ORIGINAL RESEARCH

PREVALENCE AND RISK INDICATORS OF CHRONIC PAIN IN A RURAL COMMUNITY IN SOUTH AFRICA

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ABSTRACT

Background: Despite the acknowledgement that chronic pain may be a problem for adults in rural settings, there is a lack of epidemiological investigations on its occurrence in rural South Africa. Objectives: To estimate the prevalence of chronic pain among adults in a rural community in South Africa and characterize the localization, severity, risk indicators and responses of pain sufferers. Methods: Cross-sectional analytical study using face-to-face interviews. Interviews elicited information on socio-demographic characteristics, general health status and presence of pain. Among those reporting pain, the duration, frequency, severity, activity limitation and impact was determined. Univariate statistics were used to describe the prevalence of chronic pain while bivariable χ^2 tests and multivariable logistic regression models were used to assess the relationship of socio-demographic characteristics and reported health status with chronic pain. Results: A total of 394 adults were interviewed representing a response rate of 92.8%. Of these, 169 (42.9%; 95% CI: 37.4%-47.1%) reported suffering from chronic pain. The common sites were the back, knee, ankles, head and shoulders. The median pain score was 6 on a scale of 0-10 (IQR= 5-8) and the median number of sites of pain was 1 (IQR= 1-2). The type of pain slightly varied with age with younger adults reporting more back pain and headaches while older people reported more joint pain. Female gender (adjusted odds-ratio AOR= 2.2, 95% CI: 1.9-2.8) and being older than 50 years (AOR= 3.1, 95% CI:2.7-3.9) were identified as risk indicators for chronic pain in the sample. Respondents reported that they self-treated (88.3%); consulted with a doctor or nurse (74.3%); traditional-healer (24.5%) and spiritual-healer (4%). Most respondents (63.4%) reported only transient relief of their pain. Conclusions: Chronic pain is an important health problem in the surveyed community. Further comparative studies on the relationship with risk factors are needed meanwhile interventions targeting females and the elderly are recommended.

Key Words: Chronic pain, Prevalence, Rural, Eastern Cape Province, South Africa.

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INTRODUCTION

For the optimal planning of health care systems including the organization of prevention, treatment and rehabilitative services, the study of the distribution and risk indicators of health problems is mandatory (Sjorgen *et al.*, 2009). Chronic pain represents one such health problem for which epidemiological understanding is needed (Smith *et al.,* 1996). This is so because despite being an individual and subjective experience, factors in the population as a whole are likely to influence the occurrence of chronic pain. This calls for investigations on the dynamic interactions of "person, place and time" to enrich our understanding of the phenomenon of chronic pain.

Within the broader field of public health, there is a growing realization of the importance of social and environmental contexts as the primary determinants of population health (CSDH, 2008). Simply stated, the environment in which people live and work is now broadly understood to be a "cause of the cause" in defining the aetiology of health problems (CSDH, 2008). Quantifying the prevalence of chronic pain must therefore take into account the context in which sufferers experience it.

Moreover, it is axiomatic that rural and urban environments have their "unique cultures, geography, economics, lifestyle, values, population mix, social organization and behaviours relating to illness and health care" (Hoffman *et al.*, 2002). In general, rural environments are described as having distinctive pastoral landscapes, unique demographic structure (relatively more elderly people and children) and settlement pattern (isolated rather than centred with low population density), extractive economic activities, and distinct socio-cultural milieus characterized by for example traditional leadership systems (Hart *et al.*, 2005). People in rural areas are therefore likely to experience different health concerns, including complaint of pain, from those who live in towns and cities (Wakerman and Humphreys, 2002). So important are these differences that it has been argued that epidemiological estimates derived from urban populations cannot be generalized to rural populations (Hoffman *et al.,* 2002).

Studies have reported important differences between the general health status of rural and urban adults (Mainous and Kohrs, 1995; Hoffman *et al.,* 2002; Hartley, 2004; Phillips and McLeroy, 2004; Zimmer *et al.,* 2007). After controlling for demographic characteristics using multivariable analysis, Mainous and Kohrs (1995) showed that rural elderly adults (<65years) in Kentucky, USA, had significantly poorer functioning than their urban counterparts as measured by the SF-20 subscales of physical functioning, role functioning, social functioning, general mental health, and general health perceptions. On the other hand, their study did not find a significant difference in the pain subscale between urban and rural respondents.

Andersson (1994) averred that chronic pain was likely to be a more important problem for adults in rural settings (compared to urban) and reported an investigation which demonstrated that as many as 50% of an unselected rural general population

in Sweden experienced chronic pain at the time of the survey. In the Iowa 65+ Rural Health Study in the USA, Mobily *et al.* (1994) reported that as many as 86% of rural persons aged 65 years and older had reported some type of pain in the year prior to the interview with 59% reporting multiple pain complaints. The most prevalent sites for pain were the "joints, night leg pain, back pain, and leg pain while walking" (Mobily *et* those from an urban background.

