Table 4. **Risk factors associated with diabetes in individuals aged 35 years or more, Bangladesh, 2011**

Characteristic	Logistic regression model[a]					
	First[b]		Second[c]		Full[d]	
	OR (95% CI)	*P*	OR (95% CI)	*P*	OR (95% CI)	*P*
Individual						
Age group (years)						
35–39	1.00	NA	NA	NA	1.00	NA
40–44	1.16 (0.86–1.56)	0.33	NA	NA	1.17 (0.87–1.57)	0.30
45–49	1.46 (1.09–1.95)	0.01	NA	NA	1.46 (1.09–1.96)	0.01
50–54	1.35 (0.98–1.85)	0.06	NA	NA	1.33 (0.97–1.82)	0.08
55–59	1.94 (1.40–2.69)	< 0.01	NA	NA	1.94 (1.40–2.68)	< 0.01
60–69	1.52 (1.10–2.10)	0.01	NA	NA	1.51 (1.09–2.08)	0.01
≥ 70	1.81 (1.27–2.6)	< 0.01	NA	NA	1.82 (1.27–2.60)	< 0.01
Sex						
Male	1.00	NA	NA	NA	1.00	NA
Female	0.95 (0.73–1.25)	0.72	NA	NA	0.96 (0.73–1.25)	0.75
Educational level						
No education	1.00	NA	NA	NA	1.00	NA
Primary education	1.39 (1.12–1.73)	< 0.01	NA	NA	1.36 (1.09–1.69)	0.01
Secondary education	1.55 (1.21–2.00)	< 0.01	NA	NA	1.52 (1.18–1.96)	< 0.01
Higher education	2.18 (1.58–3.00)	< 0.01	NA	NA	2.12 (1.53–2.92)	< 0.01
Currently working						
Yes	0.71 (0.54–0.92)	0.01	NA	NA	0.72 (0.55–0.94)	0.01
No	1.00	NA	NA	NA	1.00	NA
Marital status						
Currently married	1.00	NA	NA	NA	1.00	NA
Divorced, widowed or other	1.09 (0.84–1.40)	0.52	NA	NA	1.06 (0.82–1.36)	0.67
Hypertension						
Yes	1.54 (1.29–1.84)	< 0.01	NA	NA	1.57 (1.31–1.88)	< 0.01
No	1.00	NA	NA	NA	1.00	NA
Body weight						
Normal	1.00	NA	NA	NA	1.00	NA
Overweight or obese	1.93 (1.51–2.47)	< 0.01	NA	NA	1.93 (1.52–2.47)	< 0.01
Household						
Socioeconomic status						
Poorest	1.00	NA	NA	NA	1.00	NA
Poorer	0.82 (0.59–1.14)	0.23	NA	NA	0.79 (0.57–1.10)	0.17
Middle	0.82 (0.59–1.13)	0.22	NA	NA	0.80 (0.58–1.10)	0.17
Richer	1.14 (0.84–1.55)	0.39	NA	NA	1.12 (0.82–1.52)	0.48
Richest	2.22 (1.64–3.02)	< 0.01	NA	NA	2.15 (1.55–2.98)	< 0.01
Community						
Place of residence						
Urban	NA	NA	1.00	NA	1.00	NA
Rural	NA	NA	0.51 (0.42–0.63)	< 0.01	0.94 (0.77–1.15)	0.57
Region of residence						
Khulna division	NA	NA	1.00	NA	1.00	NA
Barisal division	NA	NA	2.01 (1.49–2.71)	< 0.01	2.06 (1.47–2.88)	< 0.01
Chittagong division	NA	NA	2.06 (1.54–2.76)	< 0.01	1.90 (1.39–2.60)	< 0.01
Dhaka division	NA	NA	1.48 (1.10–1.98)	0.01	1.42 (1.04–1.94)	0.03
Rajshahi division	NA	NA	1.65 (1.22–2.23)	< 0.01	1.68 (1.22–2.33)	< 0.01
Rangpur division	NA	NA	1.36 (0.96–1.92)	0.08	1.44 (1.03–2.03)	0.03
Sylhet division	NA	NA	1.70 (1.26–2.29)	< 0.01	1.71 (1.23–2.39)	< 0.01

CI, confidence interval; NA, not applicable; OR, odds ratio.

[a] The analysis included data from 600 communities, 4162 households and 6746 household members.

[b] The first logistic regression model considered only individual and household characteristics.

[c] The second model considered only community characteristics.

[d] The full model considered individual, household and community characteristics.

appears to be under way in Bangladesh, it is important that any mechanism for pooling risk introduced into the country on the way to universal health coverage should incorporate support for public health programmes that target the prevention and management of diabetes. This will ensure a central role for non-communicable diseases from the start. In addition, patient-related risk factors, such as tobacco use, being overweight or obese and physical inactivity, have also become public health problems in Bangladesh.[44,45] Tackling these factors could also make an important contribution to the management of diabetes in the country.[46,47]

Our study has several strengths and limitations. The main strengths are the large sample size, the coverage of both rural and urban areas and the nationally representative study population. In addition, the findings provide detailed information on a wide range of risk factors for diabetes and prediabetes. However, the study's cross-sectional nature means that it was not possible to establish a causal relationship between these risk factors and the occurrence of the two conditions. In addition, no information was collected on physical activity levels, tobacco use or dietary habits, which have all been associated with obesity, prediabetes and diabetes in other studies.[30,35,48] Consequently, we were unable to control for, or assess, the independent effects of these factors on the prevalence of diabetes and prediabetes. Since understanding the influence of these factors is important for improving the prevention and management of diabetes, further studies in Bangladeshi adults are needed.

In conclusion, our findings show that diabetes and prediabetes are highly prevalent among individuals aged 35 years or more in Bangladesh. The risk of both diabetes and prediabetes was increased in older, wealthier and better-educated individuals, in those with hypertension and in those living in the Barisal and Chittagong divisions. A substantial proportion of diabetics was not aware they had the disease and the majority were not receiving regular treatment.

