

## Prevalence and burden of primary headache in Akaki textile mill workers, Ethiopia

Getahun Mengistu Takele · Redda Tekle Haimanot · Paolo Martelletti

Received: 24 December 2007 / Revised: 30 January 2008 / Accepted: 4 February 2008 / Published online: 19 February 2008  
© Springer-Verlag 2008

**Abstract** Headache disorders are the most common complaints worldwide. Migraine, tension-type and cluster headaches account for majority of primary headaches and impose a substantial burden on the individual, family or society at large. The burden is immense on workers, women and children in terms of missing work and school days. There are few studies that show relatively lower prevalence of primary headaches in Africa as compared to Europe and America. There might be many reasons for this lower prevalence. The objective of this study is to determine the prevalence and burden of primary headaches among the Akaki textile factory workers, which may provide data for the local and international level toward the campaign of lifting the burden of headache worldwide. The overall 1-year prevalence of all types of primary headaches was found to be 16.4%, and that of migraine was 6.2%. The prevalence of migraine in females was 10.1% while it was 3.7% in males. The prevalence of tension-type headaches was found to be 9.8%. This was 16.3 % in females as compared to 5.7% in males. The burden of the primary headaches in terms of lost workdays, gross under recognition and absence of effective treatment is tremendous. In conclusion, the prevalence of primary headaches in the Akaki textile mill workers is significant, particularly in females, and the burden is massive, in a place of poverty and ignorance. We recommend the availability and administration of specific therapy to the factory workers

with primary headaches, and community based well-designed study for the whole nation's rural and urban population.

### Introduction

Headache is one among the most common medical complaints. Various forms of headache, properly called headache disorders, are among the most common disorders of the nervous system. They are pandemic and, in many cases, life-long conditions [1]. As many as 90% of all primary headaches, including migraine, tension-type and cluster headache, fall under few categories. Recurrent headache disorders impose a substantial burden on headache sufferers, family and society [2]. Headache disorders are in the top ten, and possibly the top five, causes of disability worldwide [3]. Although the epidemiology of headache disorders is only partly documented, taken together, headache disorders are extraordinarily common. Population-based studies have mostly focused on migraine, which, although the most frequently studied, is not the most common headache disorder. Other types of headache, such as the more prevalent TTH and sub-types of the more disabling chronic daily headache, have received less attention [1].

The overall prevalence of migraine is estimated to be 12–16% percent in North America and Europe [4]. Population-based studies are less available for other chronic headache syndromes, but tension-type headache seems to be more prevalent than migraine [5]. In developed countries, tension-type headache (TTH) alone affects two-thirds of adult males and over 80% of females. Extrapolation from figures for migraine prevalence and attack incidence

G. M. Takele (✉) · R. Tekle Haimanot  
School of Medicine, Department of Neurology, Addis Ababa University, Addis Ababa, Ethiopia  
e-mail: getahaau@yahoo.com

P. Martelletti  
Master in Headache Medicine, 2nd School of Medicine and Surgery, Sapienza University of Rome, Italy, Rome

suggests that 3,000 migraine attacks occur every day for each million of the general population. Less well recognized is the toll of chronic daily headache: up to one adult in 20 has headache, nearly every day or every day [1]. Migraine is more common in boys before the age of puberty but at the age of menarche the incidence of migraine increases in females, and migraine remains more common in women at all post-pubertal ages [2]. Both migraine and tension-type headaches affect women more often than men, while cluster headache is predominantly a disorder of men [5]. Migraine is more common in people from low-income households but less common in African Americans and Asians in the United States. These patterns of prevalence by race are also reflected in international studies, as migraine is most common in North America and Europe and less in Africa and Asia [2].

The recurrent headache disorders have an enormous impact on the individual and society. The individual impact is measured by the frequency and severity of attacks, while the societal burden is measured in terms of lost work and schooldays as well as healthcare utilization [2].

Few population-based studies exist for developing countries where limited funding and large and often rural populations, coupled with the low profile of headache disorders compared with other diseases, prevent the systematic collection of information [1]. There is a scanty data on the prevalence of primary headaches in sub-Saharan Africa in general and Ethiopia in particular. The prevalence of these headaches is very low as compared to Europe and North America. In 2004, the 1-year prevalence of headache from a door-to-door survey of rural south Tanzania was 23.1% (18.8% males and 26.4% females). In this study, the 1-year prevalence of migraine was 5% with a male to female ratio of 1:2.8 and migraine without aura was 1.4% while migraine with aura was 3.6% [6]. From a 1995 study done in Ethiopia, the 1-year prevalence of migraine was 3% (4.2% females and 1.7% males) with a peak age specific rate in the fourth decade [7].

In Hong Kong, another third world country, the estimated prevalence of headaches in 2000 was 12.5% for migraine, 18.7% for tension-type headache and 6.0% for other types of headache [8].

