Knowledge, Attitude and Practices on prediabetes management among selected paramedical professionals of Tamil Nadu: A cross sectional survey

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Abstract

Paramedical professionals have an important role in diabetes care focusing on patient education but there is limited literature on the awareness among them on prediabetes management especially from India. The aim of this cross-sectional prospective questionnaire survey was to conduct knowledge, attitude and practice survey among the paramedical professionals who are in touch with prediabetes population. A total of 312 paramedical professionals including pharmacists, nurses and laboratory technicians were recruited to the study. A written survey adapted from John Hopkins University group, USA was validated and used. One way ANOVA is used to determine the significant differences between the means and chi square test to find association between the overall knowledge attitude practice and socio demographic characteristics. Among the respondents, only 3% (n=10) were found to have good knowledge on prediabetes and almost half of the population shown poor knowledge. According to paramedical professionals' perspective on barriers towards prediabetes management, low performance towards life style modification and preventive pharmacotherapy is due to lack of motivation and poor medication adherence. Majority of the participants view on initial management approach to prediabetes was counselling on diet changes and physical activity than starting Metformin. A knowledge gap as well as lack of awareness on prediabetes management was found in our study. Since paramedical professionals get to spend more time with the target population improving their awareness on prediabetes can play a very important role in prevention of diabetes.

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1. Introduction

The World Health Organization states the definition of prediabetes as an intermediate state between diabetes and normoglycemia using two parameters, Impaired Fasting Glucose (110 to 125 mg/dl) and Impaired Glucose Tolerance (140- 200 mg/dl) or a combination of the two. According to International Diabetes Federation Diabetes Atlas, India accounts for 1 in 7 of all adults living with diabetes across the globe [1]. The prevalence of diabetes mellitus and impaired fasting blood glucose in India was found to be 9.3% and 24.5% respectively [2]. Diabetes self-management training and education plays an inevitable role in the prevention and management of diabetes and prediabetes [3]. Previous studies proved that Knowledge, Attitude and Practice surveys are an important tool that provides access to quantitative and qualitative information, revealing misconceptions and potential barriers to behavior change. Doctors usually take part in a variety of both formal and informal continuing medical educational programs throughout their career for improving and updating their knowledge and skills [4]. Literature search revealed that study on knowledge, attitude, and practice among physicians towards prevention and management of prediabetes in India reported an adequate awareness among them [5]. But knowledge and practice regarding lifestyle modifications among prediabetes population were found to be low and even the term prediabetes was new to them [6]. Survey among physicians suggest that shorter consultations compromise the care provided and range of services given to the patients [7].

Paramedical professionals also have a complementary role to doctors in diabetes care, focusing on education and providing emotional support [8]. Since paramedical professionals like nurses, pharmacists and laboratory technicians get to spend a lot more time with patients than doctors, creating awareness among these population will free up physicians to enhance their skills as well as updating knowledge for better management of more and more patients. There is limited literature on the awareness of paramedical professionals on prediabetes management especially from India. The main objective of this questionnaire survey was to analyze the knowledge attitude and practices in prediabetes management among the paramedical professionals who deals with prediabetes and compare among these groups.

2. Materials and Methods

2.1. Study design and subject recruitment

A cross-sectional prospective questionnaire-based survey was conducted among paramedical professionals of private hospitals, diabetic clinics, government hospitals, primary health centers over selected taluks of Nilgiris district of Tamilnadu (Ooty, Coonoor, Gudalur) between December 2021 to May 2022. The study was approved by the Institutional Ethics Committee, Department of Pharmacology, Government Medical College and Hospital, Ooty, The Nilgiris, Tamilnadu, India (IRB GMCTN007 Dated 20.04.2022). The knowledge, barriers and practices on prediabetes management was assessed in this study using the written survey adapted from John Hopkins university group, USA [9]. We included paramedical professionals aged between 20 to 60 years who deals more time with prediabetes namely, pharmacists, nurses, and laboratory technicians. Those who did not consent to take part in the survey as well as those who left the questionnaire without answering all the questions were removed from the final analysis. Convenience sampling was the sampling method used where researchers chose their sample based solely on convenience. Pretest of the questionnaire was carried out as a pilot work among the selected paramedical professionals (n=30) of Government Medical College and Hospital, Ooty. And the outcome of the pilot study was utilized to fine tune the questionnaire for better interpretation of the survey questions.

