



Healthcare provider views on the health effects of biomass fuel collection and use in rural Eastern Cape, South Africa: An ethnographic study



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ABSTRACT

Policymakers at global level recognise that household biomass use in developing countries has significant health consequences. However, it is unclear how local-level health professionals perceive and respond to such health effects. This paper which is derived from the findings of a larger study on perceptions and responses to the harmful health effects of carrying heavy firewood loads and to smoke from cooking fires is based on a study conducted in South Africa among managers of health programmes and community nurses of Qaukeni and Mhlontlo municipalities in rural Eastern Cape. Interviews and participant observations were conducted in 2009 using ethnographic grounded theory approaches. In addition to a 10-month period of ethnographic fieldwork, ten programme managers and nurses in two villages were interviewed about health patterns in the villages that they serve, their perceptions of, and responses to the health effects of carrying heavy firewood loads, and inhalation of smoke from wood and dung cooking fires, their professional qualifications and experience, their own household energy use; and observations made as they served clinic clients. Results show that these programme managers and nurses perceive the health effects of carrying heavy loads of firewood and of cooking smoke as minor. Sometimes, nurses give women symptomatic relief for musculoskeletal pain resulting from carrying heavy loads. We posit that their perceptions are derived from customary neglect of work-related health and non-communicable diseases, cultural interpretations of womanhood, limited access to relevant information, and limited interactions between health and energy sector professionals. We conclude that culturally and gender-sensitive awareness programmes are needed for local-level health professionals to effectively address health effects of biomass collection and use. This paper provides new insights into overlooked differences between globally-driven initiatives to address health effects of biomass use and local perceptions.

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Introduction

An estimated three billion people worldwide depend on solid fuels such as firewood, post-harvest waste, dung and coal for cooking and heating (WHO, 2011). In sub-Saharan Africa the work of collecting these fuels and cooking with them is mostly done by women and children. The carrying of firewood, often on the head

(headloading), has been linked, although not consistently, to poor health outcomes including miscarriages (Haile, 1991, 94 pp.; Rabiee & Geissler, 1992), and musculoskeletal injuries and pain (Echarri & Forriol, 2002; 2005). There are also reports of sexual harassment and rape during firewood collection in conflict and non-conflict settings (Hampshire, Porter, Mashiri, Maponya, & Dube, 2011; Kasirye, Matinga, & Clancy, 2009; Porter, Hampshire, Mashiri, Dube, & Maponya, 2010). Cooking with solid fuels in open fireplaces or on poorly designed stoves, results in pollutant emissions leading to respiratory impairment and susceptibility to infections (WHO, 2006, 42 pp.).

There are no global data on the health effects of carrying heavy loads in domestic settings but studies show that wood carriers can

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carry an average of between 28 kg and 36 kg depending on age, season, purpose for the wood and other factors, and as much as 70 kg of firewood, several times a week (Bembridge & Tarlton, 1990; Biran, Abbot, & Mace, 2004; Gandar, 1983; Haile, 1991, 94 pp.; Matinga, 2010). Thus given that the majority of the population in developing countries is engaged in manual carrying in domestic settings, the health burden could be substantial. However, there is less attention given to health issues related to fuel collection compared to that given to effects of cooking with firewood. Domestic air pollution from solid fuels is estimated to cause nearly two million deaths annually throughout the developing world, chiefly among women and children (WHO, 2011). Such evidence has over the last decade kindled international interest, and the United Nations (UN) Foundation's Global Alliance for Clean Cook stoves and the World Bank's African Clean Cooking Energy Solutions initiative are among major efforts to address energy-related indoor air quality problems in developing countries. The WHO organisation is also engaged in addressing energy-related health effects of indoor air pollution, through research support and data provision. Nationally, countries such as South Africa have included the need to reduce health effects of biomass collection and use in their energy policies although the implementation of such policies is questioned (Matinga, 2010). India, China and Peru have also rolled out major clean cooking or cook stoves initiatives. International and national initiatives have focused on promoting cleaner cook stoves and fuels, introducing standards and regulations for cooking stoves and fuels, advocating changes to energy policy, promoting awareness of effects of cooking smoke and behaviour change among users, and introducing financing schemes to help increase affordability of cleaner cooking technologies and fuels.

While global campaigns garner international support, it is local-level health and energy practitioners that have to implement any emerging policies, catalyse behaviour changes or advocate the adoption of new technologies for health improvement. With no local energy professionals in many developing countries (Matinga, 2010), it is local health professionals that will be key intermediaries. Where health practitioners are unaware of the health consequences of particular technologies and actions or perceive the consequences differently from those initiating such policies, they cannot effectively act as agents to facilitate the desired changes. They are therefore a vital link in the emerging global initiatives to address the health effects of household energy use in developing countries. Before rolling out global household energy-health interventions, it is therefore important to understand how local-level health practitioners can be a part of such initiatives. One step toward this is to understand how the local health professionals currently perceive and respond to these problems, if at all. However, there are no studies that have been reported in the literature in this regard. This study which is part of a larger ethnographic PhD research on health impacts of energy use and acquisition (Matinga, 2010) begins to fill this knowledge gap.