In 2007, in the country of Georgia, Eastern Europe, the 1-year prevalence of migraine was 8.6%, tension-type headache was 20.4% and chronic daily headache was 5.4%, two of whom were overusing acute headache medication [9]. In 2005, in an epidemiologic study in Florianopolis, Brazil, the 1-year prevalence of headache was 80.8%, of migraine 22.1%, of TTH 22.9%, and of CDH 6.4% [10]. In Norway, out of 64,560 participants of a large population-based study in 2000, the overall age-adjusted 1-year prevalence of headache was 38% (46% in women and 30% in men). The prevalence of migraine was 12% (16% in

women and 8% in men), and for non-migrainous headache 26% (30% in women and 22% in men). For frequent headache (>6 days per month) and for chronic headache (>14 days per month), the prevalence was 8 and 2%, respectively [11].

The factors for such low prevalence in Africa in general and Ethiopia in particular might be the following:

1. Headache is under recognized and not diagnosed by many health practitioners in the African set up due to a number of reasons [12]:
  - I. Rural people have a great tolerance to pain hence do not report or seek medial attention.
  - II. Headache, even if persistent and recurrent, is often perceived as a trivial problem as there are more demanding and basic problems that are given priority.
  - III. Most rural headache sufferers come from low socioeconomic segment and are less educated.
  - IV. Most headache sufferers go for the traditional, religious and herbal medications.
2. It is not considered as a reason for medical consultation and even the sick people do not know headache as a medical condition
3. In the studies done so far, there were methodological problems, use of different classifications [like the one by the Ad Hoc Committee (AHC) on the Classification of Headache and the Headache Classification Committee of the International Headache Society (IHS), etc.] and absence of objective laboratory parameters for correlation of the headache data.
4. The presence of more than one type of primary headaches in a single patient, may have an impact on categorizing the patients even when the IHS criteria is used in the diagnosis of headache by less trained and less experienced health workers. Moreover, this is complicated by the absence of neurologists or headache specialists in most parts of Africa including Ethiopia.
5. Pain is more tolerated in the African culture than in Western countries. On top of this, diseases are perceived in the magico-religious context where traditional healing plays a big role.
6. Low incomes, poor infrastructures and inadequate health care coverage make the disease burden of headache different from that in the rich and developed nations.
7. There could be a genetic difference of Africans from that of Caucasians.

Migraine in Africans is not rare as reported in earlier reports. It is, however under recognized and accorded low priority. Its clinical manifestations in Africans are similar to those seen in other populations. It is an under-treated

condition where only a low percentage of the sufferers receive specific treatment. The majority of migraine patients resort to herbal and traditional healers [3, 12].

In a world of limited resources for healthcare services and health related research, reliable data on the individual and societal impact of different disorders are crucial for a rational distribution of means [13]. Not only is headache painful, but headache disorders are also disabling [1]. Migraine associated disability remains substantial and pervasive [14]. Worldwide, according to the World Health Organization (WHO), migraine alone is 19th among all causes of years lived with disability (YLDs). Headache disorders impose recognizable burden on sufferers including, sometimes, substantial personal suffering, impaired quality of life and financial cost. Repeated headache attacks, and often the constant fear of the next one, damage family and social life as well as employment. For example, social activity and work capacity are reduced in almost all migraine sufferers and in 60% of TTH sufferers [1].

The disease burden and the costs incurred due to migraine are probably among the highest for the neurological disorders, and is probably high in poor countries as in the rich. For other headaches, reliable data on their impact are still scarce, but these disorders may be as important as migraine because they are more prevalent [13]. While those suffering from headache disorders bear much of the burden, they do not carry it all. Because headache disorders are most troublesome in the productive years (late teens to 50s), estimates of their financial cost to society, principally from lost working hours and reduced productivity, are massive. In the United Kingdom, for example, some 25 million working or school days are lost every year because of migraine alone. TTH, less disabling but more common, and chronic daily headache, less common but more disabling, together cause losses which are almost certainly of at least similar magnitude [1]. In a 2002 study of Italy, among young Italian patients, quality of life was compromised in primary headache and was significantly lower in psychosocial, physical and social functioning [15].

Headache rarely signals serious underlying illness; its public-health importance lies in its causal association with these personal and societal burdens of pain, disability, damaged quality of life and financial cost [1]. The societal impact of headaches is usually measured in economic terms. Direct costs consist primarily of health care utilization. Indirect costs include missed work (i.e., absenteeism) and reduced productivity while at work (i.e., presenteeism) due to headache [2].

Headache is high among causes of consulting medical practitioners. A survey of neurologists found that up to one-third of all their patients consulted because of headache, more than for any other complaint [1]. The direct costs of diagnosing and treating primary headaches are far

less than the costs of productivity losses due to headache attacks. As a consequence, improving health care delivery for primary headaches could be cost effective from a societal perspective [2]. The common headache disorders require no special investigation and they are diagnosed and managed with skills that should be generally available to physicians. In theory, therefore, most headaches can be optimally managed in primary care. There are barriers to effective care of these primary headache disorders. These barriers vary throughout the world, but may be classified as clinical, social or political/economic [1]. For the developed nations, there are many cost-effective, efficacious treatments available, but these are limited, unavailable or unaffordable in the developing nations [2, 7, 12].

Headache ought to be a public-health concern. Yet there is good evidence that very large numbers of people troubled by headache do not receive effective care. For example, in representative samples of the general populations of the United States of America and the United Kingdom, only half of those identified with migraine had seen a doctor for headache-related reasons in the previous 12 months, and only two-thirds had been correctly diagnosed. Most were solely reliant on over-the-counter medications [1]. Yet the reality is that, for the vast majority of those whose quality of life is spoiled by headache, effective treatment requires no expensive equipments, tests or specialists. The essential components of effective medical management are awareness of the problem, correct recognition and diagnosis, avoidance of mismanagement, appropriate lifestyle modification and informed use of cost-effective pharmaceutical remedies [3].

