



## Exploring Medicine Information Needs of Hypertensive Patients Using Short Message Service

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### Authors' contributions

*This work was carried out in collaboration between all authors. Authors OJOO, MOA and TOO designed the study. Authors OJOO and MOA wrote the protocol and with author AOO collected the data. Authors AOO and OJOO managed the literature searches and analyses of the study. Author OJOO wrote the first draft of the manuscript. Authors AOA and RAA facilitated data collection at the study site and participated in the final write-up. All authors read and approved the final manuscript.*

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### ABSTRACT

**Aims:** To explore the pattern of unmet medicine information needs of hypertensive patients on long term therapy and their attitude to use of SMS (mobile phone short message service) for medicine information exchange with hospital pharmacists.

**Sample:** 117 hypertensive patients on long term therapy who had been accessing care for at least one year.

**Study Design:** An exploratory medicine information exchange programme followed by a cross-sectional survey.

**Place and Duration of Study:** Outpatient Clinic of Department of Cardiology at Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, Nigeria between October, 2010

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and May, 2011.

**Methods:** Patients were prompted with SMS twice weekly for 5-8 months for use of their medication with advice to send their medicine information needs to the hospital pharmacist. Received messages were subjected to content analysis to identify their themes. A semi-structured questionnaire was used to explore patient attitude to the use of SMS. The 17-item questionnaire was designed on a 5-point Likert scale for responses with weights of 0-4. Data obtained were analysed using both descriptive and inferential statistics. These include frequencies and mean of weighted averages (MWA); tests of relationships, associations and of differences in means.

**Results:** A total of 63 SMS texts were received from the respondents and 44% of the messages expressed medicine information needs. Majority of the enquiries were related to indications and adverse effects. The patients' attitude to the use of SMS for medicine information exchange with pharmacists was generally positive (MWA=3.13) with no significant demographic effects. Some (46%) of the patients called for institutionalisation of the medicine information exchange programme.

**Conclusion:** The unmet medicine information needs of chronic hypertensive patients in the study were related mainly to indications and side effects of prescribed and non-prescribed medications and the patients clamoured for use of SMS in redressing the anomaly.

*Keywords: Medicine information need; hypertensive patients; long-term therapy; SMS (mobile telephone short message service); patient attitude.*

## 1. INTRODUCTION

Availability of adequate information to patients is widely recognised as a major factor influencing their role in the management of their health conditions. There have been research reports indicating the need for increased patients' access to information and possible follow-up after treatment. This becomes necessary because patients' need may not become apparent until they return home from their health care providers [1]. Inadequate information on health care issues has also been linked with non-adherence of patients to prescribed therapy [2]. Access to appropriate information about medicines is particularly important in improving patients' adherence to medication regimen and quality of life [3]. It is widely believed that pharmacists have a key role in providing this access adequately as well as helping patients utilise the medicine information obtained effectively [4]. There has been report of patients' ignorance of vital aspects of medication management [5] with call on pharmacists to provide adequate information to patients on medicine use [6,7].

The continuum of pharmacist-provided medicine information is captured in Guidelines on Pharmacist-Conducted Patient Education and Counselling of American Society of Health-System Pharmacists [8]. Medicine information needs of patients could vary. Dickinson et al. [9] reported that patients are normally concerned with four major types of information about a medicine namely its actions and uses, its side effects, issues about its administration and precautions in its handling. Factors such as disease, age of patient, delivery methods and timing as well as cost could influence medicine information needs [10-12]. Besides, patients may seek information on non-prescription medicines and pharmacists have the duty to educate and counsel them on appropriate use of non-prescription medication and discourage unsupervised use of these items [13].

Hypertension which is a chronic disease is a major contributor to worldwide cardiovascular mortality yet only one-third of patients with hypertension have their blood pressure treated to recommended levels [14]. This is partly because usually, hypertension does not exhibit any major symptoms and many of the antihypertensive medications may cause serious side effects [15]. For most patients with hypertension, home care is the norm which makes these patients to require more knowledge on the management of their illness [16]. The prevalence estimates of hypertension in Nigeria earlier reported as 32.8% has been found to be increasing [17-19].

