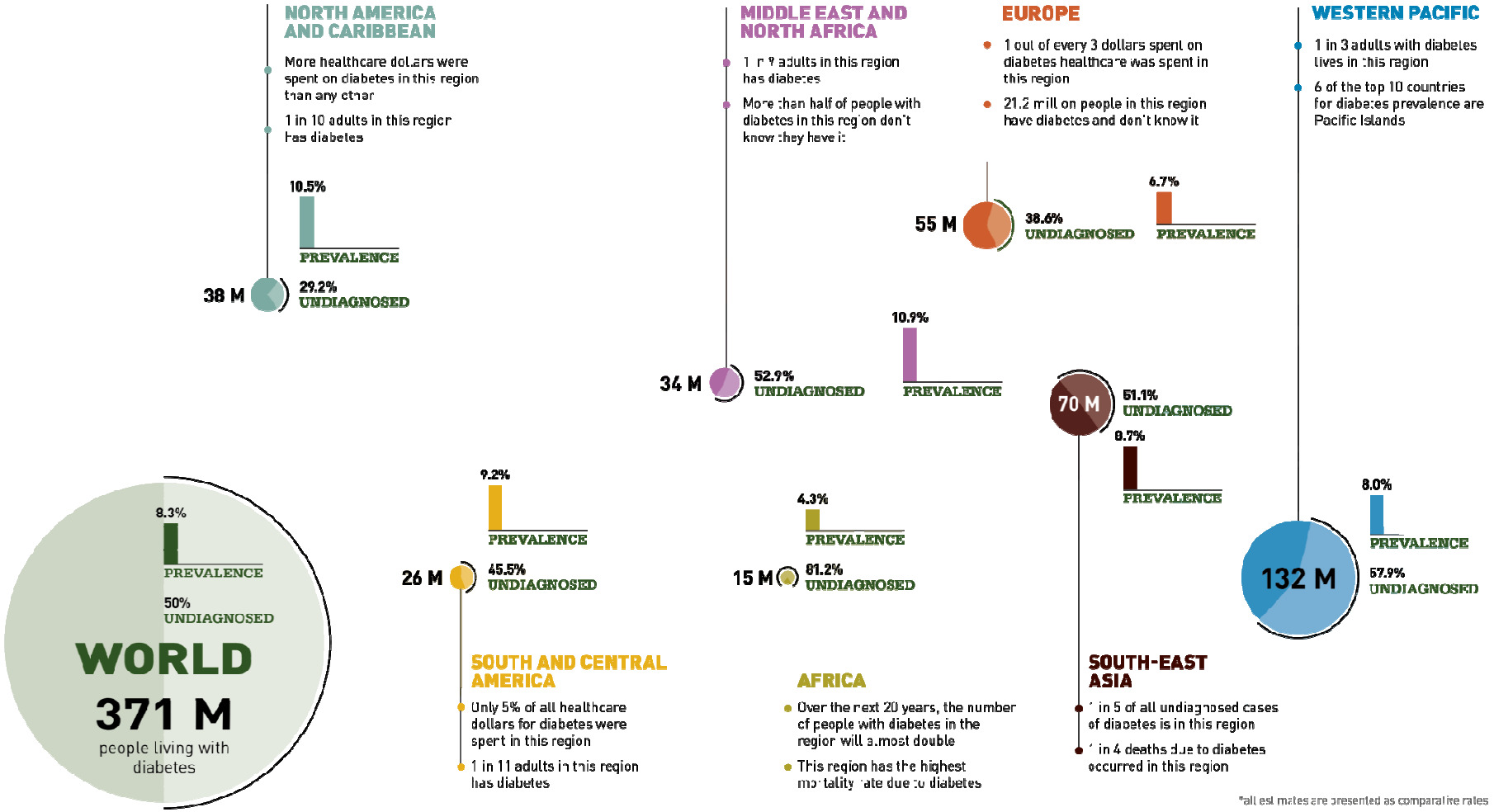
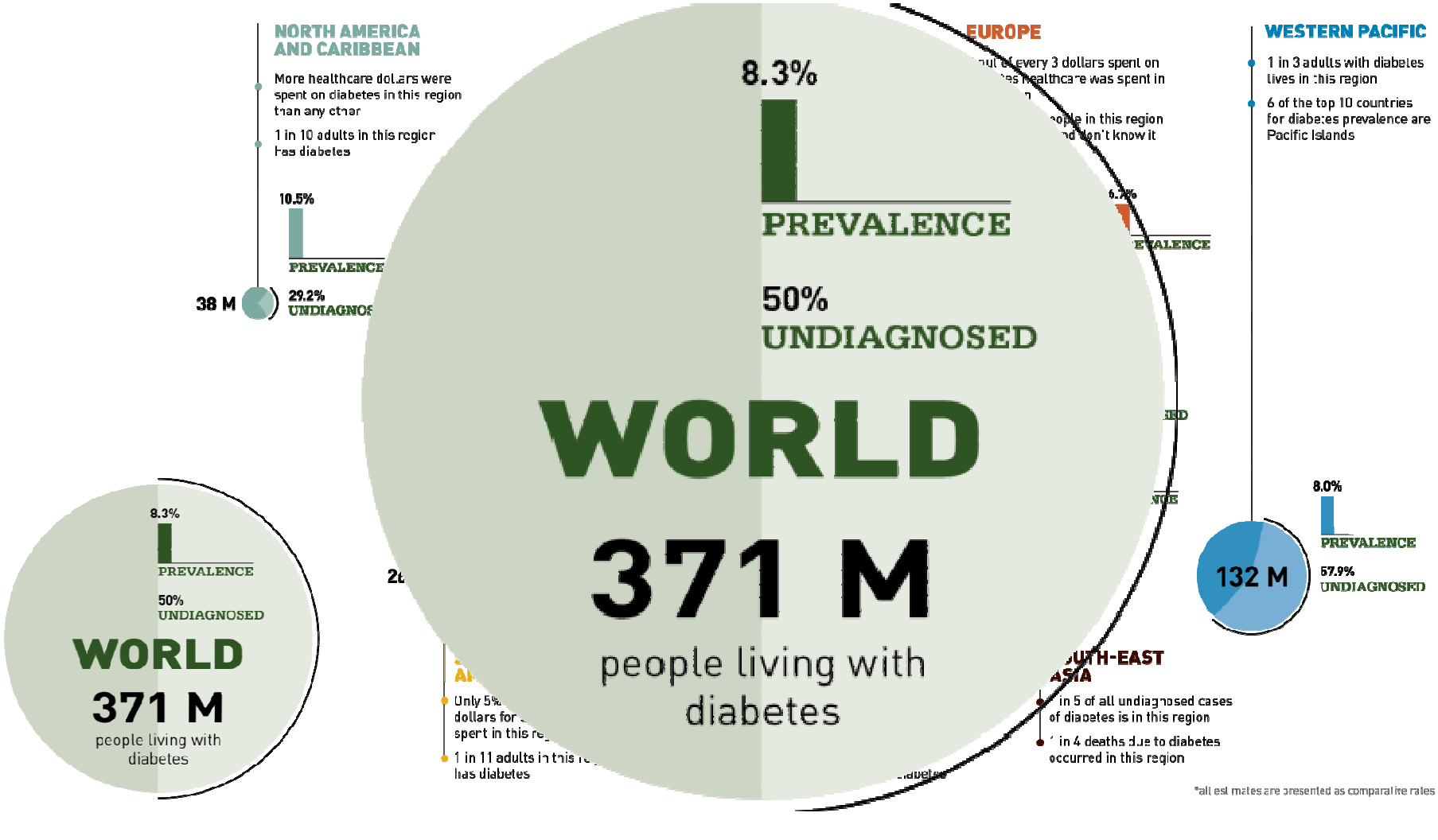
The association of diabetic retinopathy and diabetic nephropathy among type 2 diabetic patients in Thailand