## Objective

The general objective is to determine the prevalence and burden of primary headaches among the textile mills workers in Addis Ababa, Ethiopia

Specific objectives are:

1. To determine the magnitude and prevalence of primary headaches in the textile mills' workers
2. To see the burden of these headaches among the sufferers.
3. To know the missing working days and hence assess the impact of primary headaches on the productivity in particular and on economy in general.
4. To assess the care provided to the headache patients (workers) versus the over the counter use and or misuse of drugs for headache.
5. To generate data on headache prevalence and burden for use by the national and international policy makers on health care.

## Patients and methods

The study population included all workers in the Akaki textile mill. This cross-sectional prevalence study was conducted among the Akaki textile mill workers from 1 November 2007 to 28 November 2007. It included the entire workers employed by the factory. It is located in Kality, Akaki sub-city of Addis Ababa, about 25 km east of the center. It has 1,300 workers and is about 52 years old, being one of the oldest factories of the country.

Data collection was done by the investigator (PI), three nurses and a medical doctor of the factory after training and orientation on primary headaches. Prepared and pre-tested questionnaires were used. The questionnaire was divided into two parts, the first part was on the demographic and personal aspects and the second part dealt with the specific details of headache. Cases with positive history of headache were interviewed and examined by the physician trained in headache medicine, internal medicine and neurology. Subjects were diagnosed in accordance to the most frequent type of headache experienced in the last 1 year, using HIS criteria [16]. Migraine and tension-type headache were diagnosed when all criteria were fulfilled. The diagnosis of probable was made when all but one criterion were fulfilled. Chronic headache was diagnosed when the frequency of headache pain was  $\geq 180$  days per year, based on a question about the frequency of headache.

Data quality was checked and crosschecked by the PI. The collected data were processed with a computer Epi-Info version 2002 and SPSS 11.0 software packages. Chi-square, OR, *P* value and 95% Confidence interval were used for analysis.

### Ethical consideration

The proposal was submitted to the Faculty Research and Publication Committee (FRPC) of Addis Ababa University Faculty of Medicine for necessary processes as per rules and regulations. It was approved on 5 October 2007. Institutional ethical clearance was obtained. Informed consent was obtained from the study participants.

### Dissemination of results

The results and outputs of the study will be published in the national or international Journals and copies will be given to MOH, AAU-RPO, Faculty of Medicine Library and NGOs

## Results

Of the 1,300 employees of the Akaki textile mill on job at the time of the interview, 195 did not want to participate in the interview. Out of 1,105 (85%) interviewed, 681 (61.6%) were males and 424 (38.4%) were females. The age ranged from 25 to 77 years with mean of  $46.9 \pm 7.5$ . There were two workers beyond the age of 65, working as a cleaner and a guard. Out of the total, 590 (53.4%) were in the age range of 45–54 years (Table 1). Of the total study population, 866 (78.4%) were married, of which 260 (30%) were females. The divorce rate was 9.0% (99), of which 87 (87.9%) were females. About 6.7% (74) were widowed of which widows accounted for 79.7% (59) while widowers were 20.3% (15) ( $\chi^2 = 185.1$ ,  $df = 3$ ,  $P = 0.00000$ ) (Fig. 1).

Illiteracy rate (did not read or write) of the study population was 9.9% (220), of which 161 (73.2%) were females; on the other hand, among 8.5% (94) who had tertiary education 75.5% (71) were males ( $\chi^2 = 154.6$ ,  $df = 3$ ,  $P = 0.0000$ ) (Fig. 2).

Lifetime prevalence of all sorts of headaches was 96.1%, 98.6% in females versus 95.9% in males (adjusted OR = 2.3, 95% confidence interval of 0.90–5.64). One-year prevalence of all types headaches was 73.2%, in females 79.2% compared 69.5% in males (OR = 1.20, 95% CI = 0.90–1.63) (Table 2).

