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USE AND MISUSE OF ASPIRIN IN RURAL ETHIOPIA

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## USE AND MISUSE OF ASPIRIN IN RURAL ETHIOPIA

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### ABSTRACT

**Objectives:** To investigate ability to distinguish simple analgesics, to document misconceptions about aspirin use, and to identify strategies to diminish potentially harmful aspirin use in Ethiopia.

**Design:** Qualitative study (eight focus group discussions) used to inform cross-sectional survey.

**Setting:** Butajira, a small town in southern Ethiopia, and surrounding rural areas.

**Participants:** Purposively selected informants for focus groups; random sample of urban and rural residents for cross-sectional survey.

**Main outcome measures:** Ability to distinguish aspirin from paracetamol; proportion using aspirin; proportion aware of common risks of aspirin.

**Results:** Questionnaires were completed by 204 of the 250 residents sampled (82% response). Three-quarters of survey participants knew the difference between aspirin and paracetamol. Aspirin was used by 7.3% of respondents, and was mainly taken for headache and fever. In focus group discussions there was a suggestion that aspirin was considered particularly useful for children. There was very low awareness of the risks of using aspirin in children (2.5% unprompted, 18.6% prompted) or in people with asthma (1% unprompted, 5.9% prompted). Aspirin is cheap and widely available in urban and rural areas.

**Conclusion:** Awareness of the risks of aspirin use by children and in asthma is extremely low in this rural Ethiopian setting. Medications are purchased with minimal packaging by a population with low literacy. Drug dispensers and vendors must be trained to convey simple verbal warnings about aspirin use.

### INTRODUCTION

In many African countries, medications are acquired from a range of public and private providers, including clinics, health stations, pharmacies, retailers in established shops or transient market places, and individual practitioners working from their homes (1,2). In Dakar, the amount spent on medications sold by unregistered vendors in underprivileged suburbs was estimated at eleven-fold that of government pharmaceutical expenditure in the same area (2). In rural Ghana, most people bought medications without a prescription, misinformation was found to be common, and even when registered chemists were approached, many propagated misuse of medication by selling according to popular demand (3).

Research into over-the-counter (non-prescription) acquisition of medications in developing countries has chiefly focused on antibiotics (4,5) and antimalarials (1,6,7). However, painkillers and antipyretics have been shown to be widely stocked (1) and sold (2). Studies addressing home case management of malaria (6) and the appropriateness of drugs used to treat fever in

children (7) have suggested potentially dangerous use of aspirin. Recently, a community-based survey conducted among adults in Jos, Nigeria demonstrated high prevalence of self-medication with analgesics, with 22.6% of respondents falling into the category defined as 'abuse' (cumulative lifetime use of more than 5000 pills) (8). This community-based work is complemented by a hospital-based report of aspirin overdose in Kenyan children with malaria (9).

Patterns of availability and use of aspirin and paracetamol have not been explored in Ethiopia. In 2003, in the course of a study of the association between wheeze, allergic sensitisation and geohelminth infection (10), we demonstrated an association between paracetamol use and allergic symptoms (11). In order to explore this association further and rule out alternative explanations for it, we designed qualitative and quantitative studies on perceptions and use of paracetamol and aspirin in the same community.

This article describes use of aspirin, knowledge of contra-indications to its use, and issues surrounding accessibility and availability among people able to distinguish aspirin from paracetamol. Quantitative survey

data are used to complement information from focus group discussions. Strategies through which misuse may be minimised in future are then proposed.

## MATERIALS AND METHODS

*Study site:* The studies took place in and around Butajira, a small town located 135 km south of Addis Ababa, the capital of Ethiopia. Butajira was chosen for the present study as it is the site of the Butajira Rural Health Project, a demographic surveillance project covering more than 40,000 residents of the town and surrounding rural areas. Approximately 15% of people included in the surveillance project live in Butajira town which has a hospital, health centre, secondary school, post office and hydroelectricity supply, and is connected to Addis Ababa by an all-weather road. The other participants live in villages served by unmade roads, and are predominantly agriculturalists growing coffee, pepper, the stimulant chat and the cereal *teff* (12).