Methods

The research approach used in this study was ethnography, and grounded theory (Charmaz, 2006; Glaser & Strauss, 1967). Data were collected using interview guides, participant observations and long engagement. Long engagement meant for one of us (MNM), living in two villages: in Cutwini for three months in 2007 (July–October) and two months in 2009 (June–July), while five months were spent living in Tsilitwa in 2009 (February–May, then August–September). This enabled a better understanding of the socio-economic and cultural context mediating perceptions and responses of both health care providers and the residents that they serve.

Broad themes for the interview guide with health care professionals included length of service, work or programme focus, common health issues addressed, household energy use of the health care professionals, awareness and perceptions of health effects of firewood collection and cooking smoke, and actions taken by the respondents in response to these effects. In Qaukeni local service area, interviews were conducted with the chief community health nurse, who managed four programmes and its associated programme managers at St Elizabeth Hospital and Gateway Clinic in Lusikisiki (the largest town in the district). Observations were made at the one mobile clinic that Qaukeni local service area conducted in Cutwini village in 2009 where MNM had discussions with health professionals and helped them with petty tasks such as lining up clinic attendees and packaging dispensed medicines. The observations spanned three hours from when villagers started to congregate before the health workers arrived, until after the health workers departed, when villagers dispersed. During this period, discussions were held with three other health workers. While multiple observations would have given a better picture, the mobile clinic which is supposed to be conducted monthly in Cutwini often takes place once in 3–4 months for a range of reasons, and was held once during the researcher's stay. This made it impossible to make repeated observations.

In Mhlontlo local service area, three interviews were conducted with the chief nurse from Tsilitwa. The interviews were held with her in her role as a nurse, as a development forum member, both held at the clinic; and as a homeowner and community member, held at her home. In addition, observations were made at Tsilitwa clinic over two days including one ante-natal services day and were supported by discussions with the nurse-in-charge and village health care workers made during various visits to the clinic. Each observation episode lasted an average of four hours when the clinic was active, during which detailed notes were taken. In addition, hospital records covering a three week period, of what services clinic attendees came to the clinic for were examined. Further interviews were conducted with eight programme managers from Mhlontlo local service area.

As a result of an imbalance in the staffing levels as well as availability of staff, more interviews were held in Tsilitwa than in Cutwini.¹ However, this did not negatively impact the results of the study since the data is not reported comparatively but as reflecting perceptions and responses of health care professionals at municipal and village level within their specific cultural context.

All interviews were conducted in a mix of English and Xhosa since nurses used the two languages interchangeably – as is common among professionals in the region. MNM learnt Xhosa to undertake the study and spoke both languages fluently. Clearance to conduct the study was first requested and received from the Eastern Cape provincial health department. The researcher then introduced the research objectives to the local service area managers who introduced it to her staff, in the presence of the researcher. Before interviewing each individual, the research objectives were explained again and consent was sought for the interviews and to record them. Only two programme managers refused to respond. One, because she was going to a village meeting, another because she felt the research had nothing to do with her work focus which was in fact environmental health. Two programme managers requested to be interviewed together because they were both dealing with the same subject of health promotion, and considered it more efficient to be interviewed together. The request was granted.

¹ Total relevant staff in Cutwini was 5 while in Tsilitwa it was 12.

Answers were audio-recorded then transcribed verbatim in English with exception of cultural concepts which were notated and described. The transcripts were read two or more times before coding them, first using *in vivo* codes and later using focused, axial and theoretical codes (Dey, 1993; Miles & Huberman, 1994). Observation notes were similarly coded. Comparisons were done between the codes from the interview transcripts and observation notes with the health practitioners and those from the household interviews in the larger PhD study. From these, analytical memos were generated on emerging themes. For two interviews, the researcher followed up on responses by telephone to clarify meanings. All data were interpreted within the context of data collected from the larger PhD study, the empirical and the theoretical literature, focussing on the meanings of the practitioners' actions.

Study setting

Study population

The study reported here was conducted among programme managers and nurses in two local services areas, each serving about twenty villages in rural Eastern Cape (formerly Transkei), South Africa. One local service area consisted of nurses from Qaukeni Municipality and the other was of programme managers and nurses from Mhlontlo Municipality. Both local service areas cater for communities that comprise predominantly Xhosa ethnic groups. The two local service areas are about 185 km and 3 h travel by car from each other.

All health personnel interviewed were females of the wider Xhosa ethnic group and were born and raised within 20 km from the hospital they work in, except for one nurse from Mhlontlo, whose home village was 90 km from the hospital. The dominance of females in the sample reflects the situation in South Africa where 94% of all nurses are female, a proportion which is higher in rural areas (SANC, 2007). The dominance of Xhosa respondents from this area is not by design but because rural areas tend not to attract staff from other areas and are served by local professionals, thus all staff in these two local service areas were Xhosa and local. On average, all respondents had completed four-year nursing degrees and professional trainings in various specialities. This education is based on the western-informed biomedical model of health care. Their programme focus included HIV, nutrition, chronic diseases, health promotion, and maternal and child health.

