ment Center, University Hospitals of Cleveland, 2074 Abington Road, Lakeside-3128, Cleveland, OH 44106.

REFERENCES

1. Brumpt E: *Blastocystis hominis* in species et formes voisines. *Bull Soc Pathol Exot* 5:725–30, 1912
2. Phillips BP, Zierdt CH: *Blastocystis hominis*: pathogenic potential in human patients and in gnotobiotes. *Exp Parasitol* 39:358–64, 1976
3. Zierdt CH, Rude WS, Bull BS: Protozoan characteristics of *Blastocystis hominis*. *Am J Clin Pathol* 48:495–501, 1967
4. Zierdt CH: Studies of *Blastocystis hominis*. *J Protozool* 20:114–21, 1973
5. Zierdt CH: *Blastocystis hominis*, an intestinal protozoan parasite of man. *Public Health Lab* 36:147–60, 1978
6. Zierdt CH, Swan JC: Generation time and growth rate of the human intestinal parasite *Blastocystis hominis*. *J Protozool* 28:483–85, 1981
7. Zierdt CH: *Blastocystis hominis*, a protozoan parasite and intestinal pathogen of human beings. *Clin Microbiol Newsl* 5:57–59, 1983
8. Cohen AN: Ketoconazole and resistant *Blastocystis hominis* infection. *Ann Intern Med* 103:480–81, 1985
9. LeBar WD, Larsen EC, Patel K: Afebrile diarrhea and *Blastocystis hominis*. *Ann Intern Med* 103:306, 1985
10. Ricci N, Toma P, Furlani M, Caselli M, Gullini S: *Blastocystis hominis*: a neglected cause of diarrhea? *Lancet* 1:966, 1984
11. Vanatta JB, Adamson D, Mullican K: *Blastocystis hominis*: infection presenting as recurrent diarrhea. *Ann Intern Med* 102:495–96, 1985
12. Garcia LS, Bruckner DA, Clancy MN: Clinical relevance of *Blastocystis hominis*. *Lancet* 1:1233–34, 1984
13. Rayfield EJ: Infection and diabetes: the case for glucose control. *Am J Med* 72:439–50, 1982

Effect of Tea Prepared From Leaves of *Syzygium jambos* on Glucose Tolerance in Nondiabetic Subjects

The use of popular medicines, e.g., teas prepared from several plants, is a widely distributed habit among Brazilian people (1) and others (2). Attempting to isolate the active ingredients of these plants and investigating them in basic and clinical pharmacological models will take a long time. Based on the wide use of these medicines, and because several of them will not be tested in the near future, we tested, in a clinical pharmacological model (e.g., randomized clinical trials), the effect of folk preparations in nondiabetic subjects and diabetic patients. The method of obtaining, preparing, and use of these medicines was characterized through ethnopharmacological surveys, which confers ethical grounds to the investigation.

A two-step survey in diabetic patients of University-affiliated hospitals showed that most patients use alternative medicines for treatment of the disease. The plant more frequently used is jambolão (as far as we know, jambolan, malak rose-apple, and malabar plum in English). Two species were identified, *Syzygium cuminii* (L.) Skeels and *Syzygium jambos* (L.) Alst. Most of the people interviewed prepared the tea either by infusion or decoction from dry leaves of both species in an average dilution of 2.5 g/L (range 0.2–8.0 g/L). They used the tea as a water substitute, with a mean daily intake of 1 L.

To determine whether the tea prepared from leaves of *S. jambos* has a hypoglycemic effect in humans, we performed the following experiment.

The sample was comprised of 30 nondiabetic subjects aged 18–26 yr (mean 22 yr), with 15 of each sex. Obesity, chronic or acute diseases, drug use, pregnancy, recent low-calorie diets, and fasting blood glucose >5.6 mM were criteria for exclusion. They were informed about the objectives, methods, and risks of the experiment and gave their written consent.

In a randomized, parallel, double-blind fashion, the subjects received, after a 10-h fast, an oral dose of 75 g glucose and either jambolão tea, prepared by decoction of 2 g dry leaves in 250 ml water, or the same volume of placebo tea, prepared with 15 ml lemon juice, which was added also to the jambolão tea to mask its taste. Both teas were administered in dark bottles with a straw. The leaves of jambolão were classified in the herbarium of the university.

Blood sampling was collected through fingersticking before and 60, 120, and 180 min after the glucose load. Blood glucose level was determined by the photocolorimetric method, which was previously validated through the comparison with the enzymatic method (hexokinase; $r = 0.85$, $P < 0.001$, overall agreement = 0.72, $\kappa = 0.53$).

The study was planned with a statistical power of 0.9 to demonstrate a difference of 10% in the mean glucose concentration between the experimental groups, for a $Pr(\alpha = 0.05)$. The results were compared with an analysis of variance (ANOVA) for multiple factors and repeated measurements.

In the jambolão group, mean glucose levels were 4.9 ± 0.17, 8.2 ± 0.36, 6.8 ± 0.25, and 5.1 ± 0.27 mM, respectively, from fasting to 180 min. In the placebo group, blood glucose levels were 5.2 ± 0.22, 8.5 ± 0.25, 7.1 ± 0.25, and 5.6 ± 0.33 mM. Despite a trend to lower values in the jambolão group, these differences were not statistically significant ($P = 0.154$ for drug factor; $P < 0.001$ for time in ANOVA). These results showed that the tea, at the dose used, is unable to dampen the effect of a glucose tolerance test in nondiabetic subjects.