### *Sampling frame and sample selection.*

*Qualitative study:* Non-probabilistic sampling was performed to form eight focus groups representing urban men, urban women, rural men, rural women, health care providers (dispensers grouped separately from prescribers), men with allergic symptoms and women with allergic symptoms, respectively. We aimed to recruit between six and eight participants to each focus group. 'Urban' participants were those residing in the single Urban Development Association (UDA) included in the Butajira Rural Health Project (BRHP). 'Rural' participants were recruited from those residing in *Bati*, a rural area approximately 10 km from Butajira town. Health care providers were recruited from Butajira Hospital and Butajira Clinic, and included prescribers and dispensers from these health facilities, dispensers from private pharmacies in Butajira town, and rural drug vendors. People with allergic symptoms were recruited from those identified on our database as having reported wheeze, asthma, rhinitis, eczema or a combination of these symptoms and conditions in the cross-sectional survey performed one year previously.

*Quantitative study:* The sampling frame comprised individuals aged 5 years and over in 2003 who had participated in the earlier cross-sectional survey and resided in the urban area or one of four rural areas selected from the total of nine rural areas for ease of access during the rainy season. We randomly selected a sample of 250 people from the general population responding to the 2003 survey for the present study; we also studied selected groups of people who reported wheeze or asthma, rhinitis or eczema (data reported in reference 11). All results presented in this paper are from the general population sample.

*Conduct of focus group discussions, and qualitative data analysis:* Discussions were guided by two experienced facilitators, one female (who facilitated the women's groups), and one male (who facilitated the men's groups and the prescribers and dispensers groups). They used a check list to ensure coverage of certain key areas, including beliefs about the uses and adverse effects of paracetamol, aspirin and other non-steroidal anti-inflammatory drugs, conditions for which each may be used, circumstances when each should not be used, accessibility and price. Refreshments were

provided to participants and transport was arranged for health workers from the hospital, but no other reimbursement was made. Focus group discussions were tape recorded, and brief hand-written notes were taken simultaneously. The tape recordings were transcribed and translated into English by the facilitators. Transcripts were read repeatedly and manually coded by the facilitators, PD, GA- A and GD together. Data relating to aspirin are presented thematically, using quotes translated into English where appropriate.

*Study instrument, survey methods and quantitative data analysis:* A questionnaire was developed using the results of the qualitative study. With it, we checked whether people had heard of paracetamol and aspirin and knew that they were different, the frequency and quantity of paracetamol and aspirin use, indications for use of both medications, knowledge of adverse effects and contraindications to use, availability, cost and preference for one medication over the other. The questionnaire was prepared in English, translated into Amharic and back-translated to ensure accuracy. Seven local data collectors who had experience in previous field surveys were trained for three days in explaining the study, taking consent and administering the questionnaire. They were trained to administer the questionnaire to parents or adult caretakers of children aged 12 years and younger, and supervised during a pilot among adults and children who did not form part of the study sample. Supervisors checked questionnaires and returned to do random checks and checks wherever inconsistencies appeared. Data were double entered into EPI-Info version 6.1 in Butajira, the duplicate entries compared and cleaned in Addis Ababa, and the cleaned dataset exported to SPSS version 10 for all further analysis. A new variable indicating knowledge of the difference between paracetamol and aspirin was created on the basis of stating that paracetamol was not the same as aspirin or correctly identifying paracetamol from aspirin on being handed strips of each medication. Variables indicating 'ever' consumption of paracetamol and aspirin, and monthly consumption of each medication were created. Other outcome variables were created in response to the questions 'Can you name symptoms for which you have taken paracetamol (or aspirin)?'; 'Should any people NOT take paracetamol (or aspirin)?'; 'Is paracetamol (or aspirin) available close to where you live?'; 'Is paracetamol (or aspirin) affordable to you?'; 'Do you prefer to use paracetamol or aspirin?' and 'What affects your preference most?'. Demographic data on sex, age, urban or rural residence and highest educational level attained (by father if the respondent was aged less than 12 years) were transferred from the 2003 dataset by matching with individual identification number, and educational level was categorised dichotomously according to ability to read and write. Univariate associations between outcome variables and demographic variables were assessed using the chi-squared test, and binary logistic regression was used to identify the independent determinants of each outcome. Data relating to use of aspirin are presented here.