In Qaukeni, only one nurse, the chief community health nurse, was interviewed out of a staff of four. She was 63 years old and had 35 years of nursing and community health experience. In Mhlontlo, eight programme managers and nurses from the municipality and one nurse from Tsilitwa village were interviewed. The average age of programme managers and nurses from Mhlontlo was 46 years, and their average number of years working either as a nurse or as programme manager was 18. When the two youngest nurses are excluded, the average work experience rose to 32 years. All the programme managers had at least ten years' experience working as nurses before becoming managers. Also, all programme managers and nurses reported using different combinations of electricity, gas and firewood for cooking and heating in their own homes, with occasional use of cow dung.

All interviewees had multiple identities in their lives. These included their professional roles as programme managers or nurses, and their roles as Xhosa women, mothers, wives, daughters or mothers-in-law. As Xhosa women, they were familiar with Xhosa gendered divisions of labour, gendered expectations and were accordingly socialised in their lifetime. During the interviews, they spontaneously interweaved narratives of their professional

work with those of their life experiences as Xhosa women growing up in the areas that they now serve. These narratives showed that all their role dimensions mediate their perceptions and responses as professional health care providers. Both are reported in this paper because their subjective personal experiences help explain the meanings of their responses in their professional work.

While this paper focuses on the perceptions and responses of professional health care providers, it is important to locate their work, perceptions and responses within the socio-economic and energy context of the clients that they serve. The following subsection therefore provides a general sense of the clients that the health professionals serve and the clients' firewood collection and use practices, based on the data from Cutwini and Tsilitwa gathered for the larger PhD study.

Broad context of two of the villages in which the health care professionals worked

One of the researchers (MNM) lived in two of the villages served by the two local service areas while undertaking an ethnographic PhD research. The first village, called Cutwini is served by Qaukeni local service area, and the second, Tsilitwa village, is served by Mhlontlo local service area. These villages are characterised by high levels of unemployment, low levels of subsistence farming, and dependence on government welfare grants, chiefly for children. While some villages served by these local services areas had access to electricity, others, especially in Qaukeni Municipality, did not. Residents of the latter depend entirely on firewood, cow dung and, to a lesser extent paraffin, for domestic cooking and heating. However, whether a village has electricity or not, the dominant energy source for cooking in rural Eastern Cape is firewood, followed by paraffin and electricity where there is access, then cow dung in some areas. At the time of the study, Cutwini had no electricity but Tsilitwa had been connected to the national grid. Use of Liquefied Petroleum Gas (LPG) was rare in both villages.

The study by Matinga (2010) showed that the bulk of firewood in both Cutwini and Tsilitwa is collected by female members of individual households, although in Tsilitwa, some of firewood is transported to the village by vehicles and sold to households. Young men under the age of 15 occasionally assist with firewood collection in both villages. The collection of firewood by females is consistent with other studies in South Africa (Mahapa & Mashiri, 2001; Potgieter, Pillay, & Rama, 2006) and elsewhere in Africa (Biran et al., 2004; Concern Universal, 2012; Porter et al., 2010; Porter et al., 2013). For the two villages in this study, distances to the nearest forest, as measured by an odometer and a GPS-enabled phone, ranged from 7 km to 12 km. Household interviews ($n = 75$ for Cutwini and 89 for Tsilitwa) showed that the ages of firewood collectors range from 5 to 80 years old. In addition to household interviews, in Cutwini village, firewood collectors were intercepted as they returned from firewood collection trips, and their firewood bundles were weighed before the collectors were interviewed about their experiences. Weighing of the firewood bundles was done by weighing the collector while they stand on a scale carrying the firewood bundle then again without the bundle and using the difference as an estimate of the weight of firewood bundle, as previously used by Biran et al. (2004) in Malawi and Tanzania. The weights of the firewood bundles ranged from 8 kg carried by an 8-year old to 70 kg carried by adult women. The majority of pubescent and post-pubescent women carried loads of between 28 kg and 36 kg. Interviews and observations showed that collectors collect firewood an average of three times a week, from adolescence to adulthood sometimes varying frequency depending on seasons, household workloads and end-uses of the firewood loads (e.g. just before ceremonies, they may collect more frequently or

heavier loads to meet the firewood needs for the occasion). In cases of sickness, pregnancy or injury, firewood collection duties may be redistributed to other females in the household and occasionally, firewood may be purchased. However, in many cases, this is not possible and women have to continue to collect firewood through sickness, pregnancy and injury unless they are bedridden. For example, in one case, MNM collected firewood with a nine-month pregnant woman, who delivered her infant within a week of that firewood collection trip. Her firewood load weighed 37 kg. In Tsilitwa it was not possible to weigh firewood bundles because the majority of households had their firewood delivered and those that collected themselves refused to take the responsibility of going to the forest with the researcher (MNM) in case “anything happens”. This was in part due to Ward Councillor’s warning to the residents to ensure safety of the researcher (Matinga, 2010) and also because at the time of the study, there were high safety concerns in Tsilitwa even around and in homestead environs.