The SMS (mobile phone's short message service) can serve as a strategy for provision of medicine information. This is mainly because it is an accessible and cost effective means of communicating information and is readily available even in developing countries [20]. The acceptance and use of SMS by the patients can be related to factors such as perceived usefulness, ease of use, social influence as well as gender, age, experience, and voluntariness of use [21]. There is no published evidence on medicine information needs of hypertensive patients or the use of SMS to access information from their hospital pharmacists. The study aimed to explore patterns of unmet medicine information needs of chronic hypertensive outpatients and to determine their attitude to the use of SMS in a 700-bed teaching hospital in Osun State of South-western Nigeria.

## **2. MATERIALS AND METHODS**

The study comprises medicine information exchange programme using SMS between chronic hypertensive outpatients and their hospital pharmacist, followed by a cross sectional survey. Ethical clearance was obtained from the Ethics and Research Committee of the institution before commencement of the study. The criteria for inclusion of participants were those who had been on antihypertensive therapy for two years and above, or at least one year with not less than four appointments before the commencement of the study, irrespective of the medicines they were taking and whether there were co-morbidities or not. The hospital was visited on a typical clinic day over a period of three months. All the patients in attendance at the Cardiac Outpatients Clinic were addressed and their consent solicited to participate in the programme. One hundred and eighty seven patients were thereby recruited. They were provided with the hospital pharmacist's telephone number and their own phone numbers and hospital reference numbers were obtained. They were encouraged to send their requests by SMS whenever they had any medicine-related information need. Such requests were normally responded to immediately and if not, within an hour. English language was used for messages sent to patients.

The participants were informed at the time of recruitment they would be required to assess the programme after a period of time. One hundred and eleven of the participants were then exposed to prompting twice weekly with SMS messages for a period of between five and eight months starting from beginning of the programme, employing an internet-based bulk electronic-messaging service. Each prompting was to remind them to use their medicines as appropriate and attend their clinic (usually about 24-48 hours before the next appointment date). The messages exchanged were permanently stored in a computer using the Nokia PC suite and telephone model Nokia 5130c, in Microsoft Excel application packages.

Primary data were employed for analysis and included the SMS messages communicated between the patients and hospital pharmacist and responses obtained with the aid of a set of questionnaire. A draft of the questionnaire was developed based on previously published surveys on attitude. The internal consistency of the instrument and the construct validity

were ascertained by the professional judgement of hospital pharmacists and the researchers. It was then tested on a group of eight of the patients living within the hospital town who consented to the exercise and provided their residential or office addresses for further contact. The addresses were used subsequently to visit them for re-test and they were excluded from the actual survey. Content validity was assessed by asking the patients if the items in the questionnaire were easy to understand and relevant to their experience with the use of SMS for medicine information exchange. Only items rated as comprehensible and relevant by more than eighty percent of the patients were retained in the final version. The questionnaire was re-administered after a two-week interval to determine its reproducibility. The questionnaire gave a test-retest reliability coefficient of 0.82. The result of the pre-test was used to make necessary modifications on the questionnaire.

The questionnaire had two components which included items seeking information on demographic variables and other items that sought information on attitude of the patients to use of SMS for medicine information exchange with the pharmacist. Seventeen items were selected on attitude and covered issues pertaining to perceived usefulness, ease of use, social influence, acceptability, cost, effect on patient's medication use adherence, feeling elicited by use of the SMS and about health care providers as well as continuity of the programme. Responses were measured on a five-point Likert scale ranging from 'can't say', 'strongly disagree', 'disagree', 'agree', to 'strongly agree' with allotted weights of 0-4 respectively. Responses of 'agree' and 'strongly agree' were taken as indicating positive attitude and those of 'disagree' and 'strongly disagree' were taken as indication of negative attitude.

The questionnaire was administered on a total of 117 respondents through a purposive and convenience sampling process. The use of non-probability procedure in sample selection is a limitation which arose because only patients that consented to participating in the message exchange programme and were in attendance on a clinic day within the time limit for the study could be selected. The questionnaire was administered at the end of the medicine information exchange programme (eight months for the most exposed participants and five months for the least exposed). The patients were addressed in the waiting room to identify those participating in the medicine information exchange programme and solicit for their consent in responding to the questionnaire. They were told that their refusal would not affect the services rendered to them in the hospital. Only those who gave their informed consent were recruited for the study with the help of four trained research assistants.