2.2. Data collection

Data was collected through a pretested and validated hand delivered 13 item questionnaires. The data collection was carried out with the help of final year Pharm D students who had been trained regarding prediabetes. Preliminary details on demographics were collected using a data collection form which includes age, gender, years of experience, hours of practice per week, education qualification as well as hospital type. Questions were also included on their participation in diabetes prevention programs as well as short term courses or workshops. After briefly explaining the study purpose, objectives and taking written consents, respondents were asked to fill the questionnaire in a quiet environment in 20 minutes under supervision, to avoid the chances of using internet or interpersonal consultation. Participants were prior intimated to finish the questionnaire and give back in the assigned time.

2.3. Knowledge assessment

First section of the survey form consisted of 6 knowledge questions which included correct laboratory criteria for diagnosis of diabetes as well as prediabetes and responders were asked to circle the numerical values. Followed by questions regarding the management of prediabetes as per existing guidelines and participants were requested to identify the correct options for attaining minimum weight loss and adequate physical activity. Respondents who picked right option was provided one mark in the questionnaire and zero marks was given for each question that was wrongly answered. The overall score for knowledge section was calculated, and maximum possible score was 6 marks. Therefore, respondents' knowledge was divided into three categories, good knowledge (6,5), average knowledge (4,3), poor knowledge (2,1,0) in this study.

2.4. Attitudes, beliefs, and barriers assessment

Questionnaire consisted of 3 barrier-based questions. To analyze the beliefs, barriers and viewpoints on prediabetes management, a psychometric response scale of 5-point Likert scale having strongly agree to strongly disagree was used. Here responders were asked to opt the barriers which they believed to be involved in life style modification as well as in Metformin use in prediabetes. This question was asked to know whether its physical or financial limitations which remain as an obstacle or it is just the lack of motivation or drive. Other important questions were on the methods to control the development of prediabetes with options like better consultation time for physicians, better availability of study resources, better access to DPPs, better diet plans, better approaches to weight loss as well as bariatric surgery.

2.5. Practice assessment

Practice assessment was based on 4 questions which included the best initial management approach towards prediabetes including Metformin use, life style modification approaches or even bariatric surgery. Followed by questions on correct time gap in repeating glycemic tests and subsequent doctor visit. Last question in practice was on the percentage of prediabetes population prescribed with Metformin.

2.6. Data analysis

Data were coded, entered an excel software (Microsoft office Excel 2010) database and analyzed using Statistical Package for Social Sciences, IBM SPSS Version 25 (SPSS Inc., USA). The statistical tests performed were descriptive statistics along with inferential statistics which include chi square test. Chi square test was carried out to find association between the overall KAP of respondents and their sociodemographic characteristics. Answers in attitude section were represented by combining and dividing options into agree vs neutral, disagree. One -way ANOVA was applied in the statistical analysis, to check the major differences between the means of three target groups of paramedical professionals.

3. Results

3.1. Demographic characteristics of the participants

Out of 350 paramedical professionals approached, 312 completed the study criteria giving written informed consent.

15 participants were removed due to incomplete information provided and 23 professionals refused to participate due to time constraints and lack of interest. Among the 312 participants, 36% (n=112) were pharmacists, 33% (n=104) were nurses and 31% (n=96) were laboratory technicians. There were more males (54%, n= 169) than female participants (46%, n= 143). Table 1 summarizes the demographic characteristics of survey respondents. 90% (n=281) of the paramedical professionals who participated in the survey were in the age group of 20 to 40 years. The mean age of the participants was 30.6 ±7.1 years. Regarding the educational qualification, 73% (n=227) participants in this study were diploma holders and 27% (n=85) were having degree qualification. Referring to the years of experience, 50% (n=156) were having below 5 years' experience, 29% (n=89) were having 5-10 years and 21% (n=67) had above 10 years' work experience. The mean work experience was 6.2 ±4.7 years. Majority of the pharmacists (n=52) were recruited from private clinics, (n=58) nurses from government hospitals and (n=53) laboratory technicians from private hospitals. 51% (n=159) paramedical professionals who participated in the study had a work hours/ week of 30-39 hours and 39% (n= 122) had above 40 work hours per week. Surprisingly, only 10% (n= 11) pharmacists, 8% (n=8) nurses and 4% (n=4) laboratory technicians attended some diabetes prevention program once in their lifetime and none of the participants did any short-term course on diabetes and its prevention.