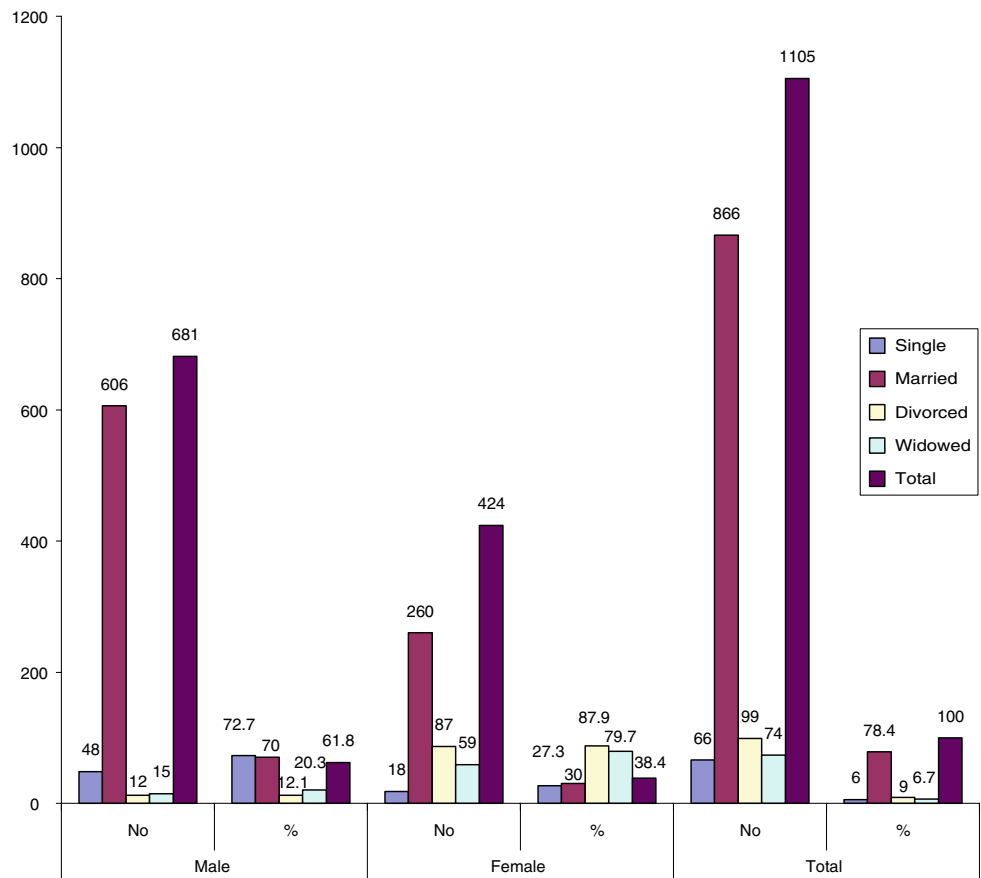
The overall 1-year prevalence of all types of primary headaches was found to be 16.4% (181/1,105). Out of these 181 cases, 114 (63%) with primary headache were females making a prevalence of 26.9% in the females while it was 9.8% in males. This is statistically significant (adjusted OR = 3.13, 95% confidence interval of 2.22–4.41,  $P = 0.000$ ). The age specific prevalence was 18.0% in the age group of 45–54 years (Tables 2, 4).

According to the International Headache Society criteria, 68 workers were found to have migraine giving a prevalence rate of 6.2%. The prevalence of migraine in females was 10.1% while it was 3.7% in males (adjusted

**Table 1** The age and sex distribution of the study population Akaki textile mill, Ethiopia, 2007

Age (years)	Male		Female		Total	
	No	%	No	%	No	%
25–34	33	4.8	27	6.4	60	5.4
35–44	176	25.8	107	25.2	283	25.6
45–54	357	52.4	233	55.0	590	53.4
55–64	113	16.6	57	13.4	170	15.4
65+	2	0.3	0	0	2	0.2
Total	681	61.6	424	38.4	1,105	100.0

**Fig. 1** Marital status of study population by gender Akaki textile mill, Ethiopia, 2007



OR = 3.23, 95% CI = 2.11–4.94,  $P = 0.000$ ). The age specific prevalence was 7.3 % in the age range of 45–54 years. The over all prevalence of migraine without aura was 51 (4.6%) making 75% of the migraine patients. This was 8.5 (36) in females and 2.2% (15) in males (adjusted OR = 4.63, 95% 2.50–8.58,  $P = 0.000$ ). The prevalence of migraine with aura was found to be 1.4% and that of probable migraine was found to be 0.1% (Tables 3, 4).

The over all prevalence of tension-type headaches was found to be 9.8% (108/1,105). This was 16.3 % in females as compared to 5.7% in males (adjusted OR = 3.14, 95%CI = 1.87–5.28,  $P = 0.000$ ). The age specific prevalence was 13.3% in the age group of 25–34 years. Frequent episodic tension-type headache was found to be 4.3%, with 7.1% in females and 2.5% in males (adjusted OR = 3.45, 95% CI of 1.87–6.35,  $P = 0.000$ ). The prevalence of infrequent episodic tension headache was 3.5, and 5.2% in females and 2.5% in males (adjusted OR = 2.45, 95% CI = 1.28–4.70,  $P = 0.007$ ). Chronic tension-type headache was found to be 1.6 and 3.5% in females and 0.4% in males (adjusted OR = 9.77, 95% CI = 2.81–34.00,  $P = 0.000$ ). Probable tension-type headache was found to be 0.4% (Tables 3, 4).

Cluster headache and other trigeminal autonomic cephalalgias were found in five (0.45%) individuals.