Miss Kamolwan Sriplang

Introduction(1)



Introduction(2)

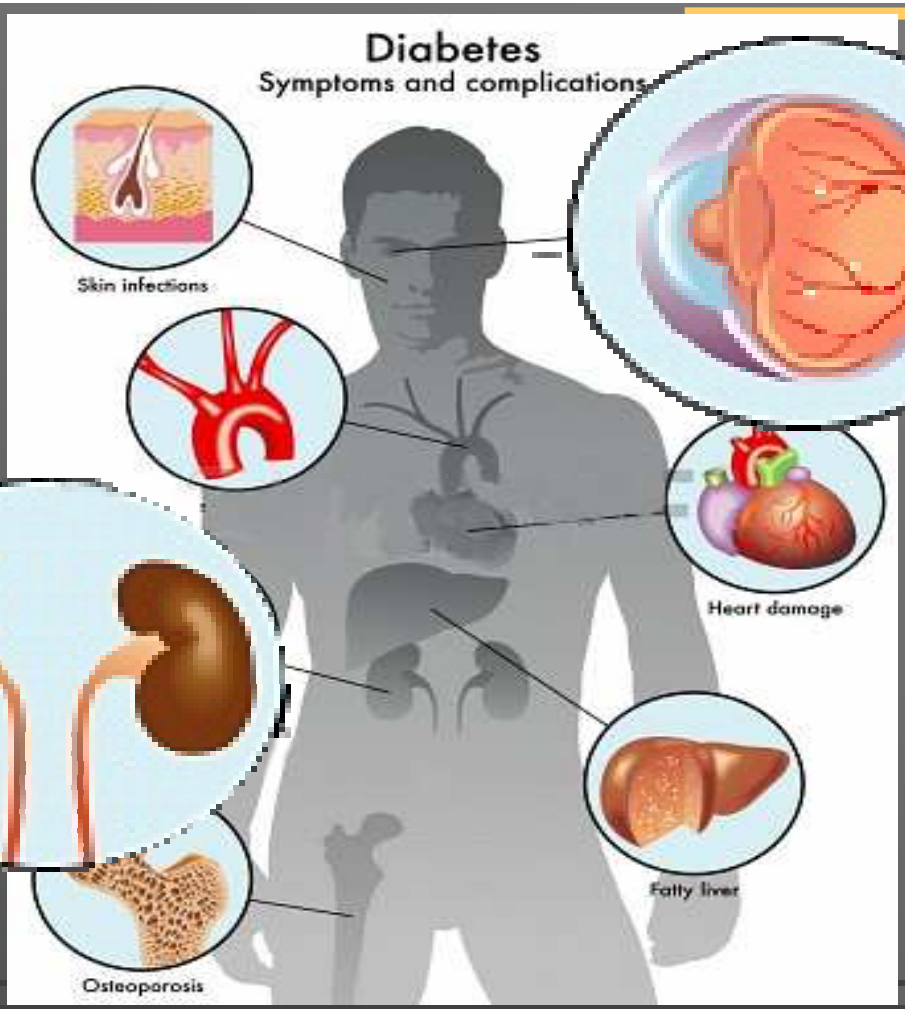


Introduction(3)