3.2. Respondent's knowledge on prediabetes

Table 2 summarizes knowledge on diagnostic criteria and management of prediabetes. One-way ANOVA results shown that there was a significant difference between and within the three groups of paramedical professionals with a significant P value below 0.05. Among the respondents, only 3% (n=10) were found to have good knowledge among which 4 were pharmacist, 4 laboratory technicians and 2 were nurses (Figure 1). Almost half of the population, 47% (n= 148) shown poor knowledge in the survey among which majority were pharmacists (n= 76) and nurses (n=60). As expected, 100% laboratory technicians correctly answered for diabetes laboratory criteria including fasting blood glucose and HbA1c. Correct weight loss recommendations for prediabetes was answered by half the population of nurses while majority of the laboratory technicians opted wrong answers. Physical activity recommendation for prediabetes was correctly pointed out by more than 50 % of pharmacist respondents and poorly answered by majority of laboratory technicians. From the result analysis, we could find that a majority population of the respondents participated in this study among pharmacists and nurses had poor knowledge on prediabetes diagnosis and management. According to the chi square test results, the association between KAP and socio demographic parameters, we could find that newly graduated pharmacists had better knowledge than experienced pharmacists with a statistical significance. Results also shows that, nurses in private hospitals and clinics had updated knowledge better than government hospitals and primary health centers. Our study also revealed that experienced laboratory technicians had better knowledge than newly graduated technicians.

3.3. Beliefs and barriers on prediabetes management

Regarding the barriers involved in life style modification, a greater number of pharmacists reported lack of motivation and nurses opted lack of nutrients and weight loss resources as a major reason while laboratory technicians found physical limitation in doing activity as a main obstacle (Table 3). Among the three categories of paramedical professionals, majority of nurses and pharmacists agreed or strongly agreed poor patient adherence as a barrier in Metformin use while most of the laboratory technicians believed patients dislike taking these medications. The answer given for interventions to improve prediabetes was improved access to diabetes prevention programs by most of the respondents including nurses and pharmacists. A few populations of laboratory technicians also believed improved access to weight loss programs as an option to improve prediabetes management.

3.4. Management practices for prediabetes

Out of the 312 participants who completed the practice questions, 133 (43%) which includes majority of pharmacists, nurses and laboratory technicians pointed proper guidance on nutrition and exercise as the best first line treatment approach for prediabetes (Table 4). Most of the paramedical professionals were aware that it is better to repeat glycemic tests as well as return to follow up visit every 3 months to 6 months for better diabetes prevention among the target population. Seventy percent of paramedical professionals (n=212) reported prescribing Metformin for up to 25% of their patients while none reported prescribing 50% and above. Indian physicians were more likely to prescribe metformin if a patient does not respond to life style changes.

4. Discussion

The current study found some gaps in awareness among paramedical professionals who deals with prediabetes regarding knowledge for screening, diagnosing and management of prediabetes. A similar study using same questionnaire was carried out among the health care providers including doctors, nurses, nutritionist, and physical conditioners in Latin America, revealed insufficient knowledge on diagnosis, clinical implications, and management on prediabetes [10]. A very few populations of less than 10% have attended some diabetes prevention programs and none have done any relevant courses on diabetes in our study findings. In the literature search also we could find that, there are very few trained diabetes educators in the rural remote areas of India although many are self-taught through experience [11]. Even though laboratory technicians had good knowledge on glycemic tests compared to pharmacists and nurses, their knowledge on physical activity and weight loss recommendations was found to be poor. Previous survey showed that most laboratory technicians wish to attend informative conferences and continuing education as it helps them to maintain a high level of proficiency in their work [12].

