

# Adherence to Anti-hypertensive Medication and its Associated Factors among Hypertensive Patients at Goba Referral Hospital, Southeast Ethiopia

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## ABSTRACT

**Background:** Hypertension is an overwhelming global challenge which is significant risk factors for cardiovascular morbidity and mortality resulting from target-organ damage to blood vessels in the heart, brain, kidney, and eyes. Non-adherence with long-term medication and lifestyle modifications for conditions such as hypertension, dyslipidemia and diabetes is a common problem that leads to compromised health benefits and serious economic consequences in terms of wasted time, money and uncured disease.

**Objective:** To assess adherence to anti-hypertensive medication and associated factors at Goba referral Hospital, Ethiopia, 2019.

**Methods:** A cross-sectional study was conducted and a Systematic sampling technique was used to select 260 study participants. The study was conducted from February 01/02/2019 to June 15/06/2019. A structured interviewed questionnaires and 8-item morisky medication adherence scale was used after some modifications made. Verbal informed consent was obtained from study participants and confidentiality was maintained. The data was entered in to Epi-data version 3.1 and analyzed using SPSS version 24. In addition, of descriptive statistics for describing data and multivariate logistic regression analyses was used to the predictors of outcome variables.

**Results:** In this study, 63(24.2%) of participants had low adherence towards anti-hypertensive medication. Anti-hypertensive medication adherence was significantly associated with respondents educational level (P-value=0.02), duration of medication intake (P-value=0.01) and habit of medication intake as prescribed (P value=0.05).

**Conclusion and recommendation:** In this study, almost three fourth of the study participants had high adherence level towards anti-hypertensive medication. And still a significant number of respondents had sub-optimal adherence level. Factors such as educational level, duration of medication intake, and habit of medication intake as prescribed were associated with adherence level. To improve patient's adherence level regular and consistence counseling regarding medication adherence by healthcare workers should be strongly recommended.

**Keywords:** Hypertension; Hypertensive patients; Anti-hypertensive medication

## ABBREVIATIONS

AHT: Antihypertensive Treatment; AKUH: Aga Khan University Hospital; AMI: Acute Myocardial Infarction; BLH: Black Lion Hospital; BP: Blood Pressure; CI: Confidence Interval; CMG: Continuous Multiple-Interval Measure of Medication Gaps; CSA: Central Statistical Agency; CV: Cardiovascular; GUH: Gondar University Hospital; HBP: High Blood Pressure; HTN: Hypertension; LHU: Local Health Unit; MMAS-8: Morisky

8-item Medication Adherence Scale; MMHg: Millimeter Mercury; OPD: Out Patient Department; OR: Odds Ratio; SD: Standard Deviation; U.S: United States; VA: Veterans Affairs; WHO: World Health Organization

## INTRODUCTION

### Background

Hypertension (HTN) or HBP (systolic blood pressure  $\geq$  140 mmHg

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and diastolic blood pressure  $\geq 90$  mmHg) is an overwhelming global challenge [1,3]. It is one of the most significant risk factors for cardiovascular (CV) morbidity and mortality resulting from target-organ damage to blood vessels in the heart, brain, kidney, and eyes [3,4]. Hypertension causes 7.1 million premature deaths each year worldwide and accounts for 13% of all deaths, globally [2].

Analysis of the global burden of hypertension revealed that over 25% of the world's adult population had hypertension in 2000, and the proportion is expected to increase to 29% by 2025 [1,3]. Even though the burden of hypertension is currently centered in economically developed countries (37.3%), developing countries will feel a greater impact due to their larger population proportion, a change in life style and sedentary life. Indeed, estimates indicate that up to three-quarters of the world's hypertensive population will be in economically developing countries by the year 2025 [1].

In Africa, 15% of the population has hypertension [1,3]. Although there is shortage of extensive data, 6% of the Ethiopian population has been estimated to have HTN. Approximately 30% of adults in Addis Ababa have hypertension above 140/90 mmHg or reported use of anti-hypertensive medication [2].

Medications to treat hypertension and other chronic conditions work and are widely available. However, the broad benefits of these drugs are not being realized because large proportion of patients are not taking these medicines the way they are prescribed and this indirectly raises the issue of therapeutic adherence among hypertensive persons [7].

