g1 (\text{HOSP}, \text{CV}) \quad [3]$$

should also incorporate the fact that:

$$\text{HOSP} = g2 (\text{INS}, \text{CV}) \quad [4]$$

We again make recourse to the two-stage model. In the first stage we estimate:

$$\text{HOSP} = g2 (\text{Instrument}, \text{V}). \quad [4a]$$

The instrument here is accessibility of hospital services measured by per capita beds, which determines usage of in-patient services but does not affect insurance coverage and whether the respondent had been ill in the 15 days preceding the survey. The estimated probability of being hospitalized (PHOSP) is substituted into the insurance model [3]:

$$\text{INS} = g1 (\text{PHOSP}, \text{V}) \quad [3a]$$

Findings

Detecting Moral Hazard and Adverse Selection

We have estimated two models regressing whether the respondent was hospitalized, with SES as the explanatory variable – a single equation model without insurance, and a second (two-stage) model including insurance. The results (Table 1) are very similar for both the models.

As expected, the demand for healthcare, like any other commodity demand, depends positively on the patient's ability to pay (proxied by log of monthly household expenditure levels, LPCE). In both models, the coefficient of LPCE is positive and significant at the 1% level. The other proxy for SES is education. Interestingly, we find an inverse U-shape between education of household head and usage of hospital services. We may explain this as follows: Less-educated household heads are less aware of the need for hospitalization (Grossman and Kaestner 1997), and their economic capability to bear hospitalization expenses is also low⁶. At the other end, educated household heads (with more than a secondary level of education) are more aware but require in-patient services less than others as they live in better conditions⁷ and are less exposed to health hazards.

Table 1. Regression results of hospitalization on SES – with and without health insurance

Variables	Without health insurance			With health insurance		
	Odds ratio	z	Probability	Odds ratio	z	Probability
PINS				3.79	2.42	0.02
Log of monthly household expenditure	1.14	5.10	0.00	1.10	3.39	0.00
Education of household head (Ref: Below primary education, including informal education)						
Illiterate	0.80	-6.10	0.00	0.80	-6.22	0.00
Primary	0.94	-1.86	0.06	0.94	-1.92	0.06
Secondary	0.94	-1.78	0.08	0.94	-1.93	0.05
Higher secondary	0.85	-4.17	0.00	0.83	-4.66	0.00

Table 1. Continued

Variables	Without health insurance			With health insurance		
	Odds ratio	z	Probability	Odds ratio	z	Probability
Occupation of household head (Ref: Service)						
Professional	0.87	-2.75	0.01	0.86	-2.86	0.00
Administrative	0.88	-2.61	0.01	0.86	-2.98	0.00
Clerk	0.90	-2.15	0.03	0.90	-2.13	0.03
Sales	0.86	-3.41	0.00	0.85	-3.56	0.00
Primary	0.92	-1.64	0.10	0.92	-1.66	0.10
Manufacturing	0.95	-1.16	0.25	0.95	-1.29	0.20
Others	0.79	-4.31	0.00	0.78	-4.38	0.00
Socio-religious identity (Ref: Hindu Scheduled Castes & Scheduled Tribes)						
Hindu upper caste	0.89	-3.50	0.00	0.88	-3.60	0.00
Other backward castes	0.94	-1.87	0.06	0.94	-1.90	0.06
Muslim	0.97	-0.74	0.46	0.98	-0.65	0.52
Others	0.91	-2.11	0.04	0.91	-2.24	0.03
Living environment	1.00	-0.33	0.75	1.00	-0.09	0.93
Age	1.02	44.37	0.00	1.02	43.81	0.00
Gender of respondent (Ref: Male)						
Female	0.95	-2.69	0.01	0.95	-2.52	0.01
Household size	0.91	-18.60	0.00	0.91	-16.44	0.00
Gender of household head (Ref: Male)						
Female headed household	1.04	0.97	0.33	1.04	0.98	0.33
Per capita beds in state	1.00	4.30	0.00	1.00	4.29	0.00
Observations	132417			132417		
LR χ^2	2772.59		0.00	2778.14		0.00
Pseudo R ²	0.04			0.04		

PINS = predicted probability of purchasing insurance; SES = socio-economic status.