However, previous research suggests that nurses work atmosphere includes more commitments, more stress with high workloads and often limited support or time for continuing or updating knowledge. Community pharmacy environments are also often busy and unpredictable [13]. Digital education can be used for educating health professionals on diabetes prevention and management since

there is a shortage of health care professionals competent in diabetes management worldwide [14]. Early identification and management of diabetes high risk individuals represent one of the major tasks of modern diabetology [15]. According to DAWN 2 study conducted over 17 countries report says that major proportion of health care providers did not receive any formal diabetes training. The first structured education program for diabetes educators in India was The National Diabetes Educator Program initiated in 2011 which trained 1032 diabetes educators. Just like physicians, one of the most important barriers for nurses in educating diabetes patients and their first-degree relatives on prevention and management is lack of time. Time constraints was found to be one of the biggest challenges in providing support and effective care [16]. According to International Pharmaceutical Federation (FIP), pharmacists are the most accessible health care professional in a community, who can play a vital role in prevention and treatment of chronic diseases. They can spend more time and help high risk individuals to reduce risk factors by prevention counselling when appropriate. As per studies a global digital health company based in New York City, adapted the CDC's DPP to a digital model to enable a flexible delivery of the evidence-based program [17]. Our study participants shown urge to improve knowledge through DPPs, so such Digital Diabetes Prevention Program (Transform) for Prediabetes can be initiated in India too. As per paramedical professionals' perspective in our study, low adherence of prediabetes subjects to life style modifications and preventive pharmacotherapy is due to lack of motivation and poor medication adherence. Paramedical professionals can play a vital role in addressing both these obstacles. From our result analysis, newly graduated pharmacists shown better awareness than experienced ones show an urgent need for structured disease specific short term online and offline continuing education courses for working pharmacists. Nursing school education does not impart knowledge on the most current drugs and clinical trials. So, induction training program for specific diseases must be given to nurses employed in government hospitals and primary health centers like private sector. One of the limitations of the study is that results cannot be generalized to all regions of India and larger population studies would reveal better. But the strength of the study is that it is the first study done on prediabetes awareness among paramedical professionals in India. An interprofessional team for diabetes prevention and management is required in Indian hospitals where the duties can be equally split between the team members where more time can be allocated as per schedules for healthy relationship with the patients.
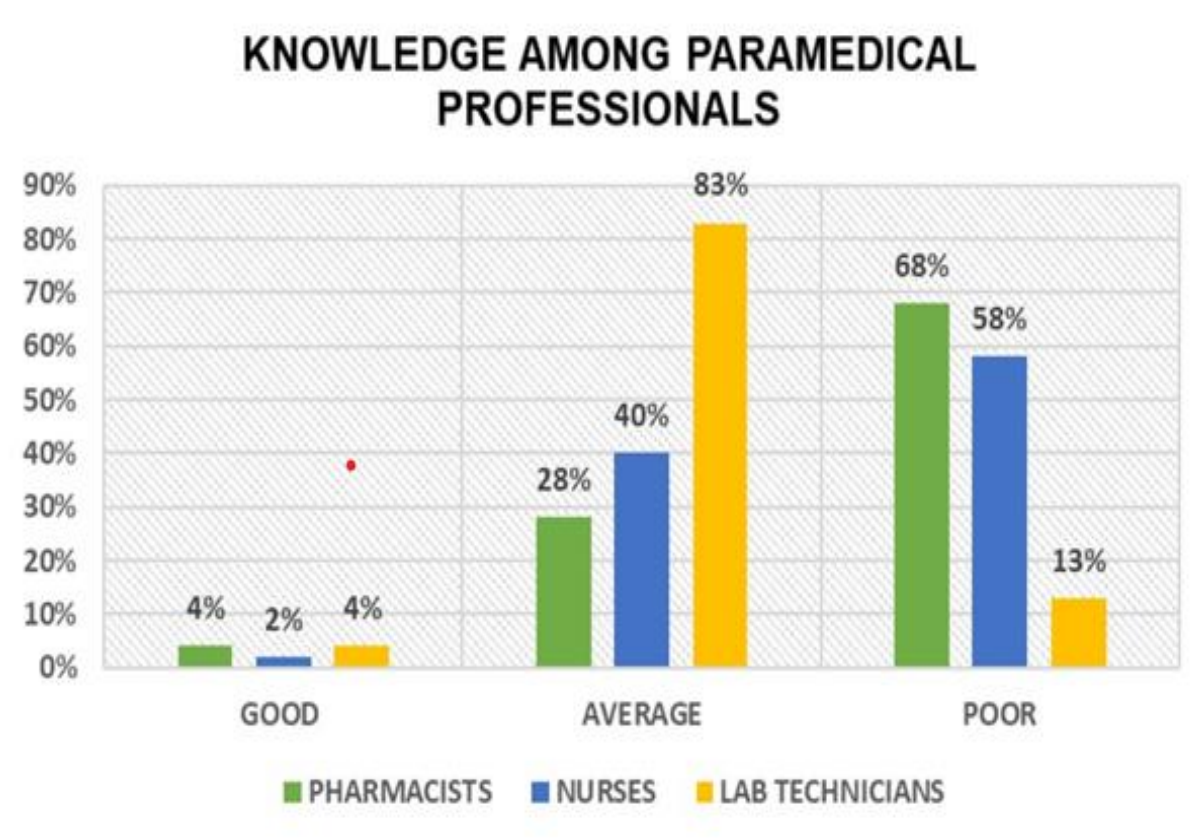