The World Health Organization (WHO) defines adherence to long-term therapy as "the extent to which a person's behavior taking medication, following a diet, and/or executing lifestyle changes corresponds with agreed recommendations from a health care provider" [7]. Other similar terms have been used instead of, adherence and the meaning is more or less identical [9]. Often, the terms adherence and compliance are used interchangeably. However, their connotations somewhat different: adherence presumes the patient's agreement with the recommendations, whereas compliance implies patient passivity. Recently, the term "Concordance" is also suggested to be used. Compared with "adherence", the term concordance makes the patient the decision-maker in the process and denotes patients-prescribers agreement and harmony. Although there are slight and subtle differences between these terms, in clinical practice, these terms are used interchangeably [9]. Measurement of medication adherence is challenging because adherence is an individual patient behavior. The following are some of the approaches that have been used:

1. Subjective measurements obtained by asking patients, family members, caregivers, and physicians about the patient's medication use;
2. Objective measurements obtained by counting pills, examining pharmacy refill records, or using electronic medication event

monitoring systems; and

3. Biochemical measurements obtained by adding a nontoxic marker to the medication and detecting its presence in blood or urine or measurement of serum drug levels [10,11].

Therapeutic non-adherence occurs when an individual's health-seeking or maintenance behavior lacks congruence with the recommendations as prescribed by a healthcare provider [9]. Many factors affect patient's adherence with medication regimes. Pharmacists need to be knowledgeable about the risk factors for non-adherence in order to help identify these issues and assist their patients [11]. Many studies have been conducted to determine explanatory factors for "good" or "poor" adherence in order to explain predict and monitor patients' behaviors [12]. No single factor has been found to reliably predict patient non-adherence [11]. Factors determining the level of antihypertensive drug adherence have been identified as follows:

1. Factors linked to treatment: The complexity of the treatment and the drugs' side effects.
2. Factors linked to the doctor-patient interaction: The balance between established medical guidelines and their own convictions, Communication between patient and doctor, patient's satisfaction with the healthcare system.
3. Factors linked to the patient: Socio-economic factors, the cost of treatment, lack of medical insurance [11,13].

The South African Hypertension Guidelines 2009 recommend lifestyle changes in all hypertensive patients. It is possible to prevent the development of hypertension and to lower blood pressure levels by simply adopting a healthy lifestyle [15]. The frustrations of advocating lifestyle changes are obvious to healthcare providers in clinical practice.

Lifestyle modification, previously termed non-pharmacologic therapy, plays an important role in hypertensive as well as non-hypertensive individuals. In hypertensive individuals, lifestyle modifications can serve as initial treatment before the start of drug therapy and as an adjunct to medication in persons already on drug therapy. In hypertensive individuals with medication-controlled BP, these therapies can facilitate drug step-down and drug withdrawal in highly motivated individuals who achieve and sustain lifestyle changes. In non-hypertensive, lifestyle modifications have the potential to prevent hypertension, and more broadly to reduce BP and thereby lower the risk of BP related clinical complications in whole populations. Indeed, even an apparently small reduction in BP, if applied to an entire population, could have an enormous beneficial effect on cardiovascular events. For instance, a 3 mmHg reduction in systolic BP should lead to an 8% reduction in stroke mortality and a 5% reduction in mortality from coronary heart disease [16]. Maximum benefit of medical treatment, resulting in poor health outcomes, lower quality of life and increased health care costs [17].

## METHODS

### Study settings

The study was conducted in Madda Walabu University Goba Referral Hospital, Oromia region. Goba town is located at 445 Km away from Addis Ababa, which is capital city of Ethiopia, Total population for this town was 50342, among 39868 men and 10474 are women (Goba town administration 2019) [18-20].

Study design: An institutional based cross-sectional study was conducted from March 06/03/2019 to June 15/06/2019.

### Sample size and sampling technique

In this cross sectional study single population proportion formula for determining the sample size and convenient sampling technique for study subject selection was used.