Thus, contrary to the literature (Guralnik et al. 1993; Mincer 1974; Pappas et al. 1993; Somers 1986), we find that the positive relationship between healthcare usage and SES persists – the coefficient of LPCE falls marginally from 1.14 to 1.10 – even if we introduce insurance into our model. One reason may be the low insurance coverage in India (Government of India 2005). Moreover, SES may remain an issue due to the complete or partial withdrawal of “cashless insurance cover⁸,” because of problems like co-insurance, co-payment, and so forth⁹.

The coefficient of PINS (predicted probability of purchasing insurance) in the model with insurance is positive and significant. This implies that insured respondents are more likely to seek hospitalization services – indicating the presence of a moral hazard. However, we cannot identify whether the moral hazard is on the patient’s part (he/she seeks treatment on his/her own) or the physician’s (the physician recommends unnecessary treatment).

In the next two-stage model ([3] and [4]), we test for the presence of adverse selection. Results reveal that the coefficient of PHOSP is significant at the 1% level and is positive (Table 2). This implies that respondents who expect to be hospitalized are more likely to purchase health insurance, indicating the presence of adverse selection.

Table 2. Results of regression model of insurance: detecting adverse selection

Variables	Odds Ratio	z	Probability
PHOSP	6.90	4.72	0.00
Log of monthly household expenditure	4.83	25.69	0.00
Education of household head (Ref: Below primary education, including informal education)			
Illiterate	0.57	-2.83	0.01
Primary	0.97	-0.21	0.83
Secondary	1.62	4.33	0.00
Higher secondary	2.32	7.45	0.00
Occupation of household head (Ref: Service)			
Professional	3.23	4.97	0.00
Administrative	4.49	6.44	0.00
Clerk	2.55	3.90	0.00
Sales	3.59	5.44	0.00
Primary	1.51	1.34	0.18
Manufacturing	2.59	3.98	0.00
Others	2.64	3.80	0.00
Age	1.04	7.38	0.00
Square of age	0.99	-6.65	0.00
Gender of respondent (Ref: Male)			
Female	0.79	-4.07	0.00
Socio-religious identity (Ref: Hindu Scheduled Castes & Scheduled Tribes)			
Hindu upper caste	1.79	4.04	0.00
Other backward castes	1.63	3.19	0.00
Muslim	0.54	-2.87	0.00
Others	2.27	5.27	0.00
Household size	0.78	-15.51	0.00
Gender of household head (Ref: Male)			
Female head	0.92	-0.69	0.49
Loss of household income	1.00	1.29	0.20
Observations	132417		
LR χ^2	2719.71		0.00
Pseudo R ²	0.18		

PHOSP = predicted probability of being hospitalized.

We again find SES a significant predictor of the decision to purchase insurance. Respondents coming from families with high expenditure levels or with better-educated heads are more likely to purchase insurance.

Variations over SES

Finally, we compare the magnitude of coefficients of PHOSP and PINS across expenditure classes and education levels.

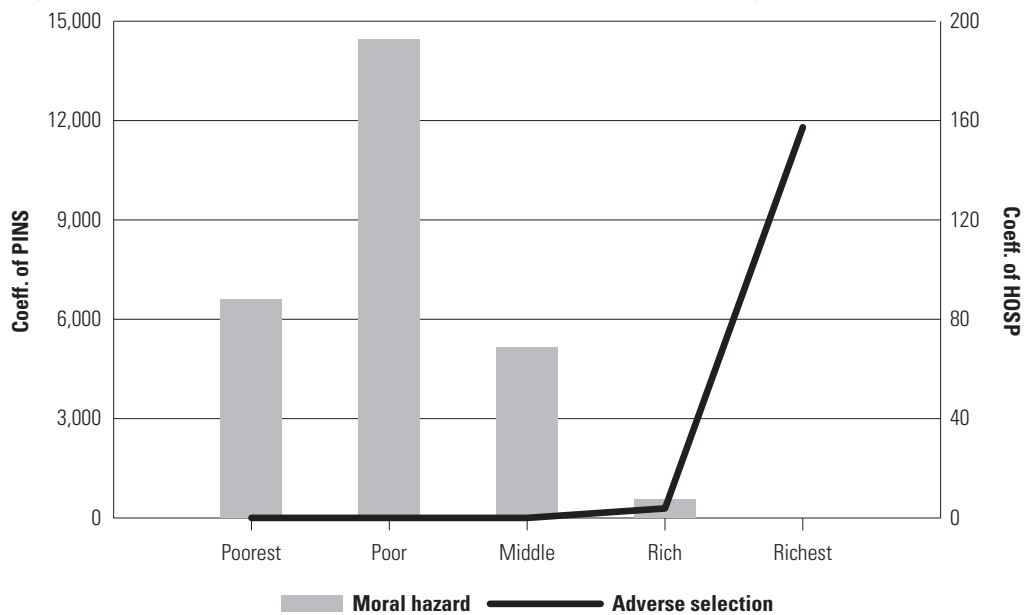
We first group the sample into five quintile groups using family expenditure levels (so that each group contains one fifth of the sample). We label these expenditure groups as poorest (bottom 20%), poor (next 20%), middle (middle 20%), rich (next 20%) and richest (top 20%).