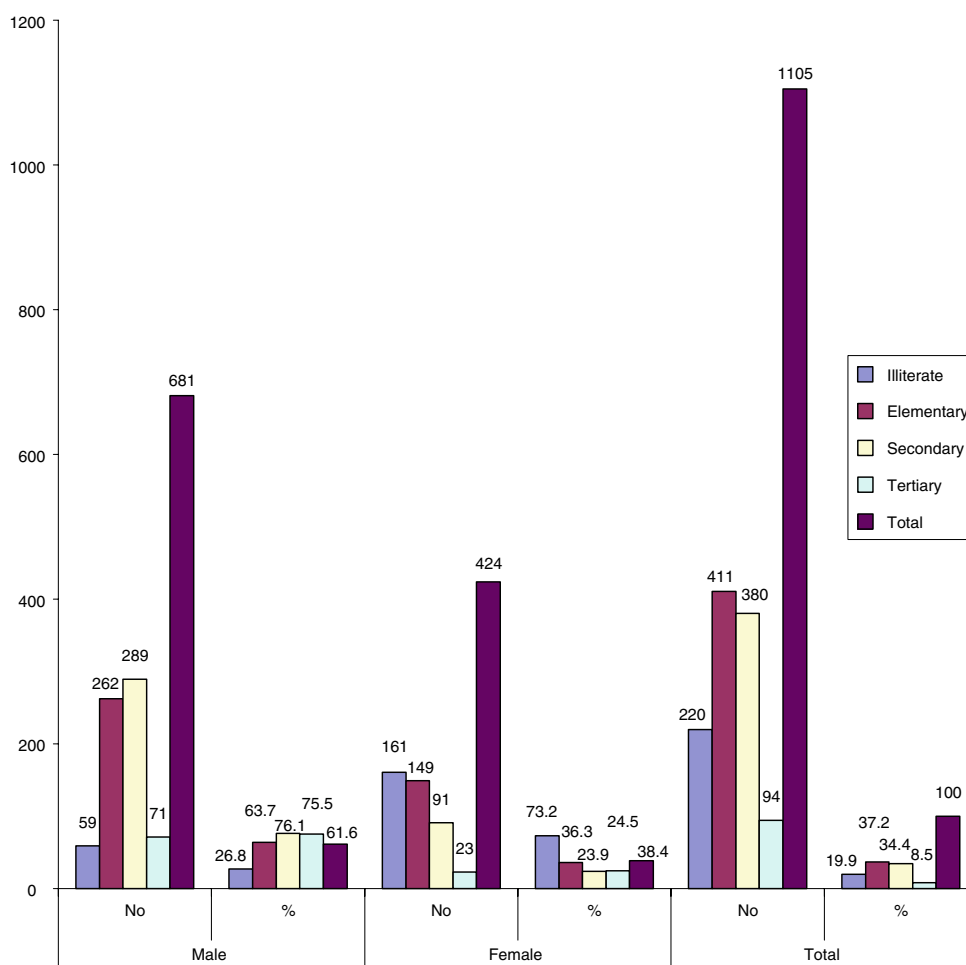
Table 5 shows the prevalence of headache versus marital status. The widowed ones have the significant higher proportion of all types of headaches followed by the divorced.

Table 6 shows the prevalence of headaches in educational categories. The general trend of reciprocal relationship of headache and educational levels was found to be evident but this is not significant statistically when confounders are controlled.

Tables 7 and 8 show the proportion of missing workdays in primary headaches during attacks. Out of 181 workers with primary headaches, 63 (34.8%) miss working days due to headache attacks. This was 60.3% in migraine and 20.4% in tension-type headaches.

Table 9 shows the use of ant-pain medications for attacks of headache. Only one patient, who has migraine with aura, ever used ergot preparation from the specific medications, the only available specific medication in Ethiopia. The most widely used over the counter medicine was acetaminophen tablets. Out of 181 workers with primary headaches, 80.1% used ant-pains intermittently or during every attack. This was 97.1% in migraine and 70.4 % in tension headache. The reasons given for those who did not use medicines were: no lasting remedy or response at all, use of alternatives like traditional medicine and holy water and fear of abuse of drugs.

**Fig. 2** Educational status of study population by gender, Akaki textile mill, Ethiopia, 2007



Average age of onset for primary headaches was  $25.7 \pm 12.4$  years, where as it was  $21.9 \pm 11$  for migraine and  $27.7 \pm 12.2$  for tension-type headaches. Out of the average  $27.3 \pm 7.7$  years spent on job in the textile mills,  $21.9 \pm 12.4$  years were with episodes of headache. These workers on average have  $13.77 \pm 15.5$  days of missing work per year. This was  $15.6 \pm 15.4$  days for migraine and  $11.2 \pm 15.6$  days per year for tension-type of headaches. Of the mean  $47.3 \pm 7.1$  years of life,  $21.9 \pm 12.4$  were spent with intermittent episodes of headache. It was  $26.8 \pm 15.5$  years for migraine and  $19.24 \pm 11.8$  years for tension-type headache (Table 10).

## Discussion

Lifetime prevalence of all sorts of headaches in this study is more than 96.0% which is in accordance to the studies done elsewhere [17]. The 1-year prevalence of all kinds of headache was 73%. This is slightly lower than the 1-year prevalence of the 2005 study of Florianopolis in Brazil, which was 80.8% [10].