*Ethical Considerations:* Ethical approval was granted by the Research and Publications Committee of the Department of Community Health, Addis Ababa University. On completion of field work for the study, three simple statements about the safe use of aspirin and paracetamol were developed, translated into Amharic and distributed to prescribers, dispensers and community leaders in the Butajira area.

## RESULTS

*Focus group discussions:* Group size ranged from four participants (dispensers) to eleven participants (allergic men), and the time spent in discussion ranged from 40 minutes (prescribers) to 95 minutes (allergic women). Age of participants ranged from 17 to 68 years.

*Questionnaire survey: response rate and socio-demographic characteristics.* The response rate for the questionnaire survey was 204/250 (82%), of whom 42.6% were male, and the median age was 19 years (range 6 to 81 years). 63.7% were urban residents, 36.8% could neither read nor write and 12.7% had reported asthma or wheeze in 2003 (Table 1). Respondents who had never heard of paracetamol or aspirin, or did not know the difference between them, were not asked detailed questions about consumption, indications and adverse effects. Therefore 153 individuals responded to detailed questions on paracetamol, and 124 to detailed questions on aspirin.

Table 1

*Demographic and health characteristics of respondents in quantitative survey (n = 204)*

All subjects		No.	(%)
Gender	Male	87	42.6
	Female	117	57.4
Area of residence	Urban	130	63.7
	Rural	74	36.3
Age (years)	6-10	27	13.2
	11-20	82	40.2
	21-30	32	15.7
	31-40	30	14.7
	41-50	13	6.4
	51-60	9	4.4
	61-70	6	2.9
Level of literacy*	Unable to read or write	75	36.8
	Able to read or write	129	63.2
Self-reported asthma or wheeze in 2003	Yes	26	12.7
	No	178	87.3

\* of respondent, or father if respondent was aged 12 years or below

*Identification, naming and ability to distinguish between paracetamol and aspirin:* Not all of the focus group discussion (FGD) participants had heard of aspirin. Urban residents seemed to be more familiar with aspirin than rural residents and it appeared to be most well known amongst the urban men, who had all heard of it, and least well known amongst the rural women. When prompted with strips of aspirin tablets,

two of the rural women responded, 'we don't know by its name' and 'we don't identify it by its name' respectively. Aspirin was identified and described as a drug for pain, fever, headache and rheumatic pain. One urban male identified aspirin as a 'recommended anti-pain for children'. From the dispensers and prescribers, it seemed that aspirin was identified by the general population either by name (including the brand names Asprone and Vinac for aspirin) or by its effect (for example 'antipain' or 'antipyretic').

In the questionnaire survey, 156 (76.5%) knew paracetamol and aspirin were different medications. In accord with the FGD findings, the ability to distinguish was higher among men than women (85.1% vs 70.1%,  $p = 0.01$ ), in the urban area than the rural areas (81.5% vs 67.6%,  $p = 0.02$ ), in younger age groups than older ( $P_{\text{trend}} = 0.027$ ) and in those who could read and write than those who could not (84.5% vs 62.7%,  $P < 0.001$ ). After adjustment for literacy, age and area of residence, sex remained borderline significantly associated with ability to distinguish analgesics (OR before adjustment 2.43, 95% CI = 1.19 to 4.94; after adjustment 2.17, 95% CI = 1.01 to 4.68).

*Indications for use of aspirin:* Across all of the FGDs, aspirin was reported to be used for headache and fever. Other indications mentioned in some groups included rheumatic pain, toothache, fever and headache due to malaria, chest pain and 'birrd' (symptoms of internal cold and chills). Several of the health professionals emphasised the additional anti-inflammatory effects of aspirin. A dispenser said that aspirin was 'the same as paracetamol but in addition to this effect aspirin has an anti-inflammatory effect which is used for rheumatic pain'.

The indications mentioned in the FGDs were confirmed among those using aspirin in the survey. 7.3% of respondents had ever used aspirin, and only 4.8% of aspirin users had taken one tablet or more per month. The indications spontaneously mentioned most often were headache (all of 9 users), fever (4 of 9), and birrd (2 of 9). There were no differences by sex, area of residence or literacy for those using aspirin for fever and birrd.

*Adverse effects and contraindications:* The discussions varied depending on whether the group contained health practitioners or lay people. Most residents were unaware of the conditions under which aspirin should not be taken. Only one urban man, having himself suffered following use from 'gastric irritation' was aware that those with gastric problems should not consume aspirin.