A recently published community-based cross-sectional survey of back and neck pain in rural southwest Ethiopia reported a point prevalence of 16.7% for back pain and 5.0% for neck pain (El –Sayed *et al.*, 2010). The study further showed that age, household assets, gender and depressive symptomatology were associated with increased risk for back pain (odds ratio (OR)= 3.44. 95% confidence interval (CI): 2.37-5.00) and neck pain (OR= 4.92, 95% CI: 2.49-9.74) (El-Sayed *et al.*, 2010). The limitation of this survey to only two types of pain (back pain and neck pain) does not allow direct comparison with the earlier studies conducted in non-African settings. Thus there is still need to determine the prevalence of pain in rural populations, its characteristics and impact on health care utilization in rural areas in Africa particularly sub-Saharan Africa.

As part of a larger survey on the epidemiology and burden of chronic pain within South Africa's Eastern Cape Province, this paper focuses on the rural arm of the study. The objectives of the study reported in this paper were to investigate, among adult rural residents in Baziya, (a rural community in the Transkei region of the Province), the:

(1) prevalence and characteristics of chronic pain;
(2) association between chronic pain and age, gender, socio-economic status, health and employment status;
(3) severity and burden of chronic pain and examine the extent to which it interferes with activities of daily living; and
(4) experience of pain including health-seeking behaviours and the determinants of these responses.

METHOD

Study design

This was a quantitative cross-sectional analytical study that included estimating chronic pain prevalence in the community and identifying the population-level risk indicators of chronic pain.

Study setting and population

The study population comprised adults (defined as individuals aged 18 years and older) who resided in Baziya, a rural settlement/village located in the Transkei region of the Eastern Cape. The principal sampling unit was households within the community and adult residents of all the households in Baziya comprised the study population. An individual was considered "resident" if he/she eats and sleeps in the household on most days of the week and in most weeks of the year and considered the household as his/her primary place of habitation over the long term.

Baziya is one of the oldest rural settlements in the Transkei region of the Eastern Cape Province (Lewis and Mrara, 1986). It is located in the King Sabata Dalindyebo District and is about 60km from Mthatha. It has an estimated population of 6 000 people, the majority of whom are elderly (older than 50 years).

al. 1994) corroborating findings of Andersson (1994). Hoffman *et al.* (2002) found chronic pain to be significantly more prevalent in rural areas of North Dakota, USA, compared to urban areas. In India, Varma *et al.* (1986) reported that participants from a rural background had more severe chronic pain than

The precise population density of the area is not available, but the population density of the region covering Baziya is estimated to be "less than 500 people per square kilometre" (StatsSA, 2003). In terms of housing, dwelling units often consist of more than one hut built close together with a 'kraal' in the centre of the cluster for cattle husbandry, which is a major occupation of the people. Houses are usually close together to form a very distinct village with communal land stretching to the edge of the administrative area.

Sample size

The sample size was calculated using EPI INFO version 6 STATCALC. The expected frequency of the factor under study, i.e. the prevalence of chronic pain was assumed to be 50% (Andersson, 1994). Mathematically, 50% is the most conservative since it gives the maximum sample size (Kirkwood and Sterne, 2003). The sample size was calculated in such a way that the expected frequency of chronic pain would lie within 5 points of the presumed frequency, i.e. 50% with a half width of 5%. This means that the worst acceptable results were set within the range of 45% to 55%. With 95% coverage (Type I error of 5%), the sample size was found to be 269. However, to take care of events of non-contact or refusal by participants, an additional 81 (30%) participants were added on the calculated sample size. So, in total, the target was to sample 350 participants for interview. Assuming that the average number of adults per dwelling was 2, it was decided that 175 dwellings would be sampled.

Sampling procedure

The principal sampling unit was households/dwellings. The absence of a comprehensive and updated map or list of all the dwellings in Baziya precluded the possibility of taking random samples of housing units. It was decided that taking a start point as the first housing unit from the main road turn off (R56) into Baziya, a systematic selection of alternate dwellings would be selected and all eligible individuals within selected households approached for inclusion in the study until 350 respondents were reached.

Data collection procedure

Face-to-face interviews using structured questionnaires were performed amongst eligible respondents in selected households between May and June 2006 inclusive. Interviews were administered by seven trained data collectors in either English or isiXhosa (the local language spoken in the area). The data collectors were bilingual health science students and all underwent a two-day training which included participation in a pilot study using the questionnaires. A nursing assistant who had worked at the public clinic in Baziya for a number of years served as a supervisor for the fieldwork activities.