The series of information received from patients through SMS were subjected to content analysis employing the ASHP model for content of an education and counselling session [8]. Data collected with the aid of questionnaire were entered into the computer SPSS statistical package version 17. Descriptive statistics such as frequencies, percentages, weighted averages and mean of weighted averages were used to summarise data while inferential statistics were used to determine the effects of demographic variables on attitude. Spearman's correlation analysis was used to test for relationship between age and attitude while Mann-Whitney U test was employed to test for effects of gender and marital status on attitude and Kruskal Wallis test for effect of level of education on attitude of participants to the use of SMS.

### **3. RESULTS**

The socio-demographic characteristics of patients involved in the medicine information exchange programme showed that out of 117 respondents, majority were female (69%).

Most of the patients (38 and 39%) were in the age ranges of 51–60 and above 60 years respectively. Only 12% were in the age range of 41–50 years. Most of the respondents were married (74%). 16% were widowed. Only 6% were single. The respondents had varying educational background; majority (58%) had tertiary education while 28% had secondary education. Most of them were either trader (37%) or in academia (30%) while 19% were retirees.

A total of 63 SMS texts were received from the patients (Table 1). Some (44%) of the messages expressed medicine information needs while non-medicine information needs (56%) formed the larger part. Of the patients' unmet medicine information needs, some (43%) were related to adverse effects of the patients' medications, 21% of the needs concerned information about medication effects such as use, expected benefits and action, 14% were medicine administration issues such as medication's route, dosage form, dosage, and administration schedule (including duration of therapy), 14% were non-prescription medication issues while 4% each concerned drug interactions and drug costs.

Majority (77%) of the non-medicine information messages were expression of gratitude. Others were enquiries on non medicine-related issues (9%) and disease management information such as their health condition, expected effects and complications (6%). About 3% each of the total messages concerned dietary information, personal information-sharing and expression of prayer request.

Some of the actual messages expressed are presented in (Table 2). Of the 12 messages pertaining to adverse affects, 7 (84%) were report of dry cough resulting from administration of Lisinopril, an angiotensin converting enzyme (ACE) inhibitor. An example is:

*"I am a stroke patient that has been on drugs for close to 6months now. During my last visit to the clinic, two other drugs were added to my previous drugs namely Lisinopril and Fluvastatin. Having used the drugs as prescribed, I noticed that within 3days I have developed dry cough. Please assist."*

One patient asked whether pentazocine was also an analgesic like paracetamol. The patient wanted to know why he or she should take pentazocine and not the latter, cheaper one to relieve pain. Apparently this was an example of patient ignorance of different types of analgesics and their modes of actions.

On issues pertaining to medicine administration, here is an example:

*"Thanks for your help. Please what is the name of the company that combines the three hypertensive drugs in one so that I can inform my doctor? It will be more convenient to use one instead of three."*

In another instance, a patient wanted to know if he could use artesunate and amodiaquine combined without specifying the doses. Another patient wanted to know what adverse effect "constant taking of paracetamol could have on an ulcer patient". This is a question of drug-disease interaction. Food-disease interaction also featured in the patients questions. For instance one question was:

*"Apart from our drugs, is it advisable to eat meat regularly?"*

One message bothered on costs of prescribed medicines as follows:

*"I'm hypertensive patient attending clinic. One of the drugs (lescol 40mg) prescribed for me is costly for me (between 1200 & 1500 Naira per sachet of 7. Can I get an alternative cheaper to do the same work?"*

**Table 1. Pattern of messages received from patients**

S/N.	Classes of messages received	Frequency (f)	% in subgroup	% of all information classes
<b>A. Medicine information</b>				
1.	Adverse effects.	12	42.86	19.05
2.	Medication effects	6	21.43	9.52
3.	Medicine administration issues	4	14.29	6.35
4.	Nonprescription medication issues	4	14.29	6.35
5.	Drug interactions	1	3.57	1.59
6.	Drug prices	1	3.57	1.59
	Subtotal	28	100.00	44.44
<b>B. Non-medicine information</b>				
7.	Expression of gratitude to pharmacist	27	77.14	42.86
8.	Enquiries on non-medicine-related issues	3	8.57	4.76
9.	Disease management information	2	5.71	3.17
10.	Dietary information	1	2.86	1.59
11.	Personal information sharing	1	2.86	1.59
12.	Prayer request	1	2.86	1.59
	Subtotal	35	100.00	55.56
	Total number of messages received	63		100.00