Despite a previous supposition, based on clinical experience, that the use of alternative medicines for the treatment of diabetes is frequent, the observed prevalence of their use was unforeseen. The use of plants with putative hypoglycemic effect seems to be a common habit around the world (3). *S. cuminii*, formerly *Eugenia jambolana*, is one of these plants. Its seeds and bark had

a hypoglycemic effect in animal models (4–6). There is a report of blood glucose control in three of seven patients who used seeds of *E. jambolana* for 70 days (7). We are not aware of any studies involving the species tested in this trial.

Our results do not rule out an effect of this tea. Such an effect may appear only during chronic use or in diabetic patients. In addition, because we gave the tea after the glucose load, we cannot exclude an effect on its absorption. However, because known oral hypoglycemic drugs have an effect in this model (8), the tea prepared from leaves of *S. jambos* probably does not have a hypoglycemic effect. Physicians and patients should be aware of these negative results while these teas are being tested in diabetic patients in a subacute period.

CLAUDIO C. TEIXEIRA, MD
FLÁVIO D. FUCHS, MD
ROSA MARIA BLOTTA
JAIR KNIJNIK
ISABEL C. DELGADO
MARINA S. NETTO
ELIANE FERREIRA
ARLENIO P. COSTA
DÉBORAH G. MÜSSNICH
GISELE G. RANQUETAT
GLEDISON GASTALDO

From the Department of Pharmacology and Clinical Hospital of Porto Alegre, Federal University of Rio Grande do Sul, Rio Grande do Sul, Brazil.

Address correspondence and reprint requests to Claudio C. Teixeira, MD, Departamento de Farmacologia, Instituto de Biociências, U.F.R.G.S., Rua Sarmento Leite, 500, 90050, Porto Alegre, RS, Brazil.

ACKNOWLEDGMENTS

This work was supported in part by grants from Conselho Nacional de Desenvolvimento Científico e Tecnológico and Ministério da Educação (Programa Nova Universidade), Brazil.

REFERENCES

1. Elisabetsky E: Pesquisas em plantas medicinais. *Ciênc Cult* 39:697–702, 1987
2. Duke JA: *CRC Handbook of Medical Herbs*. Boca Raton, FL, CRC, 1985
3. Krall LP: Oral hypoglycemic agents. In *Joslin's Diabetes Mellitus*. 12th ed. Marble A, Krall LP, Bradley RF, Christlieb AR, Soeldner JS, Eds. Lea & Febiger, Philadelphia, PA, 1985, chapt. 21, p. 413
4. Kedar P, Chakrabarti CH: Effects of jambolan seed treatment on blood sugar, lipids and urea in streptozocin induced diabetes in rabbits. *Indian J Physiol Pharmacol* 27:135–40, 1983
5. Bansal R, Ahmad N, Kidwai R: Effects of oral administration of *Eugenia jambolana* seeds and chlorpropamide on blood glucose level and pancreatic cathepsin B in rat. *Indian J Biochem Biophys* 18:377, 1981
6. Ratsimamanga AR, Loiseau A, Ratsimamanga-Urverg S, Bibal-Prot P: Nouvelle contribution à l'étude de l'action d'un principe hypoglycémiant mis en évidence dans l'écorce jeune de *Eugenia jambolana* (Myrtacées) sur l'hyperglicémie provoquée du lapin normal et pursuite de sa purification. *C R Acad Sci Ser D* (Paris) 227:2219–22, 1973
7. Sepaha GC, Bose SN: Clinical observations on the antidiabetic properties of *Pterocarpus marsupium* and *Eugenia jambolana*. *J Indian Med Assoc* 27:388–91, 1956
8. Kolterman OG, Gray RS, Shapiro G, Scarlett JA, Griffin J, Olefsky JM: The acute and chronic effects of sulfonylurea therapy in type II diabetic subjects. *Diabetes* 33:346–54, 1984

Diabetic Eye Disease Detection by Primary-Care Physicians

It is estimated that ≥50% of severe vision loss caused by diabetic retinopathy is preventable (1). A recent study showed that early screening and treatment of proliferative retinopathy could save an average of 3 yr of sight for each person with diabetes and could also achieve significant cost savings (2). In public health-care programs serving large minority populations, there is a particularly urgent need for diabetic eye disease screening.

How to best conduct a diabetic eye disease screening program has yet to be determined. Because primary-care practitioners treat ~80% of the diabetic population in the United States (3), it is important to evaluate their potential for screening diabetic eye disease. Studies have recommended ophthalmoscopy by primary-care physicians if they can be adequately trained to perform the exam and refer to ophthalmologists when indicated (5–7).

The purpose of this study was to evaluate the proficiency of primary-care physicians in detection and referral for diabetic eye disease with a standard protocol. The protocol was used for ~1 yr in community health centers that care for 6300 people with diabetes. Nine patients who had nonproliferative and proliferative retinal disease commonly found in diabetic populations were selected. For a patient to be included in the study, the fundus abnormality findings by two retinal specialists who used indirect ophthalmoscopy had to agree. A third retinal specialist independently compared the findings with the patient's recent medical record reports and fundus photographs.

Twenty-two internists and family practitioners with faculty appointments in the Department of Community Medicine participated in the study. They examined both eyes of each patient with direct ophthalmoscopy and recorded the presence of microaneurysms, dot-blot hemorrhages, macular exudates, cotton wool patches, vitreous hemorrhages, and neovascularization. The need and reasons for referral were also documented.

Data were analyzed for *1*) correct identification of fundus abnormalities and *2*) correct referral of patients. For all abnormalities, the true-positive rate was 65%, and the false-positive rate was 23%. The correct referral rate was 83%, of which 90% were for the correct reason. For eyes in which proliferative abnormalities were present, the physicians often confused the abnormality with nonproliferative abnormalities, but they recognized the presence of serious fundus problems, and 85% of their referral decisions were correct. The false-positive identification of retinal disease should decrease as pri-