6.7-7.5% ; 2004 to 2009

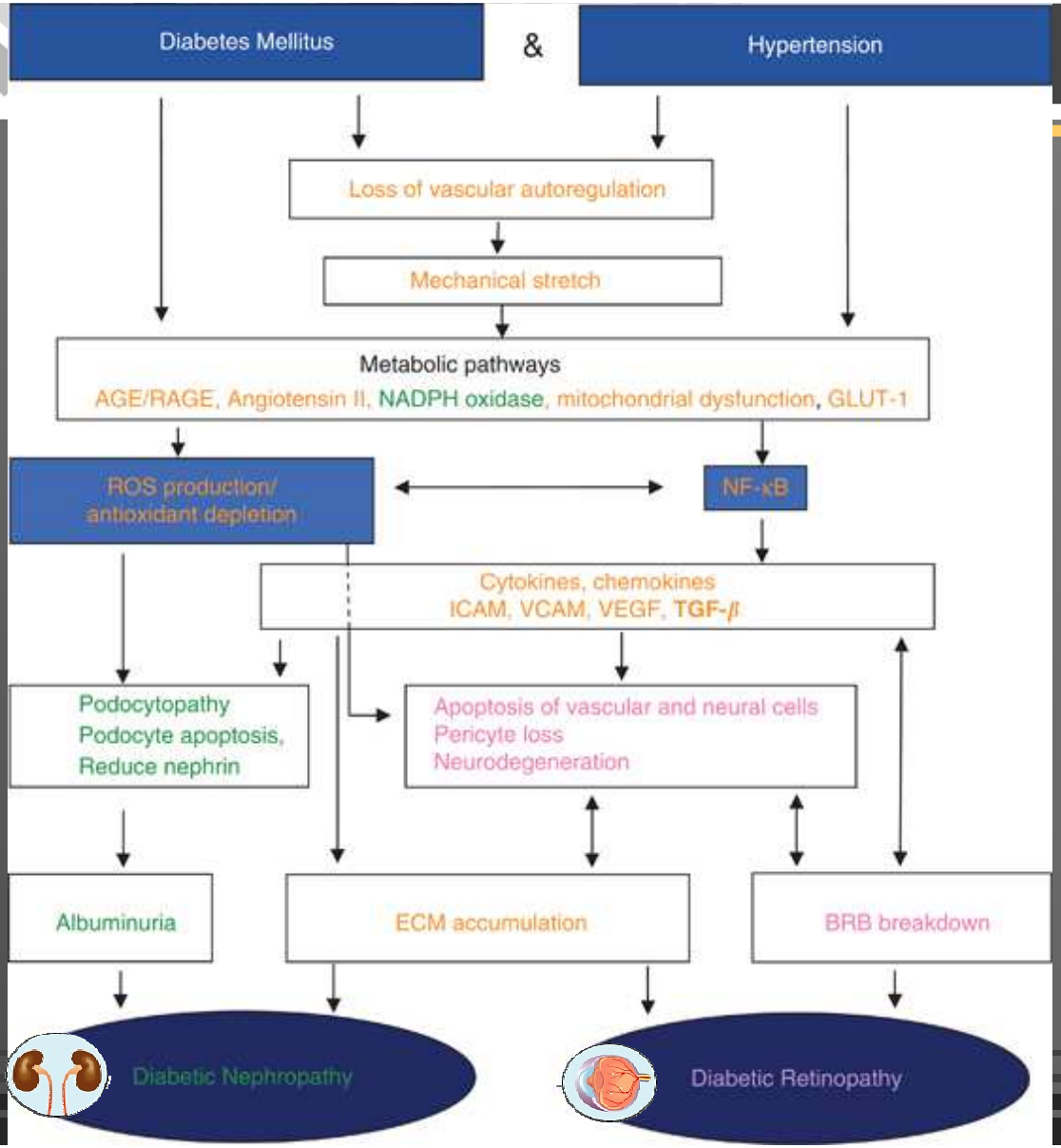
Introduction(4)

Diabetic nepropathy (DN)



Diabetic retinopathy (DR)

Introduction(5)



Introduction(6)

Natural History of Diabetic Nephropathy

	Designation	Characteristics	GFR (minimum)	Albumin Excretion	Blood Pressure	Chronology
Stage 1	Hyperfunction and hypertrophy	Glomerular hyperfiltration	Increased in type 1 and type 2	May Be Increased	Type 1 normal Type 2 normal hypertension	Present at time of diagnosis
Stage 2	Silent stage	Thickend BM Expanded mesangium	Normal	Type 1 normal Type 2 may be <30-300 mg/d	Type 1 normal Type 2 normal hypertension	First 5 years
Stage 3	Incipient stage	Microalbuminuria	GFR begins to fall	30-300 mg/d	Type 1 increased Type 2 normal hypertension	6-15 years
Stage 4	Overt diabetic nephropathy	Macroalbuminuria	GFR below N	>380 mg/d	Hypertension	15-25 years
Stage 5	Uremic	ESRD	0-10	Decreasing	Hypertension	25-30 years

Introduction(7)