Accordingly, the sample size is calculated by considering proportion 50% and 95% level of confidence ( $\alpha=0.05$ ), with tolerable error of 5% ( $d=0.05$ ) as follows:

$$n = Z^2 \cdot \frac{\alpha}{2} \cdot P(1-P) \quad n = (1.96)^2 \times 0.5(1-0.5) = 384$$

$$d^2 \quad (0.05)^2$$

Since the source of population is below 10000 correction formulas will be used

$$nf = n / (1 + n/N) \quad nf = 384 / (1 + 384/700) \quad nf = 248$$

Where  $nf$  = desired sample size

$$n = \text{sample from infinite population}$$

$N$  = population size which is 700

Therefore, the required sample size including 10% non-response rate will be:  $n = 248 + 12 = 260$

### Data collection instrument and technique

The data was collected using a questionnaire consisting of the 8-item morisky medication adherence scale the questionnaire has three parts. The first part consisted of 12 questions which covered socio demographic and the second part contained 8 questions which was used to assess respondent's knowledge of medication they take. The third part of the questionnaire includes 10 questions which was assess medication adherence [21-23].

The data were collected by using interview technique using 8-items morisky medication adherence scale and other types of questionnaires. The questionnaire was prepared in English and then translated to Amharic and Afan Oromo as necessary, as the

study subjects mostly speak this language. The questionnaire was then translated back to English to check for consistency.

### Quality assurance

The data was checked for completeness and consistence to ensure data quality collected data was edited and clean do daily basis. For missing values, irregularities, inconsistencies, unlikely values and suspicious regularities corrective measures was taken timely To ensure data quality at each data collect or level data was checked by recollecting 5% of the study population by the principal investigator [24].

### Data processing and analysis

Hospital based cross-sectional study was conducted. Systematic sampling technique was used to select 260 participants. A structured standard questionnaire was used after some modifications Morisky Medication adherence scale was used. Data was enter and analyzed using SPSS version 20 [25].

### Definition of terms and operational definitions

Hypertension (HTN): High blood pressure, a common disorder in which blood pressure remains abnormally high (readings above 140/90 mmHg) [1,2].

High Adherent: Respondents who scored less than or equal to two of the MMAS score items leveled as high adherent [26].

Low adherent: Respondents who had scored greater than or equals to 3 of the total MMAS score leveled as low adherent [26].

### Ethical consideration

The study was carried out after getting permission from the ethical clearance committee of Madda Walabu University, Department of Public Health. Then, data was collected after getting written letter from Madda Walabu University. Informed verbal consent was obtained from all study participants. Each respondent was informed about the objective of the study and privacy during interview was insured.

## RESULTS

### Socio-demographic characteristics of the study subjects

In this study a total of 260 respondents participated and the response rate is 100%. Almost half of the study participants were 126 (48.5) in the age category of above 60. In the present study male participants were 120 (46.2%) and the remaining 140 (53.8) were females. Regarding the educational status of the study participants, 115 (44.2%) was unable to write and read. In this study 119 (45.9) were farmers (Table 1).

**Table 1:** Socio-demographic characteristics of the study participants in Goba referral hospital, Ethiopia, 2019(n=260).

| Variables              | Category                | Frequency | Percent |
|------------------------|-------------------------|-----------|---------|
| Age                    | 30-40                   | 17        | 6.5     |
|                        | 41-50                   | 45        | 17.3    |
|                        | 51-60                   | 72        | 27.7    |
|                        | >60                     | 126       | 48.5    |
| Sex                    | Male                    | 120       | 46.2    |
|                        | Female                  | 140       | 53.8    |
| Educational level      | Illiterate              | 115       | 44.2    |
|                        | Primary                 | 94        | 36.2    |
|                        | Secondary               | 8         | 3.1     |
|                        | Colleges and University | 43        | 16.5    |
| Place of resident      | Urban                   | 102       | 39.2    |
|                        | Rural                   | 158       | 60.8    |
| Ethnicity              | Oromo                   | 173       | 66.5    |
|                        | Amhara                  | 75        | 28.8    |
|                        | Tigere                  | 4         | 1.5     |
|                        | Wolayita                | 6         | 2.3     |
|                        | Other                   | 2         | 0.8     |
| Marital status         | Married                 | 196       | 75.4    |
|                        | Single                  | 21        | 8.1     |
|                        | Divorced                | 12        | 4.6     |
|                        | Widowed                 | 31        | 11.9    |
| Monthly income         | <500                    | 105       | 40.4    |
|                        | 500-1000                | 68        | 26.2    |
|                        | 1000-2000               | 30        | 11.5    |
|                        | >2000                   | 57        | 21.9    |
| Religion               | Muslim                  | 112       | 43.1    |
|                        | Orthodox                | 141       | 54.2    |
|                        | Protestant              | 6         | 2.3     |
|                        | Other                   | 1         | 0.4     |
| Occupation             | Governmental Employee   | 42        | 16.2    |
|                        | Farmer                  | 119       | 45.8    |
|                        | Student                 | 2         | 0.8     |
|                        | Businessman/women       | 24        | 9.2     |
|                        | Daily laborer           | 11        | 4.2     |
|                        | Other*                  | 62        | 23.8    |
| *House wife, Pensioner | 0.5                     | 0.5       | 0.5     |