The challenge of diabetes in Bangladesh could be tackled by: (i) incorporating information on the prevention and control of diabetes into government health promotion programmes; (ii) encouraging all adults to participate in an annual screening programme; (iii) paying more attention to prediabetes, which can be ameliorated by lifestyle changes; and (iv) managing body weight, which was associated with diabetes and prediabetes in our study, by means of lifestyle measures since this will prevent or delay the complications of diabetes.[49]

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ملخص

انتشار داء السكري ومقدماته وعوامل الخطر الخاصة به بين البالغين في بنغلاديش: مسح وطني

الغرض تقدير انتشار داء السكري ومقدماته في بنغلاديش باستخدام بيانات المسح الوطني وتحديد عوامل الخطر الخاصة به.

الطريقة تم الحصول على البيانات الديموغرافية الاجتماعية والقياسات البشرية وبيانات تتعلق بضغط الدم ومستويات غلوكوز الدم من 7541 شخصاً بالغاً فوق سن 35 عاماً أو أكثر من عينة الواصمة البيولوجية للمسح الديموغرافي والصحي لبنغلاديش (DHS) لعام 2011، وكان عبارة عن مسح تمثيلي على الصعيد الوطني مع تصميم أخذ العينات الجماعية متعدد المراحل والمقسم إلى طبقات. وتم تحديد عوامل الخطر الخاصة بداء السكري ومقدماته باستخدام نماذج ارتداد لوجستي متعددة المستويات مع تعديل التجميع داخل الأسر والمجتمعات.

النتائج كانت نسبة الانتشار الإجمالي المعدل باحتساب العمر لداء السكري ومقدماته 9.7 ٪ و22.4 ٪ على التوالي. وبين سكان الحضر، كانت نسبة الانتشار باحتساب العمر لداء السكري 15.2 ٪ مقارنة بنسبة 8.3 ٪ بين سكان الريف. وإجمالاً، لم تكن نسبة 56.0٪ من المصابين بداء السكري مدركة لإصابتها، بينما كانت نسبة 39.5 ٪ فقط تتلقى العلاج بانتظام. وتضاعفت تقريباً احتمالية الإصابة بداء السكري لدى الأفراد الذين تتراوح أعمارهم بين 55 و59 عاماً عن الأشخاص الذين تتراوح أعمارهم بين 35 و39 عاماً. وكانت احتمالية إصابة المشاركين في الدراسة من الأسر الأكثر ثراءً بداء السكري أعلى عن الأسر الفقيرة. علاوة على ذلك، كانت احتمالية داء السكري أيضاً مرتبطة بشكل كبير بالمستوى التعليمي ووزن الجسم ووجود ارتفاع ضغط الدم. وتنوع انتشار داء السكري بشكل كبير حسب منطقة الإقامة.

الاستنتاج واحد من بين كل عشرة بالغين تقريباً في بنغلاديش مصاب بداء السكري، وهو ما أصبح مؤخراً مسألة صحية عامة رئيسية. ويتعين اتخاذ إجراء عاجل للتصدي للارتفاع في الإصابة بداء السكري من خلال الاكتشاف والوعي والوقاية والعلاج الأفضل.

摘要

孟加拉国成年人糖尿病和前驱糖尿病患病率及其风险因素：全国性调查

目的 使用全国性调查数据估计孟加拉国糖尿病和前驱糖尿病的患病率并确定风险因素。

方法 从 2011 年孟加拉人口和健康调查（DHS）的生物标志物样本中获取 7541 名年满 35 岁的成年人的社会人口、人体测量数据和有关血压及血糖水平的数据，该调查是采用分层、多级、群集采样设计的全国性典型调查。使用多级逻辑回归模型确定糖尿病和前驱糖尿病的风险因素，在家庭和社区范围内进行群集调整。

结果 糖尿病和前驱糖尿病的整体年龄调整患病率分别为 9.7% 和 22.4%。在城市居民中，糖尿病的年龄调整患病率是 15.2%，而农村居民中则为 8.3%。总体而言，56.0% 的糖尿病患者不知道自己患有糖尿病，仅 39.5% 的患者接受定期的治疗。在 55 至 59 岁的个人中，患糖尿病的可能性几乎是 35 至 39 岁人群的两倍。最富

有家庭的研究参与者比最贫穷家庭的参与者更有可能患有糖尿病。此外，患糖尿病的可能性和教育水平、体重以及高血压也有很大关系。糖尿病的患病率在不同的居住区域中有很大差异。

结论 卡拉奇几乎十分之一的成年人患有糖尿病，成为当前主要的公共卫生问题。亟需通过更好的检测、认知、预防和治疗等措施来应对糖尿病蔓延趋势。

Résumé

Prévalence du diabète et du prédiabète et leurs facteurs de risque chez les Bangladais adultes: une enquête nationale

Objectif Estimer la prévalence du diabète et du prédiabète au Bangladesh en utilisant les données de l'enquête nationale et identifier les facteurs de risque.

Méthodes Les données sociodémographiques et anthropométriques, ainsi que les données sur la tension artérielle et la glycémie, ont été obtenues pour 7541 adultes âgés de 35 ans ou plus, à partir de l'échantillon de biomarqueurs de l'Enquête sur la démographie et la santé au Bangladesh en 2011, qui était une enquête représentative au niveau national avec une conception d'échantillonnage par grappe stratifiée et à plusieurs étages. Les facteurs de risque pour le diabète et le prédiabète ont été identifiés en utilisant des modèles de régression logistiques multiniveaux avec ajustement pour le regroupement au sein des ménages et des communautés.