The patients' attitude to the use of SMS for medicine information exchange with pharmacists after clinic attendance is presented in (Table 3). The respondents indication of 'strongly agree' with weighted average score (WA) of 3.62 implied a strong positive attitude to the item 'The use of mobile phone's SMS by the pharmacists in the hospital to communicate with patients on medication information should continue'. The result also showed that patients strongly agreed (WA=3.51) with the statement 'The use of SMS makes me feel more cared for by the health care providers'.

The patients agreed with most of the statements expressing positive attitude to the use of SMS. They agreed that the use of SMS by the pharmacist to send medicine information was 'acceptable (WA=3.5)' and useful (WA=3.4). They also agreed 'Use of mobile phone's SMS is comfortable (WA=3.4)' and 'mobile phone's SMS is easy to use' for them (WA=2.8).

They further agreed the technique is 'safe' (WA=3.4), and does not intrude into their privacy (WA=3.3). They agreed it is an improvement over traditional available means of communicating with the pharmacist after clinic attendance by repeat visit (WA=3.3) and were 'willing to use it' (WA=3.1). They agreed to 'bear the cost' of communication whether 'to' (WA=3.1) or 'from' (WA=3.1) the pharmacist. The respondents believed SMS had 'improved the use of their medications according to schedule' (WA=3.2) and 'reduced incidence of missed doses' (WA=3.0).

**Table 2. Samples of messages exchanged between hospital pharmacist and patients involved the programme for exploring medicine information needs of hypertensive patients**

Classes of information	Actual messages exchanged
	Messages received from patients
Adverse effects	My husband had surgery to remove bladder stone yesterday afternoon He's at home but develops hiccup. What do I do?
Medicine effects	Lisinopril, moduretic, dipyriclamol. Is the combination good for me?
Medication administration issues	Hi, Good day to U sir, Pls sir, Is it reasonable to use Syrup Orofer in place of Orofer capsule if it is not available?
Drug interactions	Sir, what adverse effect could constant taking of paracetamol have on an ulcer patient?
Nonprescription medication issues	Can I use this drug for malaria-Artesunate and Amodiaquine?
Drug prices	I'm an hypertensive patient. One of the drugs (Lescol 40mg) prescribed for me is costly. Can I get a cheaper alternative to do the same work?
Disease management information	I have pain all over my body, catarrh and headache please prescribe for me. Thanks for your usual caring
Dietary information	Apart from our drugs, is it advisable to eat meat regularly?
Enquiries on non medicine-related issues	Kindly inform me if there'll be Clinic tomorrow, because of the current industrial action in the Teaching Hospital. Thanks.
Personal information sharing	Sir/ma this is to inform you that Mr oloyede has died since December. Thank you
Prayer request	I have been in the hospital very sick for the past four days. Please pray for me.
Expression of gratitude	Thanks for your concern, I'm doing fine.
Promptings to take medication	Dear Sir/Ma, Hope you are ok & using your medicines as appropriate. Remember to keep ur CLINIC date & always send us your medicine-related enquiries. *MEDICAS*
Replies to patients' enquiry	Yes, there are cheaper anti-hypertensives but other factors also determine drugs recommended such as type& source of Hypertension. Best to see your doctor to help take right decision.*MEDICAS*
	This is a medical problem. It is best to consult the doctor as soon as possible. *MEDICAS*

There was a fair response on the use of SMS 'because it costs little' (WA=2.6) and 'does not affect their ways of doing things adversely' (WA=2.6). They disagreed with the statement that expressed a negative attitude: 'I use the SMS because I like to try new things' (WA=1.8).

Overall, the mean of the weighted averages (MWA) of the respondents' scores was 3.13 showing a generally positive attitude to their use of SMS. There was no significant demographic effect on the attitude of the patients to use of SMS with respect to age (Spearman's rho,  $r=-0.14$ ,  $P=.14$ ), gender (Mann-Whitney U test,  $Z=-0.77$ ,  $P=.44$ ), marital status (Mann-Whitney U test,  $Z=-0.16$ ,  $P=.88$ ) and level of education (Kruskal Wallis test,  $\chi^2=0.27$ ,  $P=.87$ ).