Co-morbidity of medication related and other characteristics of study participants.

In this study a total of 260 respondents are participated of this 49(18.8) had Asthma, and 47(18.1) had Diabetes mellitus. In this study 89 (34.2%) of the respondents taking medication for more than five years. One hundred and ninety (73.1%) of the study participates taking their medications as prescribed (Table 2).

**Table 2:** Co-morbidity, medication related and other characteristics of study participants in Goba referral hospital, Ethiopia 2019 (n=260).

| Variables  | Category  | Frequency | Percent |
|--|---|-----------|---------|
| How long have you been taking oral medicines                 | 6 month   | 41        | 15.8    |
|  | 6 month - 1 year                                | 79        | 30.4    |
|  | 1 year - 5 year                                 | 51        | 19.6    |
|  | >5 year   | 89        | 34.2    |
| Co-morbidity   | Asthma  | 49        | 18.8    |
|  | Arthritis                                       | 38        | 14.6    |
|  | Diabetes mellitus                               | 47        | 18.1    |
|  | Cancer  | 2         | 0.8     |
|  | TB  | 6         | 2.3     |
|  | Coronary heart disease                          | 24        | 9.2     |
|  | None  | 94        | 36.2    |
| Do you take your medications as prescribed?                  | Yes   | 190       | 73.1    |
|  | No  | 70        | 26.9    |
| Do you take your medications as prescribed? "No" Why? (n=70) | You cannot afford to buy the medications always | 5         | 1.9     |
|  | The schedule of your work makes it impossible.  | 7         | 2.7     |
|  | Don't believe in the medication                 | 13        | 5       |
|  | You cannot swallow medication(s)                | 19        | 7.3     |
|  | Medications you are taking are too many         | 7         | 2.7     |
|  | Forget to take medications                      | 18        | 6.9     |
|  | Others specify                                  | 1         | 0.4     |

### Adherence level of the study participants

In this study the overall adherence level of the study participants was assessed by eight yes/no questions and almost three fourth (75.8%) of them have high adherence and 63 (24.2%) of them have low adherence towards anti-hypertensive medication (Table 3).

**Table 3:** Adherence towards anti-hypertensive medication among hypertensive patients at MaddaWalabu University Goba Referral Hospital, South East Ethiopia, 2019 (n=260).

| Variables  | Response  | Frequency    | Percent |      |
|--|---|--------------|---------|------|
| Do you sometimes forget to take your pills?  | Yes   | 36           | 13.8    |      |
|  | No  | 224          | 86.2    |      |
| People sometimes miss taking their medications for reasons other than  | Yes   | 28           | 10.8    |      |
|  | Forgetting. Thinking over the past two weeks, were there any days when you did not take your medicine?        | No           | 232     | 89.2 |
| Have you ever cut back or stopped taking your medication without telling your doctor, because you felt worse when you took it? | Yes   | 18           | 6.9     |      |
|  | No  | 242          | 93.1    |      |
| When you travel or leave home, do you sometimes forget to bring along your medication?   | Yes   | 78           | 30      |      |
|  | No  | 182          | 70      |      |
| Did you take your medicine yesterday?  | Yes   | 218          | 83.8    |      |
|  | No  | 42           | 16.2    |      |
| When you feel like your blood pressure is under control, do you  | Yes   | 109          | 41.9    |      |
| Sometimes stop taking your medicine?   | No  | 151          | 58.1    |      |
| Taking medication every day is a real inconvenience for some people.   | Yes   | 111          | 42.7    |      |
| Do you ever feel hassled about sticking to your blood pressure treatment   | Plan?   | No           | 149     | 57.3 |
|  | How often do you have difficulty remembering to take all your medications? (Please circle the correct number) | Never/Rarely | 215     | 82.7 |
|  | Once in a while   | 31           | 11.9    |      |
|  | Sometimes   | 11           | 4.2     |      |
|  | Usually   | 3            |         |      |
|  | All the time  |              |         |      |
| Overall adherence level  | Never/Rarely  |              |         |      |
|  | Low   | 63           | 24.2    |      |
|  | High  | 197          | 75.8    |      |