The 1-year prevalence of migraine, 6.2% in this study is lower than the 2007 prevalence of migraine and probable migraine of Georgia, which was 21.5% where as it was closer to the definite migraine prevalence of 8.5% [9]. The

**Table 2** Prevalence of headache in the study population, Akaki textile mill, Ethiopia, 2007

Category	Female		Male		Total		Adusted odds ratio	95% Confidence interval	P value
	No	%	No	%	No	%			
Lifetime headache prevalence	418	98.8	653	95.9	1071	96.9	2.30	0.90–5.64	0.083
One-year headache prevalence	336	79.2	473	69.5	809	73.2	1.20	0.90–1.63	0.247
Primary headaches prevalence	114	26.9	67	9.8	181	16.4	3.13	2.22–4.41	0.000
Total population	424	38.4	681	61.6	1105	100.0			

**Table 3** Migraine and tension headache categories by sex, Akaki textile mill, Ethiopia, 2007

Category	Female		Male		Total		Adjusted odds ratio	95% Confidence interval	P value
	No	%	No	%	No	%			
Migraine without aura	36	8.5	15	2.2	51	4.6	4.63	2.60–8.60	0.000
Migraine with aura	6	1.4	10	1.5	16	1.4	0.96	0.35–2.67	0.85
Probable migraine	1	0.1	0	0	1	0.1			
subtotal	43	10.1	25	3.7	68	6.2	3.23	2.11–4.94	0.000
Infrequent episodic tension type	22	5.2	17	2.5	39	3.5	2.45	1.28–4.70	0.007
Frequent episodic tension type	30	7.1	17	2.5	47	4.3	3.45	1.87–6.45	0.000
Probable tension type	2	0.5	2	0.3	4	0.4	1.61	0.23–11.47	0.97
Chronic tension type	15	3.5	3	0.4	18	1.6	9.77	2.81–34.00	0.000
subtotal	69	16.3	39	5.7	108	9.8	3.14	1.87–5.28	0.000

**Table 4** Prevalence headaches by age category, Akaki textile mill, Ethiopia, 2007

Age category	All types of tension headaches		All types of migraine headaches		All types of primary headaches	
	Number	%	Number	%	Number	%
25–34	8	13.3	2	3.3	10	16.7
35–44	26	9.2	11	3.9	38	13.4
45–54	59	10.0	43	7.3	106	18.0
55–64	15	8.8	12	7.1	27	15.9
65+	0	0	0	0	0	0
Total	108	9.8	68	6.2	181	16.4

prevalence in this study is within the WHO estimate of 3–7% in Africa according to the community-based studies [1] but much lower than the global data of 11% [18]. This study showed similar prevalence of migraine to the door-to-door study done in 2004 in rural area of southern Tanzania where the overall 1-year prevalence was 5.0% [6]. In a study done in 1995, in the rural Ethiopian community, 1-year prevalence of migraine, 3.0% was lower than the figure in this study [7]. The reasons for such difference might be that the current study is in an urban setup where

people can report and perceive headache as an illness and this study was done in factory employees where as the previous one was in a rural community. Almost similar prevalence of 4.7% was found in a 2000 study from Hong Kong [8]. This study showed much lower prevalence of migraine as compared to the 2005 study of Florianopolis in Brazil, which was 22.1% [10]. In this study, migraine without aura accounted for 75% of the cases with a prevalence of 4.6% and preponderance in females was statistically significant. The low prevalence of migraine with aura 1.4% accounting for 24% of cases with migraine is in agreement with the previous reports from Africa in general and Ethiopia in particular [7, 12].

The 1-year overall prevalence of tension-type headache, 9.8% in this study is lower than the reported prevalence of 20.4% from Georgia [9] and very much lower than the 2007 global estimate of 42% [18]. This is much higher than the 1.7% reported by WHO in some African community based studies [1]. In a 2000 study from Hong Kong, the overall prevalence of tension-type headache of 26.9% was much higher than the present study [8]. In our study, the prevalence of tension-headache was much lower than the 2005 study of Florianopolis in Brazil, which was 22.9% [10]. Chronic tension-type headache in this study found to

**Table 5** Marital status and prevalence of headache, Akaki textile mill, Ethiopia, 2007

Status Type	Single		Married		Divorced		Widowed		Total No	$\chi^2$	df	P
	No	%	No	%	No	%	No	%				
Primary	9	13.6	122	14.1	26	26.3	24	32.4	181	24.67	3	0.0000
Tension	7	10.6	74	8.5	13	13.1	14	18.9	108	9.8	3	0.02
Migraine	2	3.0	43	5.0	13	13.1	10	13.5	68	18.5	3	0.0003
Migraine without aura	2	3.0	28	3.2	12	12.1	9	12.2	51	26.4	3	0.0000
Life time headache prevalence	63	95.5	837	96.7	97	98.0	74	100.0	1,071	3.4	3	0.3
One year headache prevalence	52	78.8	624	72.1	71	71.7	63	85.1	810	14.3	3	0.0025

**Table 6** Educational status and prevalence of headache, Akaki textile mill, Ethiopia, 2007

Status Type	Illiterate		Elementary		Secondary		Tertiary		Total No	$\chi^2$	df	P
	No	%	No	%	No	%	No	%				
All primary	55	25.0	69	16.8	47	12.4	10	10.6	181	18.7	3	0.003
Tension	32	14.5	39	9.5	29	7.6	8	8.5	108	7.9	3	0.049
Migraine	22	10.0	28	6.8	16	4.2	2	2.1	68	11.1	3	0.011
Migraine without aura	20	9.1	21	5.1	9	2.4	1	1.1	51	17.3	3	0.0006
Lifetime headache prevalence	219	99.5	406	98.8	360	94.7	86	91.5	1,071	25.2	3	0.0000
One-year headache prevalence	180	81.8	298	72.5	259	68.2	73	77.7	810	14.3	3	0.0025