In both villages, residents cook indoors on an open fire. Although huts often have open doors, there is enough smoke to cause breathlessness, impair visibility and irritate eyes. Household members, chiefly girls, begin cooking-related tasks at about 5 years of age. They start with tasks such as blowing the fire and tending it. Interviews and observations in Cutwini, Tsilitwa and in surrounding villages showed that by the age of 13 years, a girl is expected to have mastered all “female tasks” including collecting water and firewood, cooking, plastering houses and looking after children (Matinga, 2010).

Interviews and observations in both villages showed that residents use both biomedical and alternative models of health care to address their ailments (Matinga, 2010). Ways of addressing ailments include traditional ancestral beliefs and use of traditional herbal remedies. Having been influenced by Christianity, beliefs in faith-healing are also common. In many cases, individuals use these modes of addressing health problems in combination and not exclusively.

The following section presents findings of the study, focussing on data from interviews with health care providers and observations at the clinics. Data from household interviews, observations and participation are presented only to clarify the results of the health care providers’ data.

Findings

Health professionals’ perceptions of, and responses to the health effects of firewood collection

The interviews with programme managers and nurses showed that none of their programmes and activities proactively incorporates the health effects of firewood collection. The most common reason given was that these effects are “just part of

women’s work” and that they are not part of the respondents’ training or their professional discourses. Four of the programme managers reported that in their experiences both as nurses and as programme managers, women do sometimes report musculoskeletal pain and injuries resulting from collecting firewood. These include compressed chests (thoracic cavity stress), neck pain and stiffness, fractured bones, snake bites and superficial wounds. In such cases, the clinics administer pain killers, analgesic or wound ointments, and treat any fractures. This was confirmed by observations at the mobile clinic in Cutwini where analgesic cream was one of the most requested medications to the extent that the clinic ran out of it within the first hour of the three hour clinic service (Table 1).

Observing the clinic day, the researcher noted that clients asked for “irubbing stuff” (the local term for analgesic creams) or oral pain killers, and nurses provided it without asking why the clients needed it. The nurses reported that they know these medicines are used to deal with body pains resulting from heavy work. The implication of this approach is that the symptoms are not systematically traced back to their causes. This then means that there is limited information and hence understanding of the health effects of firewood collection and other household work in the health information systems. As such, morbidity burden assessments may underestimate the health effects of carrying heavy firewood loads. Secondly, because there is no contextualisation of health issues such as musculoskeletal disorders, there is no clear understanding of the various causes and implications of such disorders.

None of the programme managers or nurses reported sexual harassment of clients during firewood collection. To an extent, this is consistent with household interviews. No one reported sexual harassment or physical violence during firewood collection in Cutwini but in Tsilitwa, one respondent reported being chased and beaten (while in a group) and another woman reported a friend’s attempted rape.

One programme manager stated that some young women collect firewood for “friendship reasons”, that is; as a way of socialising. As such she felt that the young women are not adversely affected, since they also enjoy the associated benefits of camaraderie during firewood collection. While collecting firewood in groups was reported as a means of socialising, it may also be a protection mechanism against threats to personal safety during collecting. It must however be stated that household respondents emphasised that most sexual harassment and rape incidents occur around homesteads, often perpetrated by acquaintances.

One programme manager had a Bachelor’s degree in Occupational Health, and managed the chronic diseases programme. Her programme focused on the effects of work on health, particularly chronic musculoskeletal disorders and respiratory illness including Chronic Obstructive Pulmonary Disease (COPD) and Acute Lower Respiratory Infections (ALRI). This respondent is therefore especially

Table 1
Most requested medicines on clinic day in Cutwini village.^a

Medication	Ranking in order of most requested	Ranking in order of most dispensed	Remark
Cough medicine	1	Not available on the day	Most requested but not available
Methyl salicylate (<i>irubbing stuff</i>)	2	3	Most requested but ran out
Zentel (Albendazole)	2	2	Children only
Prexum	2	2	Adults only
Moxypen 250 and 500 mg	3	1	Adults
Enthromycin 250 mg	3	1	Adults only
Contraceptive injections	4	4	22 women
Vaccinations	5	5	17 children vaccinated
Iodine	6	6	2 children served

^a ARVs, often code-named *treatment* by locals are not included here. Although cough medicines were not available, they are rated here as most requested because about a third of the patients left when they were told that cough medicines were not available.

interesting in this study because the effects of carrying firewood and of cooking smoke can potentially be addressed within her programme. However, she reported that the programme only focuses on these when the health effects result from paid and formal work. For rural Eastern Cape, this means focussing on (migrant) miners and ex-miners, to the exclusion of women and men whose work is primarily in households, in agriculture and in informal settings.