### Physical activity related characteristics of the study participants

Among the 260 study subjects 104 (40.0%) have little or no

activity and 98 (37.7%) have occasional activity, 58 (22.3%) of study participants have regular physical activity at least three times per week. One hundred seventy two (66.2%) of the respondent spend their day by walking and other exercise and 62 (23.8%) spend their day by sitting. In present study 108 (41.5%) of the respondents do exercise for 0-14 minutes and 48 (18.5%) do exercise for 15-29 minutes (Table 4).

**Table 4:** Physical Activity and related variables among study participants in Goba referral hospital, South East Ethiopia, 2019 (n=260).

| Variables  | Category  | Frequency | Percent |
|--|---|-----------|---------|
| How would you rate your overall physical activity level?   | Little or no activity                               | 104       | 40      |
|  | Occasional activity                                 | 98        | 37.7    |
|  | Regular physical activity at least 3 times per week | 58        | 22.3    |
| lifting and carrying   | little or no activity                               | 122       | 46.9    |
|  | occasional activity                                 | 80        | 30.8    |
|  | Regular physical activity at least 3 times per week | 58        | 22.3    |
| Does your work or daily activity primarily Involve   | Sitting   | 62        | 23.8    |
|  | Standing  | 18        | 6.9     |
|  | walking or other exercise                           | 172       | 66.2    |
|  | heavy labor   | 7         | 2.7     |
| How often do you engage in vigorous exercise which markedly increases your breathing such as: vigorous walking, cycling, running, swimming, etc? | Other   | 1         | 0.4     |
|  | seldom or never                                     | 157       | 60.4    |
|  | less than once a week                               | 44        | 16.9    |
|  | 1-2 times per week                                  | 32        | 12.3    |
|  | 3-5 times per week                                  | 16        | 6.2     |
| When you exercise, how long do you spend at each session?  | 6 or more times per week                            | 11        | 4.2     |
|  | 0-14 minutes  | 108       | 41.5    |
|  | 15-29 minutes                                       | 48        | 18.5    |
|  | 30-44 minutes                                       | 45        | 17.3    |
| On average, how many day do you lift objects which weigh 25kg or more?   | 45-59 minutes                                       | 15        | 5.8     |
|  | rarely or never                                     | 159       | 61.2    |
|  | 1-4 times   | 53        | 20.4    |
|  | 5-14 times  | 29        | 11.2    |
|  | 15-24 times   | 8         | 3.1     |
|  | 25 times or more                                    | 11        | 4.2     |

### Factors associated with adherence level of study participants

In this study adherence level towards anti-hypertensive medication was assessed and a significant association was detected with adherence level and respondent educational level (P-value=0.02), duration of medication intake (P-value=0.01) and habit of

medication intake as prescribed ( $P$  value=0.05). And factors such as age, place of resident, marital status, monthly income, presence of co-morbidity and occupational status does not show any significant association with adherence level (Table 5).

**Table 5:** Factors associated with adherence level of study participants in Goba referral Hospital south east Ethiopia, 2019 (n=260).