**Table 3. Patients' attitude to the use of SMS for communication of medicine information need with hospital pharmacist after dispensing encounters**

S/N.	Statements on patients' attitude to use of SMS for communication of medication-related information with hospital pharmacist after dispensing encounter	Weighted average (WA) of agreement responses
1.	The use of SMS by the pharmacists in the hospital to communicate with patients on medication information should continue.	3.62
2.	The use of SMS makes me feel more cared for by the health care providers.	3.51
3.	The use of SMS by the pharmacist to send medication information to me is acceptable.	3.45
4.	The SMS is useful in communicating medicines information between the pharmacist and me.	3.42
5.	I feel comfortable to act on the prompting of my pharmacist if and when SMS is used to pass across medication information to me.	3.42
6.	I consider the use of SMS for the communication of medication information (between my pharmacist and myself) safe	3.37
7.	I do not consider the use of SMS as an intrusion on my privacy.	3.34
8.	I am willing to use SMS to communicate with my pharmacist in the hospital for medication-related issues if and when necessary.	3.31
9.	The use of SMS in communication between me and the pharmacist after I have left the hospital is an improvement over the traditional available means of a return visit by me.	3.27
10.	The use of SMS to pass medication information to me has improved the use of my medication according to schedule	3.16
11.	I am willing to bear the cost of sending SMS to my pharmacist in the hospital if and when necessary.	3.12
12.	I am willing to bear the cost of sending SMS from my pharmacist in the hospital to me if and when necessary.	3.05
13.	The use of SMS for communication between the pharmacist and me has reduced the incidence of missed doses.	3.01
14.	The SMS is easy for me to use.	2.82
15.	I use the SMS because it does not adversely affect my present way of doing things.	2.63
16.	I use the SMS because it costs very little.	2.70*
17.	I use the SMS because I like to try new things.	2.00*
	Mean of Weighted Averages (MWA)	3.13

Scale of agreement: 1=strongly disagree; 2=disagree; 3=agree; 4=strongly agree; 0=can't say

\*Items denoting negative attitude

The patients made several suggestions on the question of how they thought medicine information exchange using SMS could be improved (Table 4). Some (46%) of the patients called for institutionalisation of the programme. This echoed the patients clamour for medicine information exchange beyond the dispensing encounter in the clinic and is in line



with desire of patients for partnership with their caregivers which have been reported in some unpublished studies and would meet their individual needs. A few (13%) of the patients wrote expressions of appreciation which lends voice to the fact that their needs were being met.

About 6% each of the patients expressed varying opinions that; 1. The scope of information should be expanded; 2. Every participant should receive messages; 3. Local languages should be included and; 4. Service should be consistent. Some of the respondents made requests that were medical and could only be referred to physicians. Some of the participants that were not prompted by the pharmacist for control felt deprived. Some of the participants who could not read and/or write in English language clamoured for use of their native languages as means of communication, 5% of the respondents called for more promptness in service, 3% each called for more publicity of the programme and response to all requests, 2% of the respondents requested that calls should be allowed, 2% expressed preference for phone call, 1% requested that government should finance the message exchanges and 1% opined that patients should pay.

**Table 4. Patients' suggestions to improve use of mobile phone short message service (SMS) for communication of medicine information-need with pharmacists**

S/N.	Theme of patients' suggestions/comments	N	%
1.	Institutionalize service/programme	50	46.30
2.	Appreciation	14	12.96
3.	Appreciation	7	6.48
4.	Every participant should receive message	7	6.48
5.	Cover local languages	7	6.48
6.	Service should be consistent	6	5.56
7.	Timeliness in service	5	4.63
8.	More publicity	3	2.78
9.	Ensure response to all requests	3	2.78
10.	Allow calls	2	1.85
11.	Calls preferred	2	1.85
12.	Government should finance	1	0.93
13.	Patients should pay	1	0.93
	Total	108	100.00