Résultats La prévalence globale du diabète et du prédiabète, ajustée en fonction de l'âge, était de 9,7% et 22,4%, respectivement. Chez les personnes habitant en zone urbaine, la prévalence du diabète ajustée en fonction de l'âge était de 15,2% contre 8,3% chez les personnes habitant en zone rurale. Au total, 56,0% des diabétiques ne savaient pas qu'ils l'étaient et seulement 39,5% recevaient un traitement régulier. La probabilité de diabète chez les individus âgés de 55 à 59 ans était presque deux fois plus élevée que chez les personnes âgées de 35 à 39 ans. Les participants de l'étude qui faisaient partie des ménages les plus riches, étaient plus susceptibles d'avoir le diabète que ceux faisant partie des ménages les plus pauvres. En outre, la probabilité de diabète était également significativement associée avec le niveau d'étude, le poids corporel et la présence d'hypertension. La prévalence du diabète variait significativement selon la région de résidence.

Conclusion Près d'un adulte sur dix au Bangladesh s'avère être diabétique, ce qui est devenu récemment un problème majeur de santé publique. Il est urgent de prendre des mesures pour lutter contre l'augmentation des cas de diabète via une amélioration du dépistage, de la sensibilisation, de la prévention et du traitement.

Резюме

Распространенность диабета и преддиабетного состояния среди взрослого населения Бангладеш и соответствующие факторы риска: национальное исследование

Цель Определить распространенность диабета и преддиабетного состояния в Бангладеш на основе данных национального исследования и идентифицировать факторы риска.

Методы Получены социально-демографические и антропометрические данные и данные об артериальном давлении и уровне глюкозы в крови у 7541 человека в возрасте 35 лет и старше из выборки биомаркеров, полученных в рамках Исследования в области демографии и здравоохранения Бангладеш (2011 г.), представлявшего собой национальное репрезентативное исследование со стратифицированной многоступенчатой кластерной выборкой. Факторы риска диабета и преддиабетного состояния определялись с помощью многоуровневых логистических регрессионных моделей с поправкой на кластеризацию в пределах домохозяйств и общин.

Результаты Стандартизованная по возрасту общая распространенность диабета и преддиабетного состояния составляла 9,7% и 22,4% соответственно. Среди городских жителей стандартизованная по возрасту распространенность диабета составляла 15,2% по сравнению с 8,3% среди сельских жителей. В итоге, 56,0% больных диабетом не подозревали о наличии у них подобного состояния и только 39,5% регулярно проходили лечение. Вероятность заболевания диабетом у лиц в возрасте 55-59 лет была почти вдвое выше, чем у лиц в возрасте 35-39 лет. Вероятность заболевания диабетом была выше у участников исследования из богатейших домохозяйств, чем из беднейших. К тому же, вероятность заболевания диабетом также в значительной степени была связана с уровнем образования, массой тела и наличием гипертензии. Распространенность диабета значительно варьировалась по регионам проживания.

Вывод Почти у одной десятой взрослого населения Бангладеш обнаруживается диабет, который недавно стал одной из основных проблем здравоохранения. Необходимо принятие срочных мер по противодействию повышению заболеваемости диабетом посредством улучшения диагностики, информированности, профилактики и лечения.

Resumen

Prevalencia de la diabetes y la prediabetes y sus factores de riesgo entre los adultos de Bangladesh: una encuesta a nivel nacional

Objetivo Estimar la prevalencia de la diabetes y la prediabetes en Bangladesh a partir de datos de encuestas nacionales e identificar los factores de riesgo.

Métodos Se obtuvieron datos sociodemográficos y antropométricos sobre la presión arterial y los niveles de glucosa en sangre de 7541 adultos de 35 años o mayores de la muestra de biomarcadores de la Encuesta demográfica y de salud de Bangladesh 2011 (DHS), esta fue una encuesta representativa a nivel nacional con un diseño de muestreo por conglomerados estratificado y multietápico. Se identificaron los factores de riesgo de la diabetes y la prediabetes mediante modelos de regresión logística multinivel, con ajustes para el agrupamiento en los hogares y las comunidades.

Resultados La prevalencia general ajustada por edad de la diabetes y la prediabetes fue de 9,7 % y 22,4 %, respectivamente. Entre los residentes urbanos, la prevalencia ajustada por edad de la diabetes fue de 15,2 %, en comparación con el 8,3 % entre los residentes rurales. En

total, el 56,0 % de los diabéticos no sabían que padecían la condición y solo el 39,5 % recibían tratamiento con frecuencia. La probabilidad de padecer diabetes en individuos de 55 a 59 años era casi el doble que en las mujeres de 35 a 39 años. Los participantes del estudio de los hogares más ricos tenían más posibilidades de padecer diabetes que aquellos de los más pobres. Además, la probabilidad de padecer diabetes también estuvo asociada de forma significativa con el nivel educativo, el peso corporal y la presencia de hipertensión. La prevalencia de diabetes varió según la región de residencia.

Conclusión Se halló que casi uno de cada diez adultos en Bangladesh padece diabetes, la cual se ha convertido recientemente en un problema de salud pública importante. Se necesitan medidas urgentes para contrarrestar el aumento de la diabetes, mediante la mejora de la detección, la conciencia, la prevención y el tratamiento.