One manager pointed out that people, including nurses, are not aware of the effects of firewood collection on the spine and take it as part of life, rather than a health problem (Table 2). The community health nurse at Qaukeni local service area pointed out that although professionally she realised that carrying firewood was physically painful and often resulted in chronic life-long pain, the professional health care sector does not address this:

“We simply wouldn’t think about it that way because... like... that information is not there in our training. They [nurses] would treat the patient; they wouldn’t send her away but they would just say ‘It’s backache’ and give amapainkillers [pain killers] and irubbing stuff. People, even nurses, are simply not aware.” (Community Health Nurse, interview, 15th April 2009).

Not all health care providers regarded collecting firewood as having negative or neutral effects on health. Three programme managers, two of whom were Health Promotion and Community Liaison Officers, perceived firewood collection as beneficial exercise for pregnant women. They reported that they encouraged it as part of health promotion:

“We encourage them to collect wood as a form of exercise because you know with their [household] work they are always busy so they cannot go running [jogging] so we encourage that [collecting firewood].” (Programme Officer, Health Promotion and Community Liaison, interview, 20th April 2009).

When one of the officers said this, the other whispered in her ear and after hesitation, she added that:

“In the case of pregnant women the first trimester is critical so we discourage it [firewood collection].”

Two of the nurses reported that often women report musculo-skeletal problems to the clinics after they have endured them for some considerable time; “they are in so much chronic and intense pain they cannot move”. The chief nursing sister in Tsilitwa village

Table 2
Health professionals’ perceptions and responses to firewood collection in Qaukeni and Mhlontlo.

Themes	Number of persons reporting (<i>n</i> = 10)
My programme doesn’t deal with that ^a	8
We don’t discuss health effects of firewood collection but I see connections/It is relevant/Clients talk of it	4
We give them pain killers if they ask	4
We give them rubbing stuff if they ask	4
Firewood collection while pregnant is a useful form of exercise	3
Not important these are days of RDP ^b	3
Not important we are used to it/Our culture	2

^a For this specific answer, *N* is 8 because the overall programme managers do not deal with a specific programme.

^b This refers to the fact that these nurses felt that with mass electrification undertaken since the 1990s as part of the post-apartheid government’s Reconstruction and Development Programme (RDP), firewood collection has decreased. While this is true in some areas and households, it is not true for all. Many villages in Eastern Cape remain without electricity and when available, electricity may be unaffordable or wood may be used for cultural reasons. Electricity is particularly expensive for cooking and is often used for lighting and entertainment (radio and television) only.

reported that in her experience, the worst case was when a woman who had been collecting firewood collapsed and started vomiting blood and died later the same day. Although there is no proven link between the firewood collection and the death, the nurse believed that the death was linked to excessive firewood collection while having an underlying health problem. Nevertheless, she still did not consider heavy headloading a critical health issue. Incidences of vomiting blood while carrying heavy firewood loads were reported by two other women in the household interviews (Matinga, 2010). One of these women was diagnosed with polyps or nodules in the thoracic cavity while the other thought it was because she had tuberculosis. Both believed their health conditions were worsened by carrying heavy loads such as firewood.

The data from the respondents shows that while there is some awareness of the health effects of firewood collection among local health care providers, it is not an awareness of the severity of the effects or their implications, and that programmes do not address the health effects of firewood collection (Table 3).

Health professionals’ perceptions of, and responses to the health effects of cooking smoke exposure

When asked about smoke exposure from wood and dung cooking fires, most of the respondents indicated that the effects of smoke are minor irritants or inconvenience of cooking duties. Only one programme manager reported talking about it in her programme campaigns but still considered implications of smoke to be minor. Five respondents reported that smoke from cooking fires is not harmful to health (Table 4).

One cultural concept that the respondents were asked about was that of *efukwini*, which the researcher encountered in Cutwini and Tsilitwa. *Efukwini* is a ritual in which for the about the first ten days after birth, both the mother and infant are kept in a room with restricted access (Matinga, 2010). The aim is to protect them from *umoya omdaka* (ill will or bad wind caused by supernatural means) and to keep the baby warm. To achieve this, fire is lit in the room for space heating throughout the day. Even after *efukwini*, the perception that infants must be kept warm at all times means that they are often kept in a kitchen with a fire throughout the day, for several months. This practice also allows mothers to do their household work, whilst looking after the baby.

These practices are relevant to the understanding of health effects of smoke because the lungs of children under the age of five years are not fully developed (Schwartz, 2004) and are therefore more susceptible to infection when exposed to pollutants. Accordingly, children bear a greater burden of biomass-related morbidity and mortality compared to women and men (Schwartz, 2004). Globally, children account for between 44% and 53% deaths associated with indoor air pollution (WHO, 2004; WHO, 2006, 42 pp.).

Table 3
Reasons for not addressing health effects of carrying firewood.

Reason	No of health care providers reporting (<i>n</i> = 9)
Lack of awareness of extent or implications of the problem	4
Women present too late to be assisted	2
Shortage of trained staff to diagnose	1
Focus on “fashionable diseases” like AIDS	1
No proactive strategy	1

Table 4
Health professionals' perceptions and responses to health effects of smoke.