In Figure 2 we plot the coefficients of PHOSP and PINS (obtained from [6] and [7]) for each of these expenditure groups.

$$\begin{aligned} \text{HOSP} &= a + b \text{ PINS} + c_1 \text{SD}_1 + c_2 \text{SD}_2 + c_4 \text{SD}_4 + c_5 \text{SD}_5 + d \text{ control variables} \\ \text{when SD}_i &= \text{PINS if respondent is from } i\text{th monthly family expenditure quintile} \\ &= 0 \text{ otherwise} \quad [6] \end{aligned}$$

$$\begin{aligned} \text{INS} &= \alpha + \beta \text{ PINS} + \gamma_1 \text{SD}_1 + \gamma_2 \text{SD}_2 + \gamma_4 \text{SD}_4 + \gamma_5 \text{SD}_5 + \delta \text{ control variables} \\ \text{when SD}_i &= \text{PHOSP if respondent is from } i\text{th monthly family expenditure quintile} \\ &= 0 \text{ otherwise} \quad [7] \end{aligned}$$

Figure 2. Variation of coefficients of PHOSP and PINS across expenditure groups



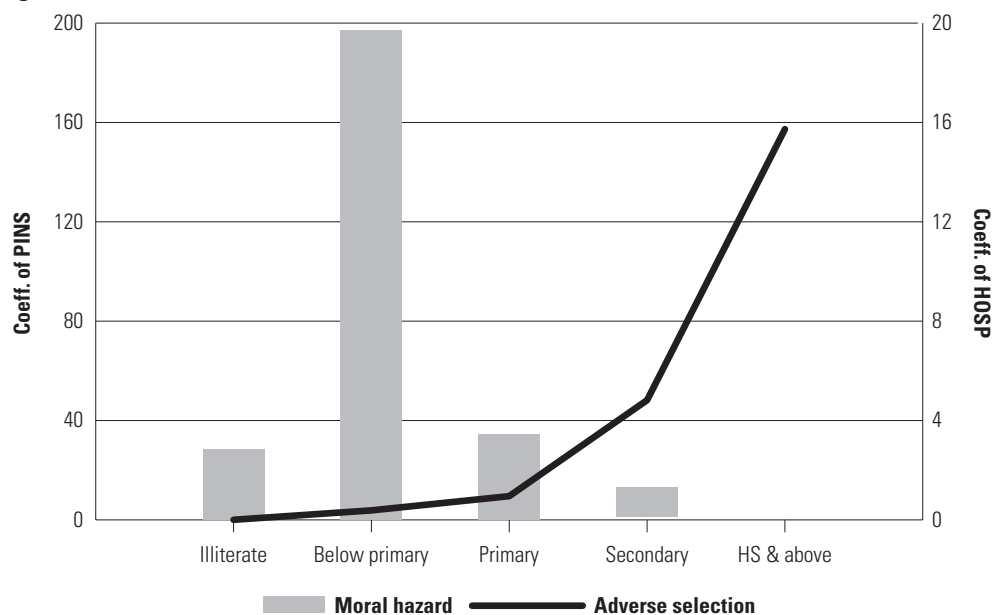
HOSP = hospitalized in year preceding survey; PHOSP = probability of being hospitalized; PINS = predicted probability of purchasing insurance.

The intercept gives the value of PINS (or PHOSP) for the third quintile group; the coefficients of PINS and PHOSP for the remaining quintile groups are given by $(c_i - a)$ and $(\gamma_i - \alpha)$, respectively.