Following the identification of the households to be included in the survey, the supervisor approached whoever was in the household and requested participation in the interview usually from the head of the household. Where permission was given, the supervisor established the presence of eligible respondents (residents who were 18 years of age and older) in the selected household. If present, the supervisor read an information sheet in the preferred language of communication (English or

isiXhosa) to the potential participant. Oral consent to participate was solicited and then the interview was administered by one of the data collectors.

In the event that no one was present at the identified dwelling, the supervisor made two return visits to the dwelling. If following three total visits there was still no one eligible, the household was excluded and replaced with the next dwelling. There were only two such cases in the household selection process and information was provided on inquiry that both dwellings were vacant in the period of the survey.

Where participants refused to participate in the interview, the age and gender of the participant was noted by the supervisor. Respondents were then asked about the presence of any other adult in the household. Appointments were made to re-visit participants who were not present. After three attempts, those who still could not be contacted were considered non-respondents. At the second visit, the data collector left a copy of the English and isiXhosa versions of the questionnaire behind for the participant. These were picked up at the third visit. Interviews were mostly conducted in the late afternoons, evenings and during weekends.

Data handling and cleaning

Data were entered twice in MS Excel spreadsheets by two assistants. The two entries were then compared and discrepancies were corrected. Following this, the data were imported to SPSS version 16.0 for Windows. In SPSS, impossible and implausible values were checked using codebook and frequency tabulation. When impossible or implausible values were obtained, the respective questionnaire was re-visited and data were corrected. Data which could not be corrected by referring to the questionnaires were re-coded as missing.

Descriptive statistics and bivariate analyses

Percentages were used to describe categorical variables like gender and level of education. Depending on the distribution mean values and standard deviations (SD) or median values and inter-quartile ranges (IQR) were used to describe quantitative variables like age. Bivariate analysis was performed to compare different mean scale score of chronic pain severity complaints and socio-demographic characteristics. For this purpose, a two-sample Student test (*t*-test) was used. Bivariate analysis with a chi-square test was also performed to determine the relationship between the independent categorical variables: chronic diseases and socio-demographic characteristics and the dependent variable of chronic pain categorized as 1-3 (mild), 4-7 (moderate) or 8-10 (severe) as suggested by Neville *et al.,* (2008). For the dichotomous socio-demographic characteristic gender, the *t*-test was used to compare the mean pain severity score between men and women. For variables with more than two subcategories namely, age group, marital status, level of education and income level per month, analysis of variance ANOVA was used to compare pain responses among the subcategories. Whenever the *F*-statistic was found to be significant, the Bonferroni test was performed to identify the significantly different subcategories or groups. In all cases, a significance level of 0.05 was assumed.

Multivariable analyses

Multiple logistic regression analysis was used to investigate the association between chronic pain and the independent variables gender, age, marital status, education level, religion and income. The independent variables that were entered in the logistic regression model were those which were found in the literature to be associated with chronic pain prevalence. Moreover, variables which were found to be significantly associated in the bivariate analyses, namely, age group and level of education were also included in the analysis. The dependent variables that were tested, one at a time, were pain prevalence and severity. Independent variables that were entered in the backward stepwise logistic model were: chronic diseases (yes or no), gender (male or female), age group in years (≤24, 25-34, 35-44, 45-54, 55-64 or ≥65), level of education (no formal education, primary education or post-primary education) and income per month (< R1,000; R1,000-3,000; or > R3,000).

Except for age group, education level, and income, all the variables entered in the models were dichotomous. These non-dichotomous variables were entered in the model in the form of defining one category as a reference group. The reference category for age group was 25-34 years. The reference category for level of education was post-primary education. The reference category for income group was > R3,000. The number of variables entered in the model was less than 10% of the events which is usually recommended (Peduzzi *et al.,* 1996). Before running the backward stepwise procedure that was used to select the variables to be included in the final model, collinearity of the variables was tested and found to be acceptable. The stepwise logistic regression procedure was based on the likelihood ratio test.

The significance level for variable entry into the model was set at 0.05 and that for removal at 0.10. After performing the backward stepwise logistic regression, all the variables were removed from the model because of lack of significance in the association with the dependent variable except for chronic diseases. The Hosmer and Lemeshow test was employed to check the goodness-of-fit of the model (Hosmer & Lemeshow, 1989). The model did not fit well. Because of this, the two major factors mentioned often in literature to be associated with chronic pain were forced to remain in the model. These were elderly age and female gender (Bowsher *et al.,* 1991; Andersson *et al.,* 1993; Croft *et al.,* 1993; Ruiz-Lopez, 1995; Birse and Lander, 1998; Brochet *et al.,* 1998; MacFarlane *et al.,* 1999; Elliot *et al.,* 1999; Buskila *et al.,* 2000; Blyth *et al.,* 2001; Catala *et al.,* 2002; Sjogren *et al.,* 2008). The two variables forced in did not nullify the statistical significance of the association. However, the odds ratio of the association slightly decreased. The Hosmer and Lemeshow test showed adequate goodness-of-fit of the revised model.