Themes	Number of persons reporting (<i>n</i> = 10)
My programme doesn't deal with that	7
Smoke not a problem/Doesn't cause problems/not important/it is normal	5
We tell them to open windows but it does not harm health	3
Important only for ex-miners	3
Smoke does affect children but we don't talk about it	2

All respondents reported that not only do they encounter this ritual among their clients, but they also encourage it. The reasons for encouraging *efukwini* were that keeping infants warm was in line with traditional beliefs and also encourages mother-child bonding and the mothers' healing and rest. It is further in line with the perceptions that smoke does not present health problems except as a minor and temporary irritant. Respondents also reported that as a result of the improving financial status of many households (owing to welfare grants), their clients increasingly use paraffin heaters, although the majority still use firewood and dung. Paraffin use itself has health-harming emissions (Pokhrel et al., 2010), is a poisoning risk for children (Malangu, Plooy, & Ogunbanjo, 2005) and is sometimes a fire hazard (Matzopoulos, Jordaan, & Carolissen, 2006).

Respondents were also asked about their knowledge of energy efficient stoves that reduce demand for firewood, improve combustion and reduce cooking smoke, and were shown pictures of various such cook stoves. None of the respondents had heard of, or seen such stoves and were only familiar with Dover™ stoves, a brand of cast iron stoves that were introduced in rural Eastern Cape by migrant workers returning from major cities such as Johannesburg. These were not necessarily designed to reduce pollution and due to their high costs were not widely adopted in poor households. Respondents also said they had not heard of any research regarding smoke and health and that they did not have access to the literature on energy and health, including the figures on the health burden of solid fuel use reported by the WHO. In addition, they did not have any programmes or communication with authorities addressing energy issues.

Health professionals' personal experiences and responses to the health effects of biomass collection and use

Personal experiences, which spontaneously emerged from discussions with the programme managers and nurses, offer insights on why they place low priority on the health effects of carrying heavy firewood loads and cooking smoke. All the programme managers and nurses had undertaken and were familiar with firewood collection and cooking in smoky kitchens. They were socialised in ways that give particular meanings to such work, which is related to their gender roles.

Programme managers and nurses recounted their personal experiences as young Xhosa girls undertaking firewood collection, cooking on open fires and performing other household duties. They reported experiencing backache, mostly between the shoulder blades, encountering and sometimes being bitten by snakes, leg pain, exhaustion, superficial wounds and chronic musculoskeletal problems. Some of the musculoskeletal problems were reported to have affected their adult life and to have been exacerbated by nursing duties later in life:

"I was one of the people who did not know [the effects of carrying heavy loads]. And now knowing I have a slipped... compressed disk, I now think that it could not have been the nursing only.

Because these problems [of back pain] were from when I was young, and I always ended up with a small nyanda [firewood bundle] and sometimes no nyanda at all. People would laugh at me." (Programme Manager, Chronic Diseases Programme, interview; 20th April 2009).

Although the above programme manager, who has a Bachelor degree in Occupational Health, reported that excruciating and chronic back pain started in her teenage years, she only sought professional help for it in 2004, over 30 years after onset. When asked why this was the case, she responded:

"It's like... in our culture, a woman is supposed to be doing these things, collecting wood, cooking, collecting water, plastering houses. When you complain then they will laugh at you. It's because you are lazy. Even for us, if our daughter says 'What! What! Collecting firewood' (sic) I just ignore her. I don't want her to grow up lazy. It must be the same in Malawi [researcher being addressed is a Malawian] because that's our culture."

Such responses show how back pain is accepted as part of life because (one of) the main underlying cause is part of expected survival and gendered tasks.

While these health professionals grew up in poor economic conditions without modern energy sources like electricity and gas, in their adult life they all have stable jobs and higher and more secure incomes than the villagers that they serve. In their households, they predominantly use electricity and gas. Better finances, time pressure, dislike of smelling of smoke at work, reluctance to make fire on cement floors of their modern houses and opportunity costs of their time have led to this transition. However, the discussions showed firewood use remains important for them for two reasons. The first was because of preference: *"I like it"* or *"grew up in it [smoke]"* (sic), and the second was because firewood, fire and smoke have cultural importance and are integral to various rituals.

All respondents pointed out the importance, for their clients and themselves, of firewood and wood fire in the Xhosa culture. Six of the ten programme managers and nurses reported that they had built huts separate from their modern homes so that they could make *"a Xhosa fire"* (i.e. an open wood fire). Two others rued the fact that they could not have huts because they lived within a (rural) town centre. As such, planning permissions did not allow traditional huts. This forced them to make fires outside. For ritual fires, they travelled to their home villages where a hut would be available. The importance of firewood use and wood fires were also expressed in terms of the comfort they bring. They referred not to the warmth that the fire provides, but to a therapeutic sense of cultural security i.e. the sense that they can maintain their unique cultural characteristics in the face of real and virtual threats such as technological, social or political changes. One nurse put it this way: *"I like the firewood, the iziko [fireplace]... It is because it tells me who I am. It reminds me I'm Xhosa"*. Thus the traditional open fire appears to be a secure, unchanging aspect of Xhosa life, in a world that is rapidly changing due to broader political and socio-economic changes.