Prescribers and dispensers stated that conditions such as gastritis, bleeding disorders and peptic ulcers would prevent them giving aspirin. Two important contraindications were highlighted by a single individual in each of these groups. One dispenser said he would not give aspirin to an asthmatic, since 'it is an allergen

by itself'. One prescriber emphasised the problem of aspirin use in 'viral syndrome in children'. Though he did not know the name, he did mention that it was fatal.

In the questionnaire survey, 69 of 120 respondents (57.5%) considered that there were no problems related to taking aspirin. Of the 22 who thought there were problems with taking aspirin, 19 mentioned gastric irritation and six masking malaria as problems. When asked the open question 'should aspirin be avoided by any groups', only five (2.5%) respondents said children; a further 38 answered yes when asked specifically if it should be avoided by children. There were no significant differences in knowing children should avoid aspirin by sex, age, literacy or area of residence. Two respondents (one an asthmatic) thought aspirin should be avoided in asthma and a further 12 when prompted.

*Availability and Cost:* FGD respondents considered aspirin to be widely available in urban and rural areas. Sources universally mentioned were pharmacies, health institutions (hospitals, health centres), private clinics and shops. Shops were the most common source in the urban area, because of long opening hours 'they are open till 10-11pm while pharmacy not so'. Despite affirming the extensive availability of aspirin, there were still individuals who claimed they preferred paracetamol since it was more 'easily' or 'commonly' available than aspirin.

The cost of aspirin was said to vary slightly by place of purchase. It was cheaper to buy at health institutions and pharmacies, costing approximately 1 birr (£0.07) for a strip of ten tablets.

Qualitative information was backed up by the questionnaire survey, with 76.7% of respondents stating that aspirin was available close to their homes. Rural residents were less likely than urban residents to find aspirin close to their homes (48.6% vs 88.0%,  $p < 0.001$ ). Females were more likely to report aspirin to be available (87.7% vs 72.4%,  $p = 0.033$ ) than males. Address remained an independent predictor of reported availability of aspirin after adjustment for age, sex and literacy (OR for rural vs urban availability 0.073, 95% CI 0.019 to 0.275).

Aspirin was said to be affordable by 86.8% of respondents. There was no significant urban-rural difference in stated aspirin affordability. There were no significant differences in affordability of aspirin by sex or literacy, and the effect of address diminished and became non-significant when controlled for age, sex and literacy.

*Preferences:* Most residents chose paracetamol over aspirin as their preferred drug. Although the reasons varied within the groups the dominating factors were recommendations by health care professionals and the wider perceived availability of paracetamol. A few respondents preferred aspirin. There were two main reasons for preference of aspirin over paracetamol. Firstly, health care professionals acknowledged the use

of aspirin for its anti-inflammatory properties: 'depending on desired effect if anti-inflammation is needed aspirin is my preferred drug'. Secondly, respondents mentioned preferring aspirin for children, as it was available locally in a child formulation known as 'baby aspirin'. Only one respondent, a prescriber showed any awareness of the potential dangers of administering aspirin to children (see above under *Adverse Effects*).

## DISCUSSION

We found that despite some confusion over the name of aspirin in the rural area, the majority of the general population knew that paracetamol was different from aspirin. This knowledge was strongly associated with literacy, partly because the strips of tablets that respondents were handed had the type of tablet written (in Amharic) on the back. Literate respondents can normally identify medications in this manner if tablets are dispensed in strips rather than individually. However, medications may be dispensed in paper envelopes, hindering identification by the user.

In this study, aspirin was used by relatively few respondents (7.3%), and only 4.8% took one or more tablets per month. In a metropolitan setting in Nigeria where analgesic mixtures, piroxicam and ibuprofen were available and more commonly used than aspirin, only 3% had ever used aspirin (8). However, the evidence we gathered suggests that aspirin use is less than in Dakar, Senegal, where aspirin sales were estimated at 58% of illicit pharmaceutical sales (2). Although we did not elicit information from which to calculate lifetime consumption, the monthly consumption estimates suggest it is unlikely that analgesic abuse is occurring on the scale reported in Nigeria (8). In this study, 22.6% of respondents had lifetime use of more than 5000 pills, a quantity associated with increased risk of end stage renal disease (13).