Interactions were tested between the other factors in the model and change in estimated chronic pain prevalence. The likelihood ratio test was employed to compare the model with and without interaction terms. The test was not significant for the model with pain severity as the dependent variable and thus no interaction term was included in the final model for pain severity. Adjusted odds ratios (AOR) were calculated and the respective 95% CI were obtained from the final models and the significance of each model was tested by the Wald test (Peduzzi *et al.*, 1996).

Ethical considerations

This study was approved by the Research Ethics Committee of the University of the Western Cape as part of a doctoral study titled "Epidemiology and burden of chronic pain within the Eastern Cape Province". Permission to undertake the study was also obtained from the local ward councillor and the village headman.

Oral consent was obtained from all respondents following the presentation of the purpose and nature of the study. Prospective participants were advised that questionnaires did not require their names or personal identifiers and that information disclosed were treated with confidentiality and would be used only for the purpose of the research. Participants were also assured of their right to withdraw from the study at any point or refuse to participate in the study entirely. There were no physical or psychological harmful effects to participants that were expected from this study. Indeed, none was observed by the researcher or reported by the participants.

RESULTS

Socio-demographic characteristics of respondents

A total of 175 residential dwellings were enumerated and 432 adult respondents meeting eligibility criteria were contacted for interviews. Of these, there were 31 outright refusals to participate in the survey and seven incomplete questionnaires giving a response rate of 91.2%. The analysis of chronic pain prevalence reported in this study is therefore based on the 394 completed questionnaires.

Table 1: Descriptive characteristics of respondents and non-respondents.

Characteristics	*Respondents* (%*)	*Non-respondents* (%*)	*P*-value
Gender	394	38	<0.001
Males	143 (36.3)	23 (60.5)	
Females	251 (63.7)	15 (39.5)	
Age (years)	394	36*	0.071
≤24	9 (2.3)	5 (13.8)	
25-34	69 (17.5)	10 (27.8)	
35-44	97 (24.6)	11 (30.6)	
45-54	156 (39.6)	4 (11.1)	
55-64	49 (12.4)	4 (11.1)	
65+	14 (3.6)	2 (5.6)	
Mean (SD)	49.4 (7.3)	40.9 (8.7)	
Marital status	394	36*	0.023
Single	20 (5.1)	6 (16.7)	
Married	159 (40.4)	22 (61.1)	
Divorced/Separated	74 (18.8)	5 (13.9)	
Widow/widower	129 (32.7)	1 (2.8)	
Cohabiting	12 (3.0)	2 (5.6)	
Highest Level of education**	394	36*	0.071
No formal education	42 (10.7)	3 (8.3)	
Primary education	240 (60.9)	25 (69.4)	
Secondary education	86 (21.8)	7(19.4)	
Post-Secondary education	26 (6.6)	1 (2.8)	
Income per month (Rand)	394	36*	0.562
<1,000	296 (75.1)	27 (75.0)	
1,000-3,000	74 (18.8)	6 (16.7)	
>3,000	20 (5.1)	3 (8.3)	
Employment**	394	36*	0.063
Working Full-time	85 (21.6)	2 (5.6)	
Working Part-time	49 (12.4)	10 (27.8)	
Unemployed	94 (23.9)	18(50.0)	
Looking for a job	37 (9.4)	1 (2.8)	
Retired/Pensioner	129 (32.7)	5 (13.9)	
Religion	394	36*	0.094
Christian	364 (92.4)	31 (86.1)	
Moslem	4 (1.0)	0 (0.0)	
Traditional	26 (6.6)	5 (13.9)	

*Two participants' data were missing; **The total percentages of non-respondents does not add up to 100% because of rounding.

The majority of the respondents were females and over 55% of respondents were 45 years or older. The study sample characteristics are presented in Table 1. In the same table, a comparison of the study sample and the non-respondents is made. The mean age of the respondents was 49.4 (SD = 7.3) years. In comparison, the mean age of the non-respondents was 40.9 (SD= 8.7) years. The age composition of both groups was not significantly different. Females (*n*= 251; 63.7%) comprised the majority of the study respondents. The gender composition of the respondents was different from the non-respondents (p< 0.001). While about 32.7% (*n*= 129) of the respondents were widows/widowers, this group was the smallest marital group in the non-respondents which had only 2.8% (*n*=1) widows/widowers.

The median income per month of the study respondents was R750 (minimum R120 and maximum R6000). The majority of the study respondents (*n*= 296; 75.1%) earned below R1000 per month. About a third (*n*=129; 32.7%) of the respondents were retired/pensioners. Those who reported to be unemployed

were 94 out of 394 (23.9%). Almost all the respondents fell into two religious groups: 92.4% Christians and 6.6% Traditional.