We can see that the tendency of insured people to seek in-patient care (moral hazard) is lower for respondents belonging to higher expenditure classes (Figure 2). This is in line with earlier studies of health insurance in developing countries (Jowett et al. 2004). With respect to the tendency to purchase insurance, however, we find that it is the fourth – and particularly the fifth – quintile that displays adverse selection. This has interesting implications, as this economic class is not only the least economically vulnerable but also has the purchasing capacity to drive up the insurance price beyond the ability of the poorer expenditure groups.

One important problem in interpreting the coefficient of PINS as indicative of the presence of moral hazard is that it may simply reflect variations in awareness of the importance of health as a capital good. This may be checked by examining the variation of coefficient of insurance over education levels.

Figure 3. Variation of coefficients of PHOSP and PINS across education levels



HOSP = hospitalized in year preceding survey; HS = higher secondary; PHOSP = probability of being hospitalized; PINS = predicted probability of purchasing insurance.

Similar to [6] and [7], we construct equations for HOSP and INS and incorporate slope dummies for education levels in these two equations. Figure 3 depicts variations in the coefficients of PINS and PHOSP across educational groups.

We find that the tendency to seek in-patient care decreases at higher levels of education. This rules out the possibility that greater health-seeking by the rich reflects their awareness of the importance of protecting their health status. Rather, our initial conjecture that moral hazard is present in the Indian health market is supported. On the other hand, even though the likelihood of seeking insurance coverage increases with education levels, this does not negate the possible presence of adverse selection.

Conclusion

The paper analyses the nature of usage of in-patient services among Indian households. Our starting point was that SES determines usage of hospital care, creating inequities in the health-care market. Studies of health insurance markets generally show that the introduction of health insurance into the healthcare market reduces the inequities in usage of healthcare. In contrast, we find that SES remains an important determinant of hospitalization usage even in the presence of insurance. This implies that the health insurance market in India is not eliminating the inequities in seeking healthcare services by providing coverage to those most in need of it. The health-SES gradient does become less steep in urban areas, but the decrease is not marked – the odds ratio of LPCE falls from 1.14 in the absence of insurance to only 1.10 after introducing insurance. There may be two reasons for the failure of health insurance to reduce inequities in utilization of hospitalization services. One is the failure of the state to provide health coverage to the poorer households. Secondly, linking tax rebates to investment in health insurance policies encourages relatively affluent households to purchase health insurance, pervasively increasing existing inequities in the healthcare market. The impact of these two forces is to make insurance coverage highly regressive¹⁰.

Another problem is the presence of market failures, leading to further distortions in market equilibrium. Firstly, results show that persons who believe they may be hospitalized in the future are more likely to purchase insurance. Secondly, the presence of insurance coverage significantly affects the decision to be hospitalized, leading to more claims. Both these effects create an upward pressure on the price of insurance, thereby pushing it further beyond the reach of the poorer sections of the community. This poses major challenges to public health policy in India, particularly in the context of the recommendations of the High Level Expert Group (HLEG) on Universal Health Coverage for India (Government of India 2011). The HLEG calls on the state to provide “affordable, accountable, appropriate health services of assured quality ... with the government being the guarantor and enabler, although not necessarily the only provider ...” (Government of India 2011: 9).

Our findings indicate that attempts to ensure universal health coverage and introduce community health insurance schemes may create moral hazard and lead to a massive upsurge in demand for healthcare facilities. Therefore, implementing this recommendation will require a complete overhaul of the health sector, incorporating aspects like remodelling healthcare institutions, establishing infrastructure to create human resources in health, delineating protocols for treatment, providing medicines and finding resources to fund this massive exercise. The last point is particularly important as the HLEG estimates that public spending on health will have to jump from the current 1.2% of GDP to 3% in 2022. Whether the Indian government will be able to rise to this challenge remains to be seen.

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Notes

1. Catastrophic health expenditure occurs when households have to reduce their expenditure on food and other items over a period to cover the OOP expenses of diagnosis and treatment. The catastrophic threshold is generally taken as cost of a disease episode in excess of 40% of total income (expenditure) or 20% of expenditure on food items.
2. Richardson et al. (2012), however, point out that the barriers to accessing health services remained even after the introduction of mandatory social health insurance coverage in Moldova.
3. The variable “living environment” is the score from principal component analysis undertaken on variables indicating structure of house, quality of drinking water (based on combination of source of drinking water and nature of its treatment), type of drainage and sanitation, and source of energy. The Kaiser-Meyer-Olkin (KMO) test for data adequacy (0.7644) indicates that factor analysis is permissible; the eigenvalue is 2.29, capturing 45.76% of the variation. Normalized scores (ranging from 0 to 100) are used in the econometric analysis. High scores indicate healthier living conditions.
4. In addition, we can also have the problem of supply-induced demand (the incentive of the physicians to refer insured patients for hospital admission).
5. Correlation between loss in income due to hospitalization and hospitalization is 0.0125. This is very low, so that use of loss in income due to hospitalization may be taken as an instrument.