Hyperglycaemia

↓

Non-prolife

Pericyte loss, ba
vascular leaka

Pre-prolife

Hypoxia, o
soft exu

Prolifera

Angiogen
retinal

Normal vision

Vision with diabetic retinopathy

Stages of vas
in diabetic retinopathy

Expert Reviews in Molecular Medicine
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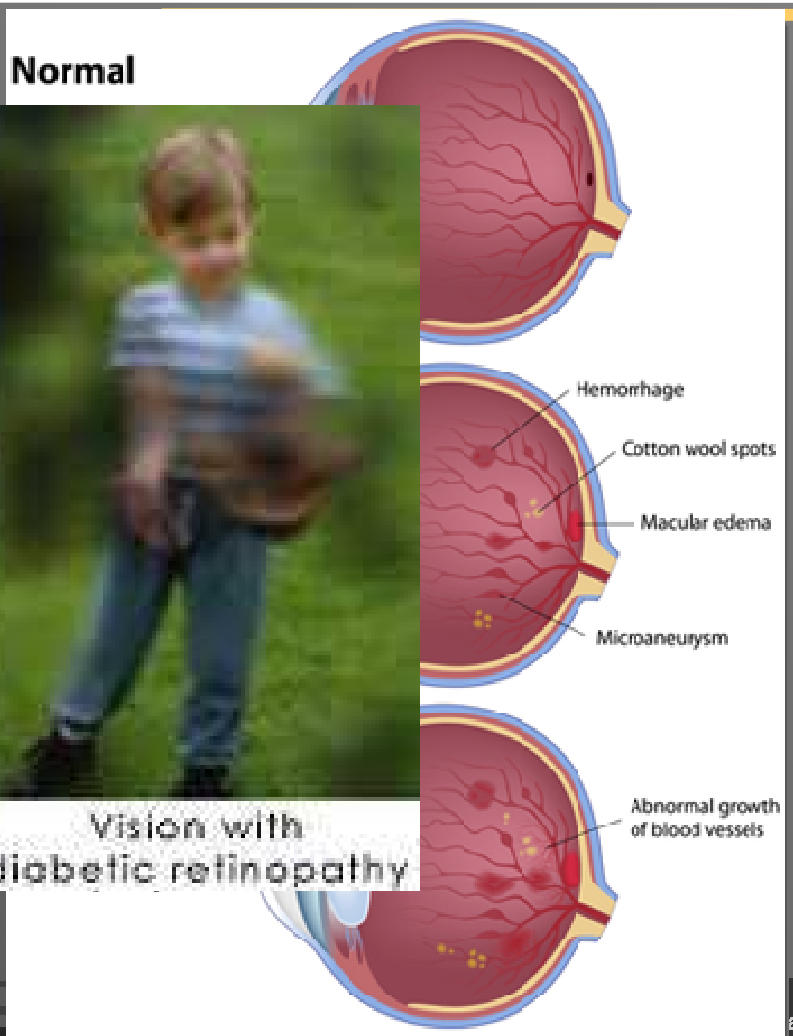
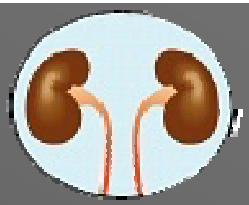


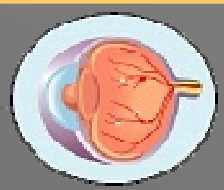
Introduction(8)



Diabetic nepropathy

- Ngarmukos C, 2006
- Sriwijitkamol A, 2011
- Krairittichai U,2011
- Aekplakorn W, 2004
- Aekplakorn W, 2011
- Sutima K, 2008
- Leena O, 2009
- Suthep, 2011
- Petch R,2006

Sathit P, 2011



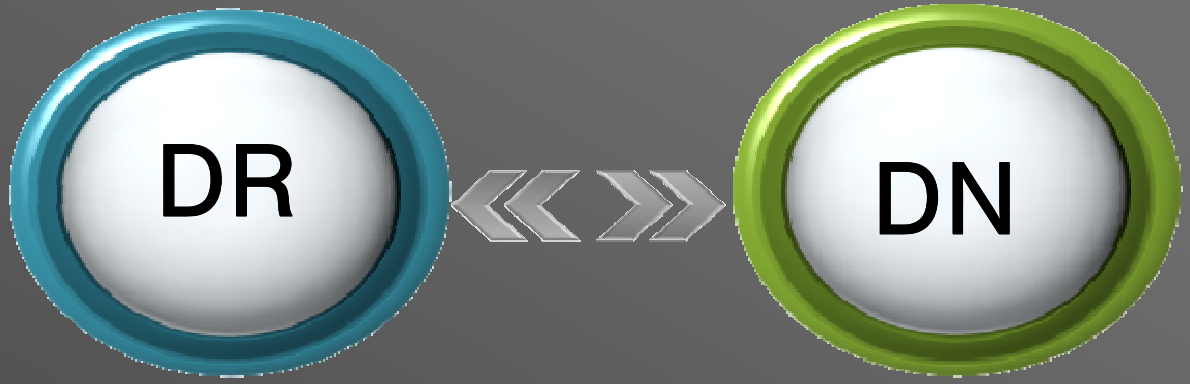
Diabetic retinopathy

- Sriwijitkamol A, 2011
- Krairittichai U,2011
- Aekplakorn W, 2004
- Aekplakorn W, 2011
- Yothin J,2009
- Srisuda O,2012
- Rattana L,2006