General health status of respondents

Of the 394 respondents, 11 (2.8%) ranked their general health as excellent, 55 (14.0%) as very good, 188 (47.7%) as good and 136 (34.5%) as fair. In general, those who ranked their health status as good or above were about 65%. Only 1% of the respondents graded their general health as poor.

Table 2: Distribution of chronic diseases among study respondents.

Chronic disease	Frequency* (%)
Arthritis	107 (34.5%)
Hypertension	62 (20.0%)
Peptic ulcer disease	38 (12.3%)
Asthma	26 (8.4%)
Cerebro-vascular accident	18 (5.8%)
Heart disease	16 (5.2%)
Diabetes	15 (4.8%)
Tuberculosis	8 (2.6%)
Epilepsy	7 (2.3%)
Cancer	6 (1.9%)
Other**	7 (2.3%)
Total	310

*These were "case counts" and not "head counts" as some respondents reported more than one condition; **The "other" group of conditions comprised of less frequent disease entities like chronic conjunctivitis, hernia, chronic pelvic inflammatory disease, and non-specific chronic symptoms and signs signifying undiagnosed underlying disease.

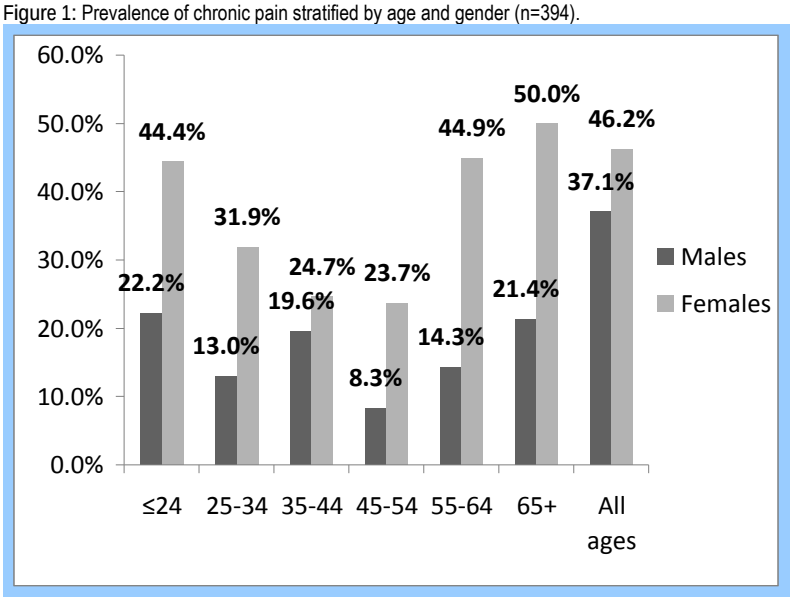
Study respondents were also asked to compare their current health with that of the previous year (reported health transition). About 61% (*n*= 240) of respondents said that their health status was much better than in the previous year. Almost 28% (n=110) of the sample said their health was somewhat better than in the previous year. In total, about 350 (88.8%) of all the respondents perceived their health status as being better than during the year preceding the study. Only 12 (3.0%) said their health had worsened compared to the past year. The rest (n=32, 8.1%) said that their health status was about the same as in the previous year.

Chronic diseases were common among the study respondents, the distribution of which is shown in Table 2. About half (*n*=191, 48.5%) reported at least one chronic disease. Those who reported having chronic diseases had two diseases on average. Arthritis and hypertension were reported by 56.0% and 32.5% of all those who had chronic diseases, respectively (n=191).

Prevalence and severity of chronic pain

Of the 394 respondents, 169 (42.9%; 95% CI: 37.4%-47.1%) reported suffering from chronic pain. The majority of those who reported chronic pain were females (n=116, 68.6%). Figure 1 shows the prevalence of chronic pain stratified by age and gender. Of all females (n=251), 46.2% reported chronic pain compared to 37.1% of males who reported experiencing chronic pain. The age distribution of chronic pain prevalence showed that for both males and females, there was an increase in prevalence from the age of 55 years onwards. There was also a noticeably high prevalence in the youngest age group (i.e. 24 years or younger).

Figure 1: Prevalence of chronic pain stratified by age and gender (n=394).



Most chronic pain lasted between five and ten years for males (37.7%) and between one to five years for females (40.5%). For both males and females, over 42% of chronic pain persisted beyond 5 years as shown in Table 3. The common sites of chronic pain were the back, knee and ankles, head, and shoulders and elbows (Table 4). Females consistently reported higher prevalence in all body locations. The type of pain slightly varied with age with younger respondents (< 50 years; n=66) reporting more back pain and headaches (72% versus 59%) while older people (50 years or older; n=103) reported more joint pain (47% versus 17%). The median number of sites in pain was 1 (IQR = 1-2).

Table 3: Prevalence of chronic pain stratified by duration and gender (n=169).