References

1. Lozano R, Naghavi M, Foreman K, Lim S, Shibuya K, Aboyans V et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet* 2012;380:2095–128. doi: http://dx.doi.org/10.1016/S0140-6736(12)61728-0 PMID:23245604
2. Murray CJ, Vos T, Lozano R, Naghavi M, Flaxman AD, Michaud C et al. Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet* 2012;380:2197–223. doi: http://dx.doi.org/10.1016/S0140-6736(12)61689-4 PMID:23245608
3. International Diabetes Federation (IDF) [Internet]. Country estimates table 2011. IDF diabetes atlas. 6th ed. 2012. Available from: http://www.idf.org/sites/default/files/EN_6E_Atlas_Full_0.pdf [accessed 7 June 2013].
4. Rahim MA, Hussain A, Azad Khan AK, Sayeed MA, Keramat Ali SM, Vaaler S. Rising prevalence of type 2 diabetes in rural Bangladesh: a population based study. *Diabetes Res Clin Pract* 2007;77:300–5. doi: http://dx.doi.org/10.1016/j.diabres.2006.11.010 PMID:17187890
5. Saquib N, Saquib J, Ahmed T, Khanam MA, Cullen MR. Cardiovascular diseases and type 2 diabetes in Bangladesh: a systematic review and meta-analysis of studies between 1995 and 2010. *BMC Public Health* 2012;12:434. doi: http://dx.doi.org/10.1186/1471-2458-12-434 PMID:22694854
6. Shera AS, Rafique G, Khawaja IA, Baqai S, King H. Pakistan National Diabetes Survey: prevalence of glucose intolerance and associated factors in Baluchistan province. *Diabetes Res Clin Pract* 1999;44:49–58. doi: http://dx.doi.org/10.1016/S0168-8227(99)00017-0 PMID:10414940
7. Yang W, Lu J, Weng J, Jia W, Ji L, Xiao J et al.; China National Diabetes and Metabolic Disorders Study Group. Prevalence of diabetes among men and women in China. *N Engl J Med* 2010;362:1090–101. doi: http://dx.doi.org/10.1056/NEJMoa0908292 PMID:20335585
8. Zhang H, Xu W, Dahl AK, Xu Z, Wang HX, Qi X. Relation of socio-economic status to impaired fasting glucose and type 2 diabetes: findings based on a large population-based cross-sectional study in Tianjin, China. *Diabet Med* 2013;30:e157–62. doi: http://dx.doi.org/10.1111/dme.12156 PMID:23397898
9. *Bangladesh population and housing census 2011*. Dhaka: Bangladesh Bureau of Statistics, Government of the People's Republic of Bangladesh; 2012.
10. Abu Sayeed M, Banu A, Khan AR, Hussain MZ. Prevalence of diabetes and hypertension in a rural population of Bangladesh. *Diabetes Care* 1995;18:555–8. doi: http://dx.doi.org/10.2337/diacare.18.4.555 PMID:7497870
11. Ahasan HN, Islam MZ, Alam MB, Miah MT, Nur Z, Mohammed FR et al. Prevalence and risk factors of type 2 diabetes mellitus among Secretariat employees of Bangladesh. *J Med* 2011;12:125–30.
12. Bhowmik B, Afsana F, My Diep L, Binte Munir S, Wright E, Mahmood S et al. Increasing prevalence of type 2 diabetes in a rural Bangladeshi population: a population based study for 10 years. *Diabetes Metab J* 2013;37:46–53. doi: http://dx.doi.org/10.4093/dmj.2013.37.1.46 PMID:23439676
13. Hussain A, Rahim MA, Azad Khan AK, Ali SM, Vaaler S. Type 2 diabetes in rural and urban population: diverse prevalence and associated risk factors in Bangladesh. *Diabet Med* 2005;22:931–6. doi: http://dx.doi.org/10.1111/j.1464-5491.2005.01558.x PMID:15975110
14. MEASURE DHS [Internet]. Demographic and Health Surveys. Publications by country. Available from: http://www.measuredhs.com/Publications/Publications-by-Country.cfm [accessed 10 February 2013].
15. Bangladesh Demographic and Health Survey 2011. Dhaka: National Institute of Population Research and Training (NIPORT); 2013. Available from: http://www.measuredhs.com/publications/publication-FR265-DHS-Final-Reports.cfm [accessed 10 February 2013].
16. International Diabetes Federation. *Definition and diagnosis of diabetes mellitus and intermediate hyperglycaemia: report of a WHO/IDF consultation*. Geneva: World Health Organization; 2006.
17. D'Orazio P, Burnett RW, Fogh-Andersen N, Jacobs E, Kuwa K, Külpmann WR et al.; International Federation of Clinical Chemistry Scientific Division Working Group on Selective Electrodes and Point of Care Testing. Approved IFCC recommendation on reporting results for blood glucose (abbreviated). *Clin Chem* 2005;51:1573–6. doi: http://dx.doi.org/10.1373/clinchem.2005.051979 PMID:16120945
18. American Diabetes Association. Diagnosis and classification of diabetes mellitus. *Diabetes Care* 2005;28(Suppl 1):S37–42. doi: http://dx.doi.org/10.2337/diacare.28.suppl_1.S37 PMID:15618111
19. Duc Son LN, Kusama K, Hung NT, Loan TTH, Chuyen NV, Kunii D et al. Prevalence and risk factors for diabetes in Ho Chi Minh City, Vietnam. *Diabet Med* 2004;21:371–6. doi: http://dx.doi.org/10.1111/j.1464-5491.2004.01159.x PMID:15049941
20. Kim SM, Lee JS, Lee J, Na JK, Han JH, Yoon DK et al. Prevalence of diabetes and impaired fasting glucose in Korea: Korean National Health and Nutrition Survey 2001. *Diabetes Care* 2006;29:226–31. doi: http://dx.doi.org/10.2337/diacare.29.02.06.dc05-0481 PMID:16443864
21. Khambalia A, Phongsavan P, Smith BJ, Keke K, Dan L, Fitzhardinge A et al. Prevalence and risk factors of diabetes and impaired fasting glucose in Nauru. *BMC Public Health* 2011;11:719. doi: http://dx.doi.org/10.1186/1471-2458-11-719 PMID:21943388
22. Rutstein SO, Johnson K. *The DHS wealth index*. DHS comparative reports no. 6. Calverton: ORC Macro; 2004.
23. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP; STROBE Initiative. Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *Bull World Health Organ* 2007;85:867–72. PMID:18038077
24. Rabe-Hesketh S, Skrondal A. *Multilevel and longitudinal modeling using Stata*. 3rd ed. College Station: Stata press; 2012.
25. Sterne JA, White IR, Carlin JB, Spratt M, Royston P, Kenward MG et al. Multiple imputation for missing data in epidemiological and clinical research: potential and pitfalls. *BMJ* 2009;338(jun29):b2393. doi: http://dx.doi.org/10.1136/bmj.b2393 PMID:19564179
26. Esteghamati A, Gouya MM, Abbasi M, Delavari A, Alikhani S, Alaedini F et al. Prevalence of diabetes and impaired fasting glucose in the adult population of Iran: National Survey of Risk Factors for Non-Communicable Diseases of Iran. *Diabetes Care* 2008;31:96–8. doi: http://dx.doi.org/10.2337/dc07-0959 PMID:17921357
27. abu Sayeed M, Ali L, Hussain MZ, Rumi MA, Banu A, Azad Khan AK. Effect of socioeconomic risk factors on the difference in prevalence of diabetes between rural and urban populations in Bangladesh. *Diabetes Care* 1997;20:551–5. doi: http://dx.doi.org/10.2337/diacare.20.4.551 PMID:9096979
28. Shafique S, Akhter N, Stallkamp G, de Pee S, Panagides D, Bloem MW. Trends of under- and overweight among rural and urban poor women indicate the double burden of malnutrition in Bangladesh. *Int J Epidemiol* 2007;36:449–57. doi: http://dx.doi.org/10.1093/ije/dyl306 PMID:17242024
29. Muntner P, Gu D, Wildman RP, Chen J, Qan W, Whelton PK et al. Prevalence of physical activity among Chinese adults: results from the International Collaborative Study of Cardiovascular Disease in Asia. *Am J Public Health* 2005;95:1631–6. doi: http://dx.doi.org/10.2105/AJPH.2004.044743 PMID:16051938
30. Pan XR, Yang WY, Li GW, Liu J; National Diabetes Prevention and Control Cooperative Group. Prevalence of diabetes and its risk factors in China, 1994. *Diabetes Care* 1997;20:1664–9. doi: http://dx.doi.org/10.2337/diacare.20.11.1664 PMID:9353605
31. Ramachandran A, Snehalatha C, Kapur A, Vijay V, Mohan V, Das AK et al.; Diabetes Epidemiology Study Group in India (DESI). High prevalence of diabetes and impaired glucose tolerance in India: National Urban Diabetes Survey. *Diabetologia* 2001;44:1094–101. doi: http://dx.doi.org/10.1007/s001250100627 PMID:11596662