#### 4. DISCUSSION

The present study aimed to explore the medicine information needs of chronic hypertensive patients and attitude of the patients to the use of SMS. Awareness of pharmacists on aspects of medication therapy management about which patients often express need for information after dispensing encounters could guide on what to further emphasise during patient counselling at dispensing sessions. Our finding confirmed earlier report on the four major types of medicine information about which patients are concerned [9]. Need for information on adverse effects, in this study, dry cough was the most frequent type expressed by the patients. The patients were on Lisinopril, an angiotensin-converting enzyme (ACE) inhibitor. Dry cough is a common side effect of treatment with ACE inhibitors and the prevalence could be as high as 19% [17,18]. Side effects such as adverse effects and adverse drug reactions as well as actual medication effects and administration issues are vital components of pharmacotherapy to be addressed by the pharmacist during

dispensing and patient counselling [8]. Non-prescription medication issues are usually concerned with self-medication and may pose frequent challenge to patient's health. Pharmacists have the duty to educate and counsel patients on appropriate use of non-prescription medication and discourage unsupervised use [3,13].

Potential drug interactions may actually occur as drug-drug, drug-food or drug-disease interactions and may lead to serious or fatal consequences. It is the duty of the pharmacist to educate patients about such interactions as well as dietary modifications to forestall food-disease interactions [22-24]. The cost of medicine is almost always a concern for patients and should be taken into consideration when recommending medicines [12] which are usually more expensive. Registered generic medicines which are usually cheaper may be recommended in place of their innovator equivalents [25].

With the current shift to pharmaceutical care philosophy in pharmacy practice, the burden is on pharmacists to ensure that patient information needs are met adequately even after dispensing encounters [3,4], since most hypertensive patients are ambulatory [16]. In many cases, the needs expressed in the messages did not arise until after the treatment encounters [1]. Serious side effects are well known causes of non-adherence to use of antihypertensive medications especially when experienced without prior information about it [2,15]. Lack of information may cause patients to go for more readily available or cheaper alternative(s) [12]. The expressed complaints and need for medicine information on side effects and actual medicine effects may indicate some level of ineffectiveness in the education and counselling of patients by pharmacists at the point of dispensing. These echo earlier call on pharmacists to provide adequate medicine information to patients [6,7].

The use of SMS can alleviate many of the identified problems in medication therapy management but this use depends on the attitude of patients to the technology. The attitude of respondents in this study showed a strong desire for the means of communication. If the patients did not desire the technology or had reservations with its use, they probably would not have given such a strong positive response that its use should continue. Our findings show that they had a strong perception of its usefulness and they were well disposed to its use [21]. Some of the participants who did not receive messages from pharmacist and did not realise they were being used as control interpreted this as inconsistency in the programme. This may have been due to delay sometimes in response of the pharmacist. Some of the patients made requests when the pharmacist was not available while some thought the programme was already institutionalised and felt that public should know about it. Phone call was outside the focus of the programme. The issue of who finances use of SMS for medicine information exchange is a subject for further studies. Overall, the attitude and suggestions of the patients show that SMS was acceptable to them as an avenue for medicine information exchange between patients and pharmacists, and this could reflect its popularity in developing countries [20].

## **5. CONCLUSION**

From the findings of this study, it can be concluded that medicine information needs of surveyed hypertensive outpatients were related mainly to indications and side effects of the prescribed medications. These findings suggest possible areas of focus in the education and counselling of patients by pharmacists at the point of dispensing. The patients showed a strong positive attitude to the use of SMS in communicating their medication information needs with the pharmacist after dispensing encounters and actually clamoured for its institutionalisation. With the current shift to pharmaceutical care philosophy in pharmacy

practice, and the resulting burden on pharmacists to ensure that patients' information needs are met adequately, there is need to explore further the institutionalisation of SMS in rendering pharmaceutical care to patients beyond dispensing encounters.

## **CONSENT**

All authors declare that written informed consent was obtained from the patients/respondents for publication of this research.

## **ETHICAL APPROVAL**

This study was approved by the Ethics and Research Committee of Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, Nigeria on 18<sup>th</sup> March, 2010.

## **COMMITTEE APPROVAL**

This work was approved by the Post Graduate Committee of the Faculty of Technology, Obafemi Awolowo University, Ile-Ife, Nigeria on 22nd November, 2010.

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## **COMPETING INTERESTS**

The authors declare that there were no competing interests in the execution of the study.

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