Duration of pain	Males (n=53)	Females (n=116)	Persons
3-6 months	7.5%	5.2%	5.9%
7-12 months	17.0%	12.1%	13.6%
1-5 years	32.1%	40.5%	37.9%
5-10 years	37.7%	34.5%	35.5%
>10 years	5.7%	7.8%	7.1%

Table 4: Prevalence of chronic pain for different body sites by gender (n=169).

	Females (n=116)		Males (n=53)	
	%	(95% CI)	%	(95% CI)
Headache/migraine	5.6	(3.8-6.4)	3.5	(3.1-5.6)
Face/teeth/jaw/ear*	1.2	(0.3-4.6)	0.9	(0.2-4.4)
Neck	0.8	(0.5-1.4)	0.7	(0.4-1.7)
Shoulders/elbows	5.5	(3.1-9.0)	5.3	(2.9-8.3)
Arms/hands	4.4	(3.3-5.2)	3.7	(3.1-7.9)
Chest	1.9	(1.3-3.0)	1.1	(0.6-3.4)
Back	21.7	(16.2-29.7)	18.5	(11.2-24.3)
Abdominal	2.8	(1.4-6.2)	1.3	(0.9-5.9)
Hip/thigh	3.8	(3.2-4.9)	2.2	(1.3-4.4)
Knee/ankle	9.9	(7.1-12.4)	6.2	(4.4-8.3)
Legs/feet	5.1	(1.8-9.7)	4.7	(1.5-5.8)
General body pain	4.5	(3.8-6.1)	3.1	(2.7-5.6)

*Excludes ear infections.

Among the 169 respondents who reported chronic pain, 18 (10.7%) rated their health as excellent, 49 (29.0%) as very good, 63 (37.3%) as good, 32 (18.9%) as fair, and 7 (4.1%) as poor. For these 169 respondents with chronic pain, the median pain severity score on a numeric scale (0=no pain to 10=worst imaginable pain) was 6 (IQR= 5-8). Seven respondents (4.1%) reported suffering from mild pain (pain score=1-3), 117 (69.2%) reported a moderate level of pain (pain score= 4-7), and 45 respondents (26.6%) reported severe pain (pain score= 8-10). Severe pain was found to be high in females ($p < 0.001$), the single and widowed ($p= 0.01$), respondents with lower income ($p= 0.04$), people of non-Christian belief (p=0.01) and respondents with lower level of education ($p= 0.02$)(Table 5).

Table 5: Association of pain intensity (scale 0=no pain to 10 = worst imaginable pain) with demographic variables (n=169).

	Pain intensity 1 to 3		Pain intensity 4 to 7		Pain intensity 8 to 10		*P* value
	n	%	n	%	n	%	
Gender							<0.001
Males	4	57.1%	49	41.9%	13	28.9%	
Females	3	42.9%	68	58.1%	32	71.1%	
Total	7		117		45		
Age (years)							0.06
<50	5	71.4%	43	36.8%	18	40.0%	
50+	2	28.6%	74	63.2%	27	60.0%	
Total	7		117		45		
Marital status							0.01
Single	1	14.3%	9	7.7%	5	11.1%	
Married	4	57.1%	69	59.0%	25	55.5%	
Divorced/separated	1	14.3%	17	14.5%	6	13.3%	
Widow/widower	1	14.3%	22	18.8%	9	20.0%	
Total	7		117		45		
Level of education							0.02
No formal education	2	28.6%	34	29.1%	12	26.7%	
Primary education	3	42.9%	64	54.7%	28	62.2%	
Post-primary education	2	28.6%	19	16.2%	5	11.1%	
Total	7		117		45		
Income per month (Rand)							0.04
<1,000	4	57.1%	69	59.0%	28	62.2%	
1,000-3,000	2	28.6%	32	27.4%	13	28.9%	
>3,000	1	14.3%	16	13.7%	4	8.9%	
Total	7		117		45		
Employment							0.28
Employed	3	42.9%	60	51.3%	18	40.0%	
Unemployed	3	42.9%	36	30.8%	17	37.8%	
Retired/Pensioner	1	14.3%	21	17.9%	10	22.2%	
Total	7		117		45		
Religion							0.01
Christian	6	85.7%	102	87.2%	35	77.8%	
Non-Christian	1	14.3%	15	12.8%	10	22.2%	
Total	7		117		45		

Risk Factors associated with chronic pain

A multiple logistic regression model (Table 6) showed that female gender (AOR = 2.2, 95% CI: 1.9-2.8) and being 50 years of age or older (AOR= 3.1, 95% CI: 2.7-3.9) were the only significant variables associated with chronic pain. Further analysis of this model to include other socio-demographic variables showed them not to be significant.

Table 6: Results of logistic regression analysis of chronic pain occurrence.