6. Mean annual expenditure of illiterate-headed households – Rs. 47,708 (approximately xxx US dollars), 23% below the mean annual expenditure of the sample – is lower than that of other households.
7. Factor scores of living environment for households headed by an individual with secondary and higher education are 73 and 81 respectively, compared to the sample average of 62.
8. Cashless insurance cover refers to a system whereby the patient is provided with treatment against a nominal fee, or even without any payment, by the health care provider. The actual expenses incurred are recovered from the third party, in this case the health insurance company covering the patient. In India hospitals have tended to inflate expenses while claiming reimbursement from health insurance companies. This led to restrictions on cashless insurance cover. Some companies withdrew this system, while others require the patient to pay a higher fee (that is reimbursed).
9. In 2010, for instance, major health insurance companies in India announced the withdrawal of cashless hospitalization facilities to policy holders as private sector hospitals were overcharging patients.
10. This is indicated by the value of Kakwani's concentration index (0.51). Kakwani's Index (Kakwani et al. 1997) ranges from –1 to +1, with high positive values denoting regressive coverage and low negative values denoting progressive coverage.

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Appendix: List of variables

Variables	Meaning
HOSP	Whether respondent has been hospitalized in year preceding survey
INS	Whether respondent has holds any private insurance
PHOSP	Predicted probability of being hospitalized in year preceding survey
PINS	Predicted probability of purchasing insurance
Log of Monthly Household Expenditure	Log of expenditure per month by family
Education of household Head	
Illiterate	Household head is illiterate
Below primary (Ref. Cat.)	Household head has below primary education, including informal education
Primary	Household head has primary level of education
Secondary	Household head has secondary level of education
Higher secondary	Household head has higher secondary or above level of education
Occupation of household head	
Professional	Household head is a professional
Administrative	Household head is an administrator
Service (Ref. Cat.)	Household head is in service
Clerk	Household head is a clerk
Sales	Household head is a salesperson
Primary	Household head is engaged in primary sector
Manufacturing	Household head is engaged in manufacturing sector
Others	Residuary category of occupation of household head
Socio-religious identity	
Hindu upper caste	Respondent belongs to Hindu Upper Caste
Hindu SCs & STs (Ref. Cat.)	Respondent belongs to Hindu Scheduled Castes & Scheduled Tribes
Other backward castes	Respondent belongs to Hindu Other Backward Castes
Muslim	Respondent belongs to Muslim community
Others	Respondent belongs to non-Muslim religious minority community
Living environment	Factor score of structure of house, quality of drinking water (based on combination of source of drinking water and nature of its treatment), type of drainage and sanitation, and source of energy
Age	Age of respondent
Square of age	Square of age of respondent
Gender of respondent	
Male (Ref. Cat.)	Respondent is male
Female	Respondent is a female
Gender of household head	
Male headed household (Ref. Cat.)	Respondent belongs to household headed by male
Female headed household	Respondent belongs to household headed by female
Household size	Number of members in household
Loss of household Income	Income lost by respondent and family members due to disease episode
In-patient treatment	Whether respondent had sought treatment as an out patient in 15 days preceding survey
Per capita beds in state	Number of beds divided by population of state

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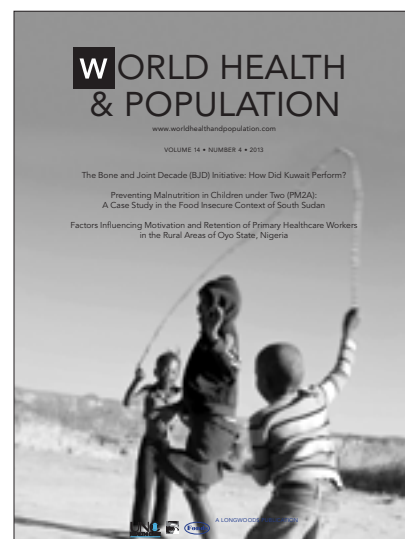
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