Objective

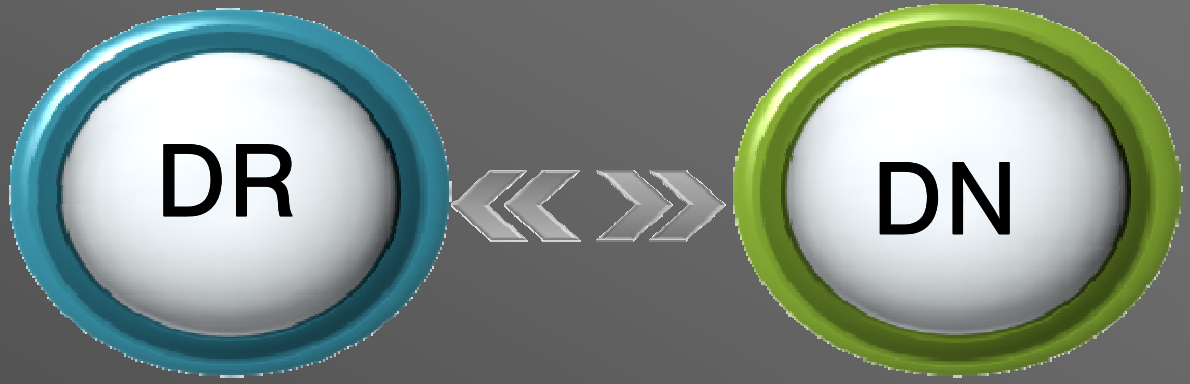
Research Question :

Does diabetic retinopathy associate with diabetic nephropathy among type 2 diabetic patients in Thailand ?



Objective

To examine the association of diabetic retinopathy and diabetic nephropathy among type 2 diabetic patients in Thailand.



Method(1)

Study design

- Cross sectional analytical
- Part of DM&HT 2012 data set

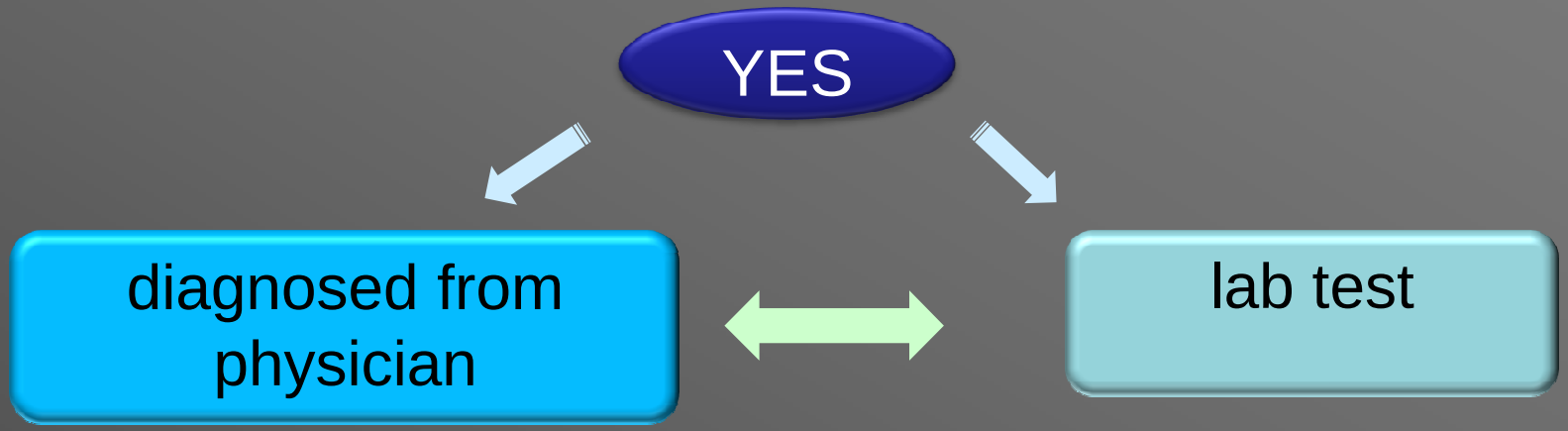
Sampling method

- Proportional to size, stratified cluster sampling of the patients for each hospital

Method(2)