Demographic characteristic	Adjusted Odds ratio	95%-CI	p-value
Gender			
Males	1		
Females	2.2	1.9-2.8	<0.001
Age (years)			
< 50	1		
50 or older	3.1	2.7-3.9	0.03

The following variables were introduced into the model and found non-significant:
marital status, level of education, income, employment and religion.

Therapy sought by chronic pain sufferers

The survey examined whether having chronic pain was associated with greater use of health services. The majority of respondents reported that they self-treated (88.3%). A considerable percentage mentioned that they consulted with a doctor or nurse (74.3%), consulted a traditional healer (24.5%), pharmacist (10%) and spiritual healer (4%). Most respondents (63.4%) reported relief of their pain to be transient.

DISCUSSION

This study describes a prevalence survey of chronic pain among adult residents in a rural community within the Eastern Cape Province, South Africa. The study was motivated by the need for epidemiological information on chronic pain in population groups in Africa. Rural/urban residence is a critical health determinant and one that researchers have historically found distinguishing health experiences (Zimmer *et al.,* 2007). Considerable literature has emerged describing poorer health and lower use of health services in rural populations compared to urban ones. Therefore, the approach taken in this study was to delineate a quintessentially rural community within the Eastern Cape Province in which the survey was then carried out. In general, the survey findings corroborate observations of a poor general health status amongst rural residents and provide data for South Africa in this respect. Over 35% of respondents self-reported fair or poor health in the study sample.

An important consideration in undertaking this study was providing a concise definition of "rural" for the purpose of sampling. Indeed there is no universal definition for the terms urban and rural. Some of the general attributes of rurality considered at the outset include the existence of an essentially pastoral landscape, unique demographic structure (with relatively more elderly) and settlement pattern (isolated- rather than centred- with low population density), extractive economic activities, and distinct socio-cultural milieus characterized by, for example, traditional leaderships systems (Hart *et al.*, 2005). These attributes describe the setting in which this survey was undertaken.

An immediate challenge of using a rural setting in South Africa was the unavailability of defined maps with streets and house numbers clearly enumerated for household surveys. A sampling frame could therefore not be established *a priori* so sampling methods were limited to taking an arbitrary start point and then "systematically" selecting households thereafter. Even though this may not generate a truly random sample, given the relatively big sample size, it is likely that the sample interviewed is reasonably representative of the general rural population of Baziya.

This survey is the first community-based survey of chronic pain among adult rural residents in South Africa. The primary finding is that prevalence of chronic pain among adults 18 years and older is approximately 43% in Baziya and indicates that chronic pain is a huge problem for this population group. The chronic pain prevalence rate is comparable to estimates from other surveys conducted in developed countries (Bowsher *et al.,* 1991; Andersson *et al.,* 1993; Croft *et al.,* 1993; Ruiz-Lopez, 1995; Birse and Lander, 1998; Brochet *et al.,* 1998; Elliot *et al.,* 1999; MacFarlane *et al.,* 1999; Buskila *et al.,* 2000; Blyth *et al.,* 2001; Catala *et al.,* 2002; Sjogren *et al.,* 2008). There is a dearth of epidemiological information on chronic pain for other African population groups.

One recently published investigation (El-Sayed *et al.,* 2010) reported back and neck pain prevalence rates of 16.7% and 5.0% respectively in a rural population in Ethiopia. The back pain prevalence rate for rural Ethiopia is similar to this study (95% CI: 16.2%-29.7% for females and 11.2%-24.3% for males). This supports the view that chronic back pain is very common in this region affecting as many as one in five adults in rural African communities.

This study however reported a much lower rate of neck pain (0.8% for females and 0.7% for males) compared to the 5.0% reported by El-Sayed *et al.* (2010). This may either be a real difference in prevalence estimates between both studies or an artefact. One explanation for a real difference in the estimated prevalence rates is possible differences in the prevalence of known risk factors for neck pain such as the cultural practice of carrying heavy loads on the head. This may explain some of the variation. On the other hand, artefact in the data could have arisen from differences in the case definition or ascertainment of neck pain. In the current study, there was a fairly high report of shoulder pain. It is unclear to what extent shoulder pain may have been reported as neck pain in the study by El-Sayed (2010). There is need for stricter description of body locations when characterizing chronic pain prevalence and the use of pictures and body charts could be helpful.

Consistent with previous literature, the majority of respondents who reported chronic pain were females and there was a positive association with advancing ages. There was however a surprisingly high prevalence of chronic pain among younger (≤ 24 years) males (22.2%) and females (44.4%). This could have a number of implications. Firstly, there will be need to address the cause of chronic pain early enough in this age group in order to prevent the progression of the sequelae of pain from mild to a more severe and disabling chronic condition. Interestingly, the literature is equivocal about the course and prognosis of chronic pain. Studies have shown that chronic pain does not necessarily continue forever (Crook *et al.,* 1989) while others argue that chronic pain sufferers do not experience complete resolution of their symptoms and disability (Cote *et al.,* 2004).