Figure 1: Prediabetes knowledge among paramedical professionals.

Table 1: Demographics of respondents.

Variables	Pharmacists (n=112)	Nurses (n= 104)	Laboratory technicians (n= 96)
Gender Males Females	79 (70%) 33 (30%)	37 (36%) 67 (64%)	53 (55%) 43 (45%)
Age 20-29 years 30-39 years 40-49 years 50-60 years	44 (39%) 46 (41%) 18 (16%) 04 (04%)	37 (35%) 60 (58%) 04 (04%) 03 (03%)	61 (64%) 33 (34%) 02 (02%) 00 (00%)
Years since practice < 1 year 1-5 years 6-10 years 11-15 years 15 and above	13 (12%) 38 (34%) 35 (31%) 18 (16%) 08 (07%)	09 (09%) 35 (34%) 44 (42%) 13 (12%) 03 (03%)	09 (09%) 35 (34%) 44 (42%) 13 (12%) 03 (03%)
Educational qualification Diploma Degree	82 (73%) 30 (27%)	78 (75%) 26 (25%)	67 (70%) 29 (30%)
Type of health care setting Private hospitals Private clinics Government Hospital Primary health centers	35 (31%) 52 (46%) 05 (05%) 20 (18%)	27 (26%) 16 (15%) 58 (56%) 03 (03%)	53 (55%) 23 (24%) 02 (02%) 18 (19%)
Working hours/week < 20 Hours 20-29 Hours 30-39 Hours 40 and above Hours	00 (00%) 05 (05%) 72 (64%) 35 (31%)	00 (00%) 00 (00%) 25 (24%) 79 (76%)	15 (16%) 11 (11%) 62 (65%) 08 (08%)
Work location Urban Rural	83 (74%) 29 (26%)	82 (79%) 22 (21%)	83 (86%) 13 (14%)
DPP Participation Yes No	11 (10%) 101 (90%)	08 (08%) 96 (92%)	04 (04%) 92 (96%)
Diabetes course completion Yes No	00 (00%) 112 (100%)	00 (00%) 104 (100%)	00 (00%) 96 (100%)

*DPP- Diabetes prevention program, Data are presented as N (%).

Table 2: Knowledge for diagnosis and management of prediabetes.

Knowledge questions	Pharmacists (n=112)	Nurses (n=104)	Laboratory technicians (n=96)
Correct identification of diabetes laboratory criteria; FBS	32 (29%)	46 (44%)	96 (100%)
Correct identification of diabetes laboratory criteria; HbA1c	43 (38%)	39 (38%)	96 (100%)
Correct identification of prediabetes laboratory criteria; FBS	30 (27%)	39 (38%)	59 (62%)
Correct identification of prediabetes laboratory criteria; HbA1c	36 (32%)	39 (38%)	58 (60%)
Correct body weight loss recommendation	35 (31%)	50 (48%)	6 (6%)
Correct physical activity recommendation	56 (50%)	40 (39%)	9 (9%)

*FBS- Fasting Blood Glucose, Data are presented as N (%).

Table 3: Barriers for interventions in prediabetes.