32. Hu D, Sun L, Fu P, Xie J, Lu J, Zhou J et al. Prevalence and risk factors for type 2 diabetes mellitus in the Chinese adult population: the InterASIA Study. *Diabetes Res Clin Pract* 2009;84:288–95. doi: http://dx.doi.org/10.1016/j.diabres.2009.02.021 PMID:19442859
33. Borrell LN, Dallo FJ, White K. Education and diabetes in a racially and ethnically diverse population. *Am J Public Health* 2006;96:1637–42. doi: http://dx.doi.org/10.2105/AJPH.2005.072884 PMID:16873745
34. Seeman T, Merkin SS, Crimmins E, Koretz B, Charette S, Karlamangla A. Education, income and ethnic differences in cumulative biological risk profiles in a national sample of US adults: NHANES III (1988–1994). *Soc Sci Med* 2008;66:72–87. doi: http://dx.doi.org/10.1016/j.socscimed.2007.08.027 PMID:17920177
35. Mokdad AH, Ford ES, Bowman BA, Dietz WH, Vinicor F, Bales VS et al. Prevalence of obesity, diabetes, and obesity-related health risk factors, 2001. *JAMA* 2003;289:76–9. doi: http://dx.doi.org/10.1001/jama.289.1.76 PMID:12503980
36. Monteiro CA, Conde WL, Popkin BM. Independent effects of income and education on the risk of obesity in the Brazilian adult population. *J Nutr* 2001;131:881S–6S. PMID:11238779
37. Jebb SA, Moore MS. Contribution of a sedentary lifestyle and inactivity to the etiology of overweight and obesity: current evidence and research issues. *Med Sci Sports Exerc* 1999;31(Supp 1):S534–41. doi: http://dx.doi.org/10.1097/00005768-199911001-00008 PMID:10593524
38. Misra A, Khurana L. Obesity and the metabolic syndrome in developing countries. *J Clin Endocrinol Metab* 2008;93(Suppl 1):S9–30. doi: http://dx.doi.org/10.1210/jc.2008-1595 PMID:18987276
39. Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K, Adair-Rohani H et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet* 2012;380:2224–60. doi: http://dx.doi.org/10.1016/S0140-6736(12)61766-8 PMID:23245609
40. Abegunde D, Stanciole A. *An estimation of the economic impact of chronic noncommunicable diseases in selected countries*. Geneva: World Health Organization; 2006.
41. Rahman MM, Gilmour S, Saito E, Sultana P, Shibuya K. Self-reported illness and household strategies for coping with health-care payments in Bangladesh. *Bull World Health Organ* 2013;91:449–58. doi: http://dx.doi.org/10.2471/BLT.12.115428 PMID:24052682
42. Savedoff WD, de Ferranti D, Smith AL, Fan V. Political and economic aspects of the transition to universal health coverage. *Lancet* 2012;380:924–32. doi: http://dx.doi.org/10.1016/S0140-6736(12)61083-6 PMID:22959389
43. Moreno-Serra R, Smith PC. Does progress towards universal health coverage improve population health? *Lancet* 2012;380:917–23. doi: http://dx.doi.org/10.1016/S0140-6736(12)61039-3 PMID:22959388
44. Giovino GA, Mirza SA, Samet JM, Gupta PC, Jarvis MJ, Bhala N et al.; GATS Collaborative Group. Tobacco use in 3 billion individuals from 16 countries: an analysis of nationally representative cross-sectional household surveys. *Lancet* 2012;380:668–79. doi: http://dx.doi.org/10.1016/S0140-6736(12)61085-X PMID:22901888
45. Bhuiyan MU, Zaman S, Ahmed T. Risk factors associated with overweight and obesity among urban school children and adolescents in Bangladesh: a case-control study. *BMC Pediatr* 2013;13:72. doi: http://dx.doi.org/10.1186/1471-2431-13-72 PMID:23651597
46. Beaglehole R, Epping-Jordan J, Patel V, Chopra M, Ebrahim S, Kidd M et al. Improving the prevention and management of chronic disease in low-income and middle-income countries: a priority for primary health care. *Lancet* 2008;372:940–9. doi: http://dx.doi.org/10.1016/S0140-6736(08)61404-X PMID:18790317
47. Levitt NS. Diabetes in Africa: epidemiology, management and healthcare challenges. *Heart* 2008;94:1376–82. doi: http://dx.doi.org/10.1136/hrt.2008.147306 PMID:18519551
48. Qiu SH, Sun ZL, Cai X, Liu L, Yang B. Improving patients' adherence to physical activity in diabetes mellitus: a review. *Diabetes Metab J* 2012;36:1–5. doi: http://dx.doi.org/10.1136/hrt.2008.147306 PMID:18519551
49. Knowler WC, Barrett-Connor E, Fowler SE, Hamman RF, Lachin JM, Walker EA et al.; Diabetes Prevention Program Research Group. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *N Engl J Med* 2002;346:393–403. doi: http://dx.doi.org/10.1056/NEJMoa012512 PMID:11832527