Secondly, this snapshot observation may be suggestive of an earlier presentation of chronic pain amongst adults in this rural community. This is so because only 7.1% of respondents reported the duration of chronic pain as lasting more than 10 years. A cohort analysis of ten-yearly age group may therefore reveal that high prevalence at an early age (as shown by cross-sectional data), may reflect an earlier occurrence of chronic pain in more recent years (Igumbor and Buso, 2006). However, caution must be taken in making firm conclusions in this respect based on the cross-sectional data presented in this study. There is need to conduct prospective epidemiological studies to provide definitive answers to the temporal aspects of chronic pain occurrence in rural populations.

Regardless of the interpretation, a third implication is the need for more investigations of chronic pain in younger age groups. Indeed there is limited information on the prevalence of chronic pain in younger age groups in Africa. Perquin *et al.* (2000) reported prevalence rates of 19.5% for males and 30.4% for females aged 0-18 years. Follow-up of this cohort revealed that chronic pain persisted in 48% and 30% of respondents after one and two years, respectively (Perquin *et al.*, 2003).

The back was the most common anatomical site in which chronic pain was reported. This is not surprising as very high reports of back pain have been reported in different settings in Africa. The very high report of joint pains in particular the knee and ankles is noteworthy.

Respondents reported a fairly high use of health care services. Chronic pain is generally associated with higher utilization of health care services. There are several reasons why this is the case including the significant impact of chronic pain on everyday functioning and quality of life (AE, 2007).

Study limitations

The cross-sectional design does not provide evidence of the direction of association as it fails to distinguish what preceded the other between the dependent and independent factors in the association (cause and effect). On top of that, cross-sectional data yield a snapshot of chronic pain at a certain point in time, whilst the occurrence of chronic pain may change over time. There is therefore need for studies focussing on the life course influences of the development of chronic pain in adulthood. Longitudinal studies are warranted and could carefully measure some of the identified risk indicators from this and previous studies. Such studies should also undertake more investigations of the biological pathways linking the psychosocial environment and pain reporting.

Face-to-face interviews were chosen over self-administered questionnaires in order to optimise the quality of the data, given the anticipated low literary level in the community. However, the reliance on respondent's self-report and recall has a number of drawbacks. It is not possible to generate data on the evolution of chronic pain and thus address concepts such as incidence and causality. The data on health care resource utilisation generated by respondent's recall is also open to error, although there is no reason to suspect systematic bias. Moreover, confirmation of diagnoses by clinical experts or through medical records was not performed. However, even in a face-to-face clinical interview with a doctor or health care professional, there is reliance on self-report from the sufferers of chronic pain who may find it difficult to describe the natural history of their chronic pain.

The major strength of this study was its relatively large sample size and a high response rate. There is however need to address the methodological challenge of enumeration of households in the rural context to retrieve fairly representative samples. This is a practical challenge in this context and care needs to be taken that clustering of the factor of interest is not a potential issue through the sampling process. Also, the primary sampling unit in this study was the household and estimates should ideally require adjustments for cluster sampling design. An *a posterior* analysis of the design effect by selecting a random sample of 1 respondent per household and comparing with the point estimate values yielded similar values. It is therefore doubtful that sampling bias was a problem in this study.

Another limitation of this study is the relatively weak measure of psychological well-being. A number of scales have been developed such as the mental health quality of life scale, domains on mental health in general health status questionnaires such as the SF-36 questionnaire, EuroQoL etc. It will be interesting to compare chronic pain with different mental health states.

Conclusions

This is the first known study to comprehensively look at the epidemiology and burden of chronic pain in a rural population of an African country. The prevalence of chronic pain in the surveyed rural community was high and comparable to published data for urban settings and in developed countries. Chronic pain was a significant health problem in this rural community within the Eastern Cape Province. Although chronic pain was generally highly reported, being female and of advanced age were identified as risk indicators for chronic pain. Analytical cohort studies about the relationship between risk factors and chronic pain are needed. The observation that pain sufferers did not seem to be satisfied with the medical treatment that they received is important as is the persuasive prevalence indicating the need for intensified preventive strategies. It is clear that there is an urgent need for targeted public health interventions especially towards females and the elderly who experienced a significant chronic pain burden in this rural community.

From this study, it is recommended that care and treatment services for people experiencing chronic pain should be made accessible and expanded to rural communities within the Eastern Cape Province. Specialized pain clinics located in tertiary institutions which are largely located in urban cities alone are inadequate. Improved management of chronic pain at primary care level is needed. Furthermore, a comprehensive approach to prevention and management of chronic pain should be adopted to effectively tackle the diverse pain complaints. Close collaboration between doctors, nurses, pharmacists, community health workers, and traditional healers should be instituted to alleviate the negative effects of chronic pain. Lastly, future longitudinal studies on the life-course of chronic pain are needed.

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