**Table 7** Primary headaches versus missing working days, Akaki textile mill, Ethiopia, 2007

Category	Missing work days		Crude odds ratio	95% confidence interval	$X^2$	P value
	No	%				
Migraine	41/68	60.3	6.3	3.2–12.3	29.4	0.000001
Migraine without aura	29/51	56.9	3.7	1.9–7.3	13.9	0.0002
Migraine with aura	11/16	68.8	4.8	1.6–14.5	7.3	0.007
Tension type	22/108	20.4	0.2	0.10–0.40	23	0.000003
Infrequent episodic tension type	7	17.9	0.34	0.12–0.81	5.3	0.02
Frequent episodic tension type	11	23.4	0.48	0.22–1.02	3.0	0.08
Chronic tension type	4	22.2	4.98	1.59–15.59	6.43	0.011
All primary headaches	63/181	34.8	0.14	0.05–0.41	14.5	0.00014

**Table 8** Primary headaches versus missing of workdays, Akaki textile mill, Ethiopia, 2007

Category	Number	%	Adjusted odds ratio	95% confidence interval	P value
Migraine headaches	41	60.3			
Migraine without aura	29	56.9	383.84	108.46–1358.43	0.000
Migraine with aura	11	68.8	624.99	131.27–2975.61	0.000
Tension-type headaches	22	20.4			
Infrequent episodic tension type	7	17.9	58.73	14.11–244.47	0.000
Frequent episodic tension type	11	23.4	95.45	25.52–356.95	0.000
Chronic tension type	4	22.2	89.25	18.26–436.36	0.000
All primary headaches	63	34.8			

be 1.6% is in accordance to the WHO figure of 1–3% in adults and previous report from rural Ethiopia, which was 1.7% [1, 7, 12]. The 1-year prevalence of chronic tension-type headache, which is one of the most disabling headache syndromes, in our study is 3.5% in females and 0.4% in males. This gender difference was statistically significant.

Cluster headache is extremely rare in Africa as reported previously, as well as in this study [1, 7, 12].

Both migraine and tension headache have an enormous burden and impact on the individual family, society and on the nation. This burden is serious in developing

countries like Ethiopia where the resources are meager, ignorance and poverty are overwhelming, and infrastructures for healthcare systems are scanty. The cumulative impact over time with a compromised quality of life was enormous on individuals. In this study, cases with primary headache and migraine each lived 21.9 years on average with intermittent attacks of headache while this was more than 19 years for tension headache. The majority of cases with migraine have severe or moderate attacks of headache, photophobia, phonophobia and nausea or vomiting.



**Table 9** Primary headaches versus use of medicine (ant-pain), Akaki textile mill, Ethiopia, 2007

Category	Medicine use		Adjusted odds ratio	95% confidence interval	P-value
	No	%			
Migraine	66/68	97.1	3,349.47	733.4–15297.5	0.000
Migraine without aura	51	100.0	1,196.39	0.000–5.6E + 17	0.307
Migraine with aura	14	87.5	530.86	122.37–2303.03	0.000
Tension type	76/108	70.4	367.98	126.64–1069.24	0.000
Infrequent ETTH	28	71.8	325.75	117.23–905.16	0.000
Frequent ETTH	36	76.6	422.27	154.43–1154.68	0.000
Chronic TTH	12	66.7	265.43	77.57–908.23	0.000
All primary headaches	145/181	80.1	2,473.44	336.34–18189.49	0.000

**Table 10** Primary headaches and the burden, Akaki textile mill, Ethiopia, 2007

Category	Mean value	SD	Range
Mean age in years	47.3	7.1	30–60
Mean years on work	27.3	7.7	5–47
Means years lived with primary headaches	21.9	12.4	1–50
Mean age in years at onset of all primary headaches	25.7	12.2	5–55
Mean age in years at onset of tension-type headache	27.7	12.2	5–55
Mean age in years at onset of migraine headache	21.9	11	6–53
Mean years lived with tension-type headaches	19.24	11.77	1–48
Mean years lived with migraine headaches	26.8	11.78	2–50
Mean days of missing work due to all primary headaches per year	13.77	15.5	1–60
Mean days of missing work due to migraine headaches per year	15.61	15.4	1–60
Mean days of missing work due to tension-type headaches per year	11.17	15.57	2–60

Although the 1-year prevalence of primary headaches above 16% in this study is much lower than the global estimate 46% and that of Africa 21% [18], only one case of migraine with aura was ever treated with available specific medication of ergot preparation in the past. This shows how serious is the under recognition and under treatment of headaches in the capital city of Ethiopia, Addis Ababa. To complicate the matter, all sufferers in this study did not know that effective treatment exists and the care givers did not diagnose as well treat them.

Many migraine sufferers miss work because of their headaches, and reduced productivity as a result of working during the migraine attack is common [2].