Table 1. **Characteristics of the study population aged 35 years or more, Bangladesh, 2011**

Characteristic	No. (%)[a,b]			P[c]
	All (*n* = 7541)	No. without diabetes (*n* = 6746)	No. with diabetes (*n* = 795)	
Individual				
Age in years, mean ± SE	51.48 ± 0.17	51.31 ± 0.18	53.01 ± 0.54	< 0.01
Sex				0.19
Male	3721 (49.3)	3342 (49.6)	379 (46.9)	NA
Female	3820 (50.7)	3404 (50.4)	416 (53.1)	NA
Educational level				< 0.01
No education	3418 (48.2)	3156 (49.6)	262 (36.1)	NA
Primary education	2080 (26.8)	1869 (26.8)	211 (26.7)	NA
Secondary education	1403 (17.4)	1217 (16.9)	186 (21.3)	NA
Higher education	640 (7.6)	504 (6.7)	136 (15.9)	NA
Currently working				< 0.01
Yes	3898 (52.2)	3439 (51.5)	459 (58.7)	NA
No	3643 (47.8)	3307 (48.5)	336 (41.3)	NA
Marital status				0.09
Currently married	6329 (84.2)	5683 (84.5)	646 (81.8)	NA
Divorced, widowed or other	1212 (15.8)	1063 (15.5)	149 (18.2)	NA
Hypertension				< 0.01
Yes	5568 (74.5)	5093 (76.0)	475 (60.1)	NA
No	1973 (25.5)	1653 (24.0)	320 (39.9)	NA
Body weight				< 0.01
Normal	6915 (92.8)	6272 (93.9)	643 (82.8)	NA
Overweight or obese	626 (7.2)	474 (6.1)	152 (17.2)	NA
Household				
Socioeconomic status				< 0.01
Poorest	1343 (19.5)	1252 (20.3)	91 (12.7)	NA
Poorer	1351 (19.1)	1267 (19.8)	84 (12.2)	NA
Middle	1461 (19.8)	1364 (20.6)	97 (12.7)	NA
Richer	1581 (20.7)	1422 (20.6)	159 (21.8)	NA
Richest	1805 (20.9)	1441 (18.7)	364 (40.7)	NA
Community				
Place of residence				< 0.01
Urban	2480 (23.3)	2115 (22.0)	365 (35.4)	NA
Rural	5061 (76.7)	4631 (78.0)	430 (64.6)	NA
Region of residence				< 0.01
Khulna division	1204 (13.2)	1112 (13.7)	92 (8.6)	NA
Barisal division	860 (5.7)	755 (5.5)	105 (6.7)	NA
Chittagong division	1116 (16.7)	973 (16.1)	143 (21.4)	NA
Dhaka division	1312 (32.7)	1172 (32.5)	140 (33.4)	NA
Rajshahi division	1064 (14.4)	949 (14.3)	115 (14.4)	NA
Rangpur division	1068 (12.0)	977 (12.2)	91 (9.8)	NA
Sylhet division	917 (5.7)	808 (5.6)	109 (5.8)	NA

NA, not applicable; SE, standard error.

[a] All values represent absolute numbers and percentages unless otherwise stated.

[b] In estimating percentages, the complex survey design and sampling weights were taken into account.

[c] *P*-values were derived using a *t* test or χ^2 test for continuous and categorical variables, respectively.

Nationwide Survey of Prevalence and Risk Factors for Diabetes and Prediabetes in Bangladeshi Adults

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Diabetes is a major noncommunicable disease, ranking as a leading cause of death and disability worldwide (1). Globally, the prevalence of diabetes is ~8%, and nearly 80% of patients with diabetes live in low- and middle-income countries (2). Like many developing countries, prevalence of diabetes in Bangladesh increased substantially from 4% in 1990 to 10% in 2011 and is projected to reach 13% by 2030 (3,4). Despite this heavy burden, currently there are no epidemiologic studies in Bangladesh that investigate prevalence of diabetes and risk factors using nationally representative data. Therefore, we estimated the prevalence of diabetes and prediabetes and identified associated risk factors using Bangladesh nationwide survey data by multilevel logistic regression models.

Our analysis was based on the 2011 Bangladesh Demographic and Health Survey. Data were available as of February 2013, including 8,835 residents (4,524 men and 4,311 women) aged ≥35 years. The overall response rate was 89.17%. After dropping of nonresponders and missing data related to working status and hypertension, the remaining sample was 7,541. The estimated age-adjusted prevalence was taken into account for complex survey design and sampling weights.