Barrier questions	Pharmacists (n=112)	Nurses (n=104)	Laboratory technicians (n=96)
Barriers to lifestyle modification (Strongly agree and agree)	38 (33.9)	18 (17.3)	13 (13.5)
Patient's lack of motivation	15 (13.4)	19 (18.3)	45 (46.9)
Patient's physical limitation in doing activity	23 (20.5)	29 (27.9)	10 (10.4)
Lack of weight loss resources for patient	18 (16.1)	29 (27.9)	08 (8.3)
Lack nutrition resources for patient	17 (15.2)	08 (7.7)	18 (18.8)
Patients do not think it is important to make these changes	01 (0.9)	01 (01)	02 (2.1)
Financial limitations			
Barriers to metformin use (Strongly agree and agree)	14 (12.5)	08 (7.7)	35 (36.5)
Patients dislike taking medications	26 (23.2)	15 (14.4)	11 (11.5)
Medication cost to patient	35 (31.3)	36 (34.6)	15 (15.6)
Poor patient adherence	24 (21.4)	22 (21.2)	23 (24)
Potential side effects	06 (5.4)	16 (15.4)	12 (12.5)
Providers lack of awareness of clinical guidelines for metformin use	07 (6.3)	07 (6.7)	0 (0)
Lack of FDA approval for metformin use in prediabetes			
Interventions to improve management of prediabetes (Strongly agree and agree)	24 (21.4)	11 (10.6)	10 (10.4)
More time for doctors to counsel patients	21 (18.8)	32 (30.8)	13 (13.5)
More educational resources for patients	39 (34.8)	34 (32.7)	30 (31.3)
Improved access to diabetes preventive programs	16 (14.3)	21 (20.2)	5 (5.2)
Improved nutrition resources for patients	08 (7.1)	05 (4.8)	38 (39.6)
Improved access to weight loss programs	04 (3.6)	01 (01%)	0 (0)
Improved access to bariatric surgery.			

*Strongly agree and agree responses are only represented in the table, Data are presented as N (%).

Table 4: Practices on prediabetes management.

Barrier questions	Pharmacists (n=112)	Nurses (n=104)	Laboratory technicians (n=96)
Initial management approach	48 (42.8%)	42 (40.4%)	43 (44.8%)
Counseling on diet changes and physical activity	18 (16.1%)	21 (20.2%)	07 (7.3%)
Refer to nutritionist	16 (14.3%)	22 (21.1%)	25 (26%)
Refer to behavioral weight loss program	30 (26.8%)	19 (18.3%)	21 (21.9%)
Discuss starting metformin	0 (0%)	0 (0%)	0 (0%)
Refer to bariatric surgery			
Repeat laboratory tests	54 (48.2%)	50 (48.1%)	45 (46.9%)
3 months	21 (18.8%)	27 (26.0%)	51 (53.1%)
6 months	31 (27.7%)	21 (20.2%)	0 (0%)
1 year	04 (3.6%)	04 (3.8%)	0 (0%)
2 years	02 (1.7%)	02 (1.9%)	0 (0%)
No specific recommendation			
Return for follow-up clinic visit	46 (41.1%)	44 (42.3%)	58 (60.4%)
3 months	36 (32.1%)	46 (44.2%)	23 (24%)
6 months	30 (26.8%)	14 (13.5%)	05 (5.2%)
1 year	0 (0%)	0 (0%)	05 (5.2%)
2 years	0 (0%)	0 (0%)	05 (5.2%)
No specific recommendation			
% Patients with prediabetes prescribed metformin	0 (0%)	01 (1%)	0 (0%)
0 %	22 (19.6%)	07 (6.7%)	34 (35.4%)
1-5 %	85 (75.9%)	71 (68.3%)	56 (58.3%)
5-25%	05 (4.5%)	25 (24%)	06 (6.3%)
25-50 %	0 (0%)	0 (0 %)	0 (0%)
50-75%	0 (0%)	0 (0 %)	0 (0%)
>75 %			

*Data are presented as n (%).

5. Conclusions

From our study we could find that there is a knowledge gap as well as lack of awareness on prediabetes among the working paramedical professionals of Tamil Nadu. This is a major concern which needs to be addressed since the number of diabetes and prediabetes population are increasing day by day since past years. Paramedical professionals like pharmacists, nurses and laboratory technicians get to spend more time with the high-risk population of diabetes than the physicians especially first-degree relatives. They can play a very important role in improving the awareness on early detection and management of this silent killer disease and slow down the diabetes epidemic in the near future. This work is just an initiative for future research works to be conducted in this area on a larger population.

Conflict of interest

There are no conflicts of interest.

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