Aspirin was used predominantly for headache (100%), fever (44%), and *birrd* (22%). Indications for use were documented in Jos, Nigeria (8). In this metropolitan population, the most common indications for analgesic use were rheumatological (89%), headache (67%), fever (8%) and stress (7%). The authors comment: 'Advertising for these [analgesic] products is aggressive...It is the norm to see billboards and other media advertising them'. Advertising may influence indications for use, but is as yet uncommon in any media form in rural Ethiopia. This difference in advertising, and possibly a difference in prevalence of malaria fever, may explain the different patterns of indications for use in the two communities.

Although aspirin was not used as often as paracetamol, several focus group participants considered aspirin to be the analgesic of choice for children, and referred to a 'baby aspirin' formulation. Very few questionnaire respondents considered that

children should not take aspirin. Only one health care professional knew there was potential danger using aspirin in children but even he could not be explicit. The risk of Reye's syndrome is low at approximately 1:1,000,000, but febrile children with Reye's syndrome are 35 times more likely to have been given aspirin than those without. Since 1986, aspirin manufacturers have been required to add warnings about Reye's syndrome to product labels in most developed countries, but these warnings do not appear to have penetrated through to dispensers and consumers in this rural setting. There are reports of use of aspirin for fever in children in other African countries. Use of 'baby' or 'Junior' aspirin formulation has been reported in Kenya (6), and concerns regarding aspirin overdose in febrile Kenyan children have been raised (9). Aspirin was used in 36.7% of feverish children prior to enrolment into a study of malaria treatment in Uganda (7). These investigators found that aspirin was recommended more frequently than paracetamol by private drug shop attendants, whereas paracetamol was more frequently prescribed in government health facilities (7).

Very few questionnaire respondents considered that aspirin should not be used in asthma. Only one dispenser stated that he would not dispense aspirin in asthma. The prevalence of diagnosed asthma has been estimated at between 2% and 3% in studies in rural and urban Ethiopia (14,15), while the prevalence of self-reported wheeze is 10% to 18%. Systematic review of studies in which aspirin sensitivity in people with asthma was reported suggests prevalence of aspirin induced asthma of 21% (95% CI 14% to 29%) (16). Given a population of approximately 70 million, 294,000 (70 x 10<sup>6</sup> x 2% x 21%) Ethiopians may experience aspirin induced asthma.

We identified three major issues in conveying the health risks of common medications to users. Firstly, a large proportion of the population is unable to read their first language (in our study area, Guraginya or Amharic, but more than seventy languages are used in Ethiopia), and an even greater proportion would be unable to read packaging or information leaflets in English. Secondly, analgesics are usually sold in twos or in strips of ten tablets, so information given on or inside the container is not given to users with the tablets. Thirdly, many prescribers and dispensers were unaware of basic contra-indications to use of aspirin, though unlike investigators in rural Ghana (3), we found no evidence of deliberate provision of misinformation. Prescribers, dispensers and vendors must therefore be trained to make basic contra-indication checks and to give accurate verbal information even when this conflicts with their ability to make a sale.

*Strategies to minimise misuse:* The results of this study suggest that strategies should be designed at different levels to minimise misuse of aspirin. First, at policy level, manufacturers must be required to transfer

observation of guidelines that exist in more-developed countries to countries like Ethiopia. This includes withdrawal of formulations marketed as 'baby' or 'junior' aspirin. Another strategy, aimed at district-level professionals, would be to provide accurate information on contra-indications to dispensers and prescribers of analgesics. This group is literate, and so simple written information about groups of people who should avoid aspirin might be used. This might be provided in the packaging of analgesics, or independently in poster format. At community level, dissemination of information on risks associated with use of aspirin by children or people with asthma to the general population would require longer term efforts, but might be achieved through local opinion leaders.

In conclusion, in this rural Ethiopian population, there are potentially dangerous misconceptions about aspirin use, particularly among children and people with asthma. Aspirin is cheap and available through a number of outlets in urban and rural areas. It is often dispensed with minimal packaging, limiting the dissemination of warning messages through package labels or inserts. The population is therefore highly dependent on verbal advice from prescribers and dispensers, among whom we also found low awareness of adverse effects.

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