Overall, 795 persons (9.7% [95% CI 4.2–10.5]) had diabetes, and 1,786 persons (23.0% [95% CI 21.3–24.7]) had prediabetes. Prevalence was nearly similar in both sexes (diabetes: men 9.3%, women 10.4%; prediabetes: men, 22.9%, women, 23.3%). Among diabetic persons, nearly 56.0% (95% CI 51.2–60.7) were unaware that they had diabetes. Only 39.5% (95% CI 35.1–44.1) of diabetic persons received treatment from consulting doctors regularly. In the multivariable logistic regression analyses, the odds of diabetes increased with increasing age (odds ratios of having diabetes for age-groups 35–39, 40–44, 45–49, 50–54,55–59, 60–69, and ≥70 years were 1.00 (reference), 1.17 [95% CI 0.86–1.57], 1.46 [1.09–1.96], 1.33 [0.97–1.82], 1.94 [1.40–2.68], 1.51 [1.09–2.08], and 1.82 [1.27–2.60], respectively) and with increasing weight (1.93 [1.52–2.47] among persons who were overweight/obese compared with normal-weight persons). The results also suggest that persons with higher education, those having hypertension, those belonging to the richest household, and the currently working group were more likely to have diabetes compared with their uneducated, nonhypertensive, poorest, and nonworking counterparts. Regarding prediabetes, age, education, and BMI showed a significant positive association. Bangladesh is a small country (147,570 km^2); however, there was a striking variation of being diabetic and prediabetic across the geographic regions. The highest age-adjusted prevalence of diabetes was observed in the southeastern part (Chittagong, 12.4%, and Barisal, 11.6%) of the country, followed by central (Dhaka, 10.2%), middle-western (Rajshahi, 10.2%), eastern (Sylhet, 10.0%), northwestern (Rajgpur, 8.0%), and western (Khulna, 6.4%) parts. Regression models revealed that residents in the southeastern part of Bangladesh were almost two times more likely to be diabetic compared with those living in western parts.

In conclusion, diabetes has become a major public health issue in Bangladesh, affecting one in ten adults. However, significant proportions of adults were unaware of their diabetes disease status, and few with diabetes received treatment regularly. These results suggest that urgent action is necessary to stop diabetes development through improving detection, awareness, prevention, and treatment of diabetes.

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Results Demographic and Health Surveys (MEASURE DHS) for providing permission to use the 2011 Bangladesh DHS data.

Duality of Interest. The authors obtained the data used in this study from the MEASURE DHS Archive. The data were originally collected by Macro International Inc. (Calverton, MD). No other potential conflicts of interest relevant to this article were reported.

Author Contributions. S.A. conceptualized the analysis plan for this study, drafted the manuscript, performed the statistical analysis, and reviewed and approved the final manuscript. M.M.R. conceptualized the analysis plan for this study, performed the statistical analysis, contributed to data interpretation and discussion, and reviewed and approved the final manuscript. S.K.A. contributed to data interpretation and discussion and reviewed and approved the final manuscript. P.S. critically revised the manuscript for important intellectual content and reviewed and approved the final manuscript. S.A. is the guarantor of this work and, as such, had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

References

1. Lozano R, Naghavi M, Foreman K, et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet 2012;380:2095–2128
2. International Diabetes Federation. *IDF Diabetes Atlas*. 5th ed. Brussels, Belgium, International Diabetes Federation, 2012
3. Rahim MA, Hussain A, Azad Khan AK, Sayeed MA, Keramat Ali SM, Vaaler S. Rising prevalence of type 2 diabetes in rural Bangladesh: a population based study. Diabetes Res Clin Pract 2007;77:300–305
4. Saquib N, Saquib J, Ahmed T, Khanam MA, Cullen MR. Cardiovascular diseases and type 2 diabetes in Bangladesh: a systematic review and meta-analysis of studies between 1995 and 2010. BMC Public Health 2012;12:434

Table. Gallbladder Disease by Age Group for Both Women's Health Initiative Hormone Therapy Trials

	No. (%) of Participants With Gallbladder Disease		Hazard Ratio (95% CI)	*P* Value
	Hormone Therapy[a]	Placebo		
CEE alone trial				
All age groups	461 (1.64)	312 (1.06)	1.55 (1.34-1.79)	<.001
Age group, y				
50-59	157 (1.69)	117 (1.21)	1.40 (1.10-1.78)	
60-69	219 (1.78)	133 (1.01)	1.75 (1.41-2.17)	.66[b]
70-79	85 (1.32)	62 (0.93)	1.44 (1.04-2.00)	
CEE + MPA trial				
All age groups	528 (1.31)	319 (0.84)	1.57 (1.36-1.80)	<.001
Age group, y				
50-59	179 (1.24)	104 (0.77)	1.62 (1.27-2.06)	
60-69	254 (1.43)	152 (0.91)	1.57 (1.28-1.92)	.66[b]
70-79	95 (1.18)	63 (0.81)	1.47 (1.07-2.02)	

Abbreviations: CEE, conjugated equine estrogens; MPA, medroxyprogesterone acetate.

[a] Corresponds to CEE alone or CEE plus MPA.

[b] Indicates *P* value for interaction.

of gallbladder disease. For the CEE alone trial, the 2 HRs were 1.67 (95% CI, 1.35-2.06) and 1.55 (95% CI, 1.34-1.79), respectively.

To be able to compare directly the intervention and post-stopping findings, and due to the similarity of results using either of the above approaches, we chose to present the results for self-reported gallbladder disease in our recent article. This approach also allowed us to have approximately twice as many end points as were included in the earlier analysis because hospitalization records were not available for those who did not have overnight hospital stays or had outpatient procedures.