Four others expressed similar sentiments about the traditional fireplace and cultural identity. It must be noted that the word *iziko* appears to be closely related to *isiko* meaning ritual. Almost no Xhosa ritual or major event is complete without burning herbs to release smoke imbued with meaning, or cooking on an open wood fire. Releasing ritual smoke in households and cooking on open fires are strongly linked to communicating with ancestors. It is then not surprising that in their professional roles, the majority of the respondents did not consider firewood and smoke as detrimental to health. It is part of their life and it is associated with positive cultural attributes.

All respondents also talked extensively of the notion of a "good woman" and good *makoti* (daughter-in-law), and of the various

cultural artefacts that represent a woman's industriousness among other things including doing hard work without complaining (see quotes above), constructing stylistic firewood piles called *igoqo* (Matinga, 2010) and serving others. Being a good woman was closely connected to undertaking one's gendered work without complaining, with speed and to set standards. A "good woman" who meets her socio-cultural expectations is rewarded with respect and other forms of cultural capital. Given this high value of gendered meanings of firewood collection, cooking and firewood itself, the health professionals in this setting are socialised to overlook the associated health effects.

Discussion

The high levels of education among the interviewees, with an average of four years nursing training and 18 years of practice, appear to conflict with the low prioritisation of health effects of firewood collection and smoke. This low priority at local level also contrasts sharply with the high-level attention that the issue of smoke and health is receiving at global level. The results imply that local health professionals in this setting are unlikely to be effective at translating the goals of global initiatives such as the UN Foundation's Global Alliance for Clean Cooking and the World Bank's African Clean Cooking initiative into action at local level. This is because there is a mismatch between their perceptions and responses to the effects of carrying firewood and of cooking smoke, and the emerging stance of global actors such as the UN foundation, the World Bank, and the WHO, that perceive the energy-health issues to be critical. Observations and themes emerging from the interviewees' narratives and the literature offer four possible explanations for the low prioritisation of health effects of firewood collection and cooking smoke as well as the implications of the *status quo*.

First, respondents' professional work is bounded by their training in which particular health problems are prioritised over others for various social, economic, political and historical reasons. Within the African setting, work-related health and non-communicable diseases have received little attention (Boutayeb & Boutayeb, 2005; Delamothe, 2009; Jeebhay & Jacobs, 1999, Chap. 19; Myers & Macon, 1989; Unwin et al. 2001), with recent exceptions of diabetes, hypertension and cardiovascular diseases. It is for this reason that the nurse-in-charge in Tsilitwa reported that focus was on "*fashionable diseases such as AIDS*", a statement which captures the tendency to emphasise a particular disease at a given period to the neglect of others. In the African context, the neglect of health issues related to household work is a serious gap in addressing work-related health since the majority of the population undertakes household and other work manually. In contrast, fewer persons are formally employed and hence benefit from formal occupational health regulations and interventions. This means that the health effects of work outside formal employment arena while it likely affects a large proportion of people, is not captured and accounted for since systems tend to address formal work only.

Second, the western-informed biomedical model of health, as applied to women in the African context, focuses on women's sexual, maternal and reproductive health. Hence, African women's bodies are chiefly conceptualised and acknowledged within a limited frame of their reproductive capacity. While focus on reproductive health is important, it has led to the exclusion of other aspects of women's health including those aspects affected by women's other roles as resource providers and managers of their households *i.e.* women's work-related health. A study by Avotri and Walters (1999) in Ghana illustrates this and shows that when women themselves were interviewed, their health concerns were about worrying, and aches and pains which they linked to heavy

workloads, the 'compulsory' nature of their work, and their financial insecurity. In Kenya, women reported that they "devotedly" attend antenatal services but their health outcomes are affected by their heavy workloads (Izugbara & Ngilangwa, 2010). The neglect of women's health as it relates to their productive roles also ignores that fact that maternal outcomes are affected by the variety of tasks that make up women's work. Discussing firewood sellers in Ethiopia, Haile (1991, 94 pp.) found that they have high rates of miscarriages linked to their load-carrying work. Carrying heavy loads during pregnancy has also been associated with premature birth and uterine prolapse (Bao et al., 1989). Meanwhile, exposure to cooking smoke is linked to low-birth weight (Boy, Bruce, & Delgado, 2002; Mishra, Dai, Smith, & Mika, 2004) and over 500 000 children under the age of five die annually from indoor air pollution caused by cooking smoke (WHO, 2004) which they are exposed to as they are cared for by women and their siblings (chiefly female children) while the latter cook and perform other household work. Thus, although some health programmes discourage women from hard work and carrying heavy loads during pregnancy, such warnings are not supported by interventions to make work less arduous, not just in pregnancy but through women's lifetimes given that in rural areas of developing countries, many tasks are not mechanised. Instead, despite the absence of options for the women to reduce or renegotiate their gruelling work routines, pregnant women may be blamed if their child or they themselves die because they continued arduous work during pregnancy (Storeng, Akoum, & Murray, 2013).