| Variables                                     | Response                 | Adherence level |            | X <sup>2</sup> (df),<br>P-value |
|---|--------------------------|-----------------|------------|---------------------------------|
|   |                          | Low (63)        | High (197) |                                 |
| Age   | <=50                     | 18              | 44         | 1.02(1), 0.31                   |
|   | >50                      | 45              | 153        |                                 |
| Educational level                             | Illiterate               | 20              | 95         | 7.78(2), 0.02                   |
|   | Primary & secondary      | 34              | 68         |                                 |
|   | Colleges                 | 9               | 34         |                                 |
| Place of resident                             | Urban                    | 27              | 75         | 0.46(1), 0.49                   |
|   | Rural                    | 36              | 122        |                                 |
| Marital status                                | Married                  | 43              | 153        | 4.99(3), 0.17                   |
|   | Single                   | 4               | 17         |                                 |
|   | Divorced                 | 5               | 7          |                                 |
|   | Widowed                  | 11              | 20         |                                 |
| Monthly income                                | <500                     | 16              | 89         | 12.2(3), 0.06                   |
|   | 500-1000                 | 21              | 47         |                                 |
|   | 1000-2000                | 13              | 17         |                                 |
|   | >2000                    | 13              | 44         |                                 |
| Religion                                      | Muslim                   | 19              | 93         | 6.1(3), 0.10                    |
|   | Orthodox                 | 42              | 99         |                                 |
|   | Protestant               | 2               | 4          |                                 |
|   | Other                    | 0               | 1          |                                 |
| Occupational status                           | Governmental Employee    | 10              | 32         | 4.84(2), 0.08                   |
|   | Farmer                   | 22              | 97         |                                 |
|   | Daily Laborer and others | 31              | 68         |                                 |
| How long have you been taking these medicines | 6 month                  | 16              | 25         | 16.56(3), 0.01                  |
|   | 6 month - 1 year         | 9               | 70         |                                 |
|   | 1 year - 5 year          | 9               | 42         |                                 |
|   | >5 year                  | 29              | 60         |                                 |
| Co-morbidity                                  | Yes                      | 45              | 121        | 2.07(1), 0.15                   |
|   | No                       | 18              | 76         |                                 |
| Do you take you medications as prescribed?    | Yes                      | 52              | 138        | 3.78(1), 0.05                   |

## DISCUSSION

In this study, adherence level towards anti-hypertensive medication was assessed and almost three fourth, (75.8%) of the study participants had high adherence level towards anti-

hypertensive medication. In line with this study, a cross-sectional study conducted at Black lion hospital (BLH) chronic follow up unit, Addis Ababa, reported adherence level of respondents to medication was, 69.2% [27-29]. This difference might be due to sample size and study population socio-demographic characteristics dissimilarity. Similarly, a study from Aga Khan University Hospital (AKUH), in Pakistan, showed that 77% of the cases were adherent [7].

On the other hand, low adherence level was reported from a study from University of Gondar Hospital (GUH), Northwest Ethiopia, reported that more than half (64.6%) of the study participants were found to be adherent to their treatment [1]. Similar, a study from Penang General Hospital (Malaysia), showed that 51.3% patients had poor adherence to antihypertensive medication [23]. This difference might be due to sample size and study population socio-demographic characteristics dissimilarity. A study report by Haruna et al. also reported non adherence rates for patients with hypertension are reported to be 50% [11].

In this study, adherence level towards anti-hypertensive medication was significant association with respondent educational level, duration of medication intake, and habit of medication intake as prescribed. And in current study, factors such as age, place of resident, marital status, monthly income, presence of co-morbidity and occupational status does not show any significance association. However, different studies reported a significant association between medication adherence and marital status, work status, health care facilities, duration of hypertension [30]. A study by Abera, et al. also identified factors that associate with adherence level, such as sex, distance from the hospital, number of co-morbidities, knowledge about HTN and its treatment [1,32-34]. As evidenced from the current study and other related studies, duration of medication intake, habit of medication intake as prescribed, early diagnosis and management of co morbidities, adherence counseling and patient education about the disease and its treatment are important factors to improve adherence status of patients [35,36].

## CONCLUSION

In this study, adherence level towards anti-hypertensive medication was assessed and almost three fourth of the study participants had high adherence level towards anti-hypertensive medication. In this study, adherence level towards anti-hypertensive medication was significantly associated with respondent educational level, duration of medication intake, and habit of medication intake as prescribed. So, health facilities should give due emphasis by considering these predictors for maintaining adherence of hypertensive medications.

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study was done by interviewing the pregnant women visited GRH after an ethical consent was obtained from Madda

Walabu University ethical clearance committee and individual verbal consent was obtained from the study participants. This manuscript has never been submitted and deliberated for publication to any other journals or books.

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## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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