As shown in the Table, the tests for interaction by age group were not statistically significant in our analyses. Similar analyses of hospitalized cases used in the report by Cirillo et al[1] confirmed the absence of a statistically significant interaction by age ($P = .13$ for interaction with CEE + MPA and $P = .08$ for interaction with CEE alone). In these analyses, the HRs increased by age group in the CEE alone trial and decreased by age group in the CEE plus MPA trial, suggesting no consistent pattern by age.

We believe that the analyses of gallbladder disease presented in our recent report (and summarized in the Table) provide valid estimates for assessment of effect modification by age. Neither these analyses nor those based on the Cirillo et al[1] data set demonstrate consistent age trends.

Mounting evidence suggests that the transdermal route of estrogen administration, which avoids first-pass hepatic metabolism, may be less likely to increase the risk of gallbladder disease than the oral route of hormone delivery.[2]

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1. Cirillo DJ, Wallace RB, Rodabough RJ, et al. Effect of estrogen therapy on gallbladder disease. *JAMA*. 2005;293(3):330-339.

2. Liu B, Beral V, Balkwill A, Green J, Sweetland S, Reeves G; Million Women Study Collaborators. Gallbladder disease and use of transdermal versus oral hormone replacement therapy in postmenopausal women: prospective cohort study. *BMJ*. 2008;337:a386.

Prevention and Control of Hypertension in Different Countries

To the Editor Hypertension is the leading risk factor for death and disability worldwide. Dr Chow and colleagues[1] provided statistics on prevalence, awareness, treatment, and control of hypertension among selected high-, middle-, and low-income countries. The proportions of hypertension, awareness, treatment, and control reported in this article were strikingly different from other studies.[2-4]

For example, Chow et al[1] found that 39% of adults in Bangladesh had hypertension, whereas previous nationwide studies reported a prevalence of 25%.[3] The study also reported that about 40% of South Asian (Bangladesh, India, and Pakistan) adults were aware of their condition and 32% received treatment.

Previous studies from Bangladesh suggested about half of adults with hypertension were aware that they had it and 41% of the respondents with hypertension were receiving treatment,[3] which are comparatively higher than the fig-

ures of Chow et al.[1] Similar discrepancies also exist for India, China, and South Africa and may be due to a range of problems in the design and analysis of the study.

The data set of Chow et al[1] had small sample sizes and low response rates in low-income countries, in which typically response rates are high. The authors also did not strictly follow the probability sampling design or account for probability weights in their analysis. These shortcomings could have introduced selection bias and miscalculation of prevalence.

Chow et al[1] speculated that lower detection of hypertension may be due to costs and difficulties in accessing care. However, hypertension diagnosis in Bangladesh and many other low- and middle-income countries is almost free, and this minimal cost does not impose any financial burden on households.[4]

Low education, insufficient health facilities, and limited awareness of the need for testing could prevent diagnosis in rural or poor populations, and interventions to reduce these barriers to testing are more important than focusing on cost alone.

Accurate knowledge of prevalence, awareness, and treatment strategies helps policy makers to understand the present situation of hypertension and formulate appropriate national hypertension control policies. However, the results presented by Chow et al[1] may not help to improve understanding of this important disease.

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1. Chow CK, Teo KK, Rangarajan S, et al; PURE (Prospective Urban Rural Epidemiology) Study investigators. Prevalence, awareness, treatment, and control of hypertension in rural and urban communities in high-, middle-, and low-income countries. *JAMA*. 2013;310(9):959-968.

2. Ibrahim MM, Damasceno A. Hypertension in developing countries. *Lancet*. 2012;380(9841):611-619.

3. Mitra and Associates. Bangladesh demographic and health survey 2011. http://www.measuredhs.com/pubs/pdf/FR265/FR265.pdf. Accessibility verified December 26, 2013.

4. Rahman MM, Gilmour S, Saito E, Sultana P, Shibuya K. Self-reported illness and household strategies for coping with health-care payments in Bangladesh. *Bull World Health Organ*. 2013;91(6):449-458.

In Reply Dr Rahman and Mr Gilmour raise concerns regarding the hypertension prevalence estimates in the Prospective Urban Rural Epidemiology (PURE) study, particularly for Bangladesh. We cautioned in the article that the sampling framework in each country was not nationally representative and therefore may not be representative of each country. The sample size in low-income countries was 31 685 and the response rate was 55%.

The analyses were not weighted because population census data were not available from all communities. Sampling was not identical across communities because of variation in the availability of population lists used for sampling. Hence, for practical reasons, investigators in each country, in consultation with the project office, identified the best method of sampling to obtain a representative sample of households in a community.

With respect to Bangladesh, there are important similarities and differences between the PURE study and the Bangladesh Demographic and Health Survey (BDHS).[1] Both studies were conducted by the same survey group. In the PURE study, the sample of 2754 was from households with participants aged 35 to 70 years. The BDHS (n = 7839) sampling framework excluded households with only older individuals, which may have led to a lower prevalence estimate due to selection bias.[1]

Importantly, the definitions used for hypertension differed. In the BDHS, the 25% prevalence[1] was based on people who had uncontrolled hypertension (≥140/90 mm Hg) or were taking an antihypertensive medication, but an additional 15% (oral communication, Shahidul Islam, Mitra and Associates, October 26, 2013) of people taking hypertension medication with controlled blood pressure were not classified as hypertensive. The PURE definition included both these groups. Therefore, the prevalence of controlled and uncontrolled hypertension in the BDHS of 40% is comparable with our value of 39%.

We did not report specifically on awareness, treatment, and control rates for Bangladesh in our article, but the differences in age and the definitions of hypertension used in the PURE study and the BDHS would have an effect on any comparison. Our figures for South Asia were 40.4% aware and 31.9% treated, and 40.8% aware and 31.7% treated in low-income countries (Table 2 in the article).

The reasons for lower detection and treatment of hypertension in low-income countries are likely to be multifactorial, as indicated in our article, including difficulties or costs in accessing health care, lack of knowledge about uncontrolled hypertension, and differing values. The interventions needed are therefore likely to be multifactorial as well.

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