The third explanation stems from the respondents' personal accounts, which were dominated by continual reference to Xhosa culture, the role of women in collecting firewood and cooking, and the notion of a "good woman". These show that the professional setting in these two rural communities is not only a western-informed biomedical setting but is also a Xhosa setting. As such physiological conditions are interpreted through this "multicultural" lens. The respondents used both their roles as professional health personnel trained under a western-informed biomedical model of health care, and as Xhosa women raised in a culture with particular gender interpretations and expectations. From the theoretical literature, this can be understood by using Bourdieu's notion of the *habitus*, defined as an acquired system of generative schemes objectively adjusted to the particular conditions in which it is constituted, and endlessly producing thoughts, perceptions, expressions and actions, while being limited by the historical and social conditions of its production, until individuals bring their *habitus* to new fields so that it '*divides against itself*' (Bourdieu, 1977: 511). In this study, there is less a sense of conflict and therefore less of "*habitus divided against itself*". Rather, when nurses bring their Xhosa *habitus* to a biomedical *habitus* of their training and professional work, there is *habitus porosity* (Matinga, 2010). As a porous *habitus*, the Xhosa schemes and dispositions, and the western biomedical conceptualisations constantly interact, inform and reinforce each other, in turn informing perceptions and responses. At any given point, one *habitus* can dominate. The notion of *habitus porosity* is close to that of *hybrid habitus*, entailing not just a leftover of dominant habitus but an entrenching of binaries (Decoteau, 2013). Given that the interviewees grew up and lived in the rural areas of the former Transkei with limited access to modern energy services and health services, and given the neglect of work-related and environmental health in African settings, the Xhosa *habitus* dominates the basis for perceiving and responding to the health effects of firewood collection and cooking smoke, having been developed, lived and reinforced over a lifetime and having been barely challenged by alternative interpretations.

A fourth explanation is that there is limited interaction and therefore transfer of knowledge between the energy and the health

sectors; between high policymaking levels and on-the-ground implementation levels; and between academic and on-the-ground practitioners. The global health and energy communities, with their wealth of scientific and policy evidence, are distanced from these isolated and marginalised communities, and the local health professionals who have the responsibility of implementing health interventions in rural communities. As such, the health professionals in this rural setting are limited in their knowledge and actions by a lack of information and knowledge.

This study marks the beginning of understanding the perceptions and responses of local health professionals to effects of carrying firewood and of cooking smoke, and how these match or not with global initiatives. It is only the first step and is limited in that the sample is small and all respondents belong to one ethnic group with limited experience beyond their local service areas or their cultural group. It is unclear whether in a more professionally or culturally heterogeneous sample in a developing country setting, the perceptions and responses of local health professionals would be more in line with the emerging literature and actions at global level. However, the findings remain important because rural communities in the developing world, which are the ones that are most affected by traditional biomass use, are isolated communities that are served by local and isolated health professionals. Thus the paper has provided critical insights in an overlooked link of translating global ambitions into local actions. Further studies with larger samples and from different cultures and countries must be undertaken to improve our understanding perceptions and responses at local level within the context of globally-driven efforts.

Conclusion

This paper has examined the perceptions and responses to the health effects of firewood collection and smoke from cooking fires among local-level health professionals in two local service areas in rural Eastern Cape, South Africa. The results show that the level of awareness of these issues among well-qualified professionals in such a setting is low. The reasons include: the traditional priorities and set up of the health system which exclude health effects of biomass energy collection, use and other household work as well as non-reproductive health of women; cultural beliefs and gendered interpretations of associated household work; inaccessibility of the relevant research at local practitioner level and the separation of global and national energy and health communities where evidence is generated, from the local-level practitioners who are expected to act on this evidence.

The finding that in rural and marginalised health care communities, the biomedical model of health care is applied in tandem with local interpretations is critical. It shows that policymakers and programme developers must not assume a shared understanding of the health effects of biomass use between global and local professional health care as well as energy personnel, even when these health professionals have their training and work embedded in western biomedical models of health. When global actions such as those being considered by the UN Foundation, the World Bank and WHO are implemented, they must take on a culturally and gender-sensitive approach that incorporates socio-cultural meanings and complexities of the issues they plan to address. Given the limited knowledge on socio-cultural aspects of the firewood collection and cooking, a starting point would be supporting research from a socio-cultural perspective to inform new policies and interventions. Another action is to train local health practitioners to understand the social context of the communities they serve and include it in their services. In this way, global actions can better incorporate local realities into emerging solutions. On its part, the South African government must develop and commit resources to a range of

programmes that support its policy commitments on clean energy and clean environment, focussing particularly on addressing and accommodating cultural and socio-economic constraints to change.

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