In our study, more than 60% with migraine and above 20% with tension headache missed working days and almost all with migraine as well as more than half with tension headache have a reduced work capacity during attacks. This is in agreement with the WHO report [1, 19]. In this study, 34.8% of cases with primary headache had on average 13.77 lost work days per year and this was higher in migraine, about 16 lost working days, and least in tension type, 11 lost working days. This is almost in agreement with the 1995 study from Dares Salaam, Tanzania, which was 11.3 lost workdays per year [20]. The economic impact on

workers and their families as well as on the nation is massive especially for a developing country like Ethiopia, where poverty, ignorance and malnutrition are rampant.

In conclusion, the prevalence of primary headaches in the Akaki textile mill is significant, particularly in females, and the burden is massive, in a place of poverty and ignorance.

We recommend the availability and administration of specific therapy to the factory workers with primary headaches, and community based well-designed study for the whole nation's rural and urban population, as suggested in the WHO's Aids for management of common headache disorders in primary care [21].

**Acknowledgments** This epidemiological work represents the final dissertation held at the Master in Headache Medicine by Dr. Getahun Mengistu Takele, during the Academic year 2006–2007 at Sapienza University of Rome. Dr. Mengistu's scholarship has been granted by Sapienza University (0010959–2.2.4.1.40.2 to the author P.M.) in favor of the WHO's Global Campaign *Lifting the Burden*. The author G.M.T. is indebted to Dr. Worash Getaneh, geologist from Addis Ababa University, Department of Earth and Environmental Sciences for his ever-unreserved effort in accessing the Internet and encouraging the first author. He did allow his office and personal computer use day and night and sacrificed his time despite many commitments. We thank also Dr. Mihela Zebenigus, neurologist in the Department of Neurology of Addis Ababa University for her continuous support.

Finally we are grateful to the participants and management of Akaki textile without which this study would not have been successful.

**Conflict of interest** None.

## References

- World Health Organization (2004) Headache Disorders. Fact sheet N°277, March 2004. Accessed 28 June 2007
- Munsat TL, Mancall EL, DesLauriers MP (1994) The AAN launches a new education program: CONTINUUM lifelong learning in neurology. *Neurology* 44:771–772
- Steiner TJ (2005) Lifting the burden: the global campaign to reduce the burden of headache worldwide. *J Headache Pain* 6:373–377
- Rasmussen BK (1995) Epidemiology of migraine. *Biomed Pharmacother* 49:452–455
- Rasmussen BK, Jensen R, Schroll M, Olesen J (1991) Epidemiology of headache in a general population—a prevalence study. *J Clin Epidemiol* 44:1147–1157
- Dent W, Spiss HK, Helbok R, Matuja WBP, Sheunemann S, Schmutzard E (2004) Prevalence of migraine in a rural area in South Tanzania: a door-to-door survey. *Cephalalgia* 24:960–966
- Tekle Haimanot R, Seraw B, Forsgren L, Ekbohm K, Ekstedt J (1995) Migraine, chronic tension type headache and cluster headache in an Ethiopian rural community. *Cephalalgia* 15:482–488
- Cheung Raymond TF (2000) Prevalence of migraine, tension type headache and other headaches in Hong Kong. *Headache* 40:473–479
- Katsarava Z, Kukava M, Mirvelashvili E, Tavadze A, Dzagnidze A, Djibuti M, Steiner TJ (2007) A pilot methodological validation study for a population-based survey of the prevalences of migraine, tension type headache and chronic daily headache in the country of Georgia. *J Headache Pain* 8:77–82
- Queiroz LP, Barea LM, Blank N (2005) An epidemiological study of headache in Florianopolis, Brazil. *Cephalalgia* 26:122–127
- Hagen K, Zwart JA, Vatten L, Stovner LJ, Bovim G (2000) Prevalence of migraine and non-migrainous headache-head-HUNT, a large population-based study. *Cephalalgia* 20:900–906
- Tekle Haimanot R (2003) Burden of headache in Africa. *J Headache Pain* 4:S47–S54
- Stovner LJ, Hagen K (2006) Prevalence, burden, and cost of headache disorders. *Curr Opin Neurol* 19:281–285
- Lipton RB, Stewart WF, Diamond S, Diamond ML, Reed M (2001) Prevalence and burden of migraine in the United States: data from the American Migraine Study II. *Headache* 41:646–657
- Nodari E, Battistella A, Naccarella C, Vidi M (2002) Quality of life in young Italian patients with primary headache. *Headache* 42:268–274
- Headache Classification Subcommittee of the International Headache Society (2004) The international classification of headache disorders, 2nd edn. *Cephalalgia* 24:1–160
- Steiner TJ (2004) Lifting the burden: the global campaign against headache. *Lancet Neurol* 3:204–205
- Stovner LJ, Hagen K, Jensen R, Katsarava Z, Lipton RB, Scher AI, Steiner TJ, Zwart JA (2007) The global burden of headache: a documentation of headache prevalence and disability worldwide. *Cephalalgia* 27:193–210
- World Health Organization (2000) WHO report on Headache. Headache Australia, September 2000. <http://www.headacheaustralia.org.au/?p=70>. Accessed 16 Dec 2007
- Mutuja WBP, Mteza LBH, Rwiza HT (1995) Headaches in a non-clinical Population in Dares salaam, Tanzania. A community-based study *Headache* 35:273–276
- Aids for management of common headache disorders in primary care (2007) *J Headache Pain* 8(S1):1–47