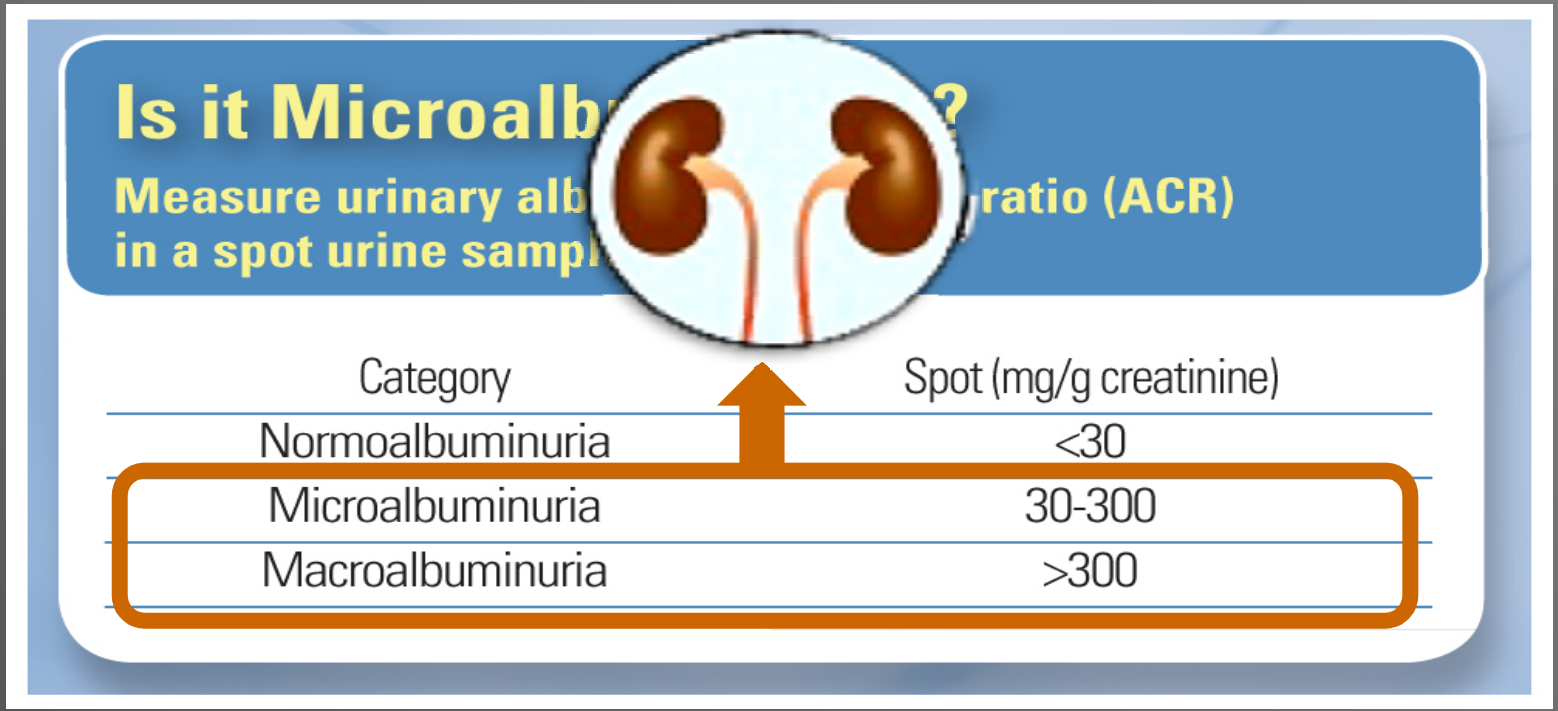
Study outcome

- **The main outcome was DN (Yes,NO)**



- Covariate : sex, age, HbA1c, lipid profile, blood pressure, duration of DM

Method(3)



National Kidney Foundation

Reference: National Kidney Foundation. KDOQI™ *Clinical Practice Guidelines and Clinical Practice Recommendations for Diabetes and Chronic Kidney Disease.* Am J Kidney Dis 49:S1-S180, 2007 (suppl 2).

Method(4)

Descriptive analysis

- Frequency, Percentage, Mean(SD), Median(Min:Max)

Bivariate analysis

- Simple logistic regression
- Crude OR

Method(5)

Mutivariable analysis

- Mutiple logistic regression
- Backward elimination method
- Adjust odd ratio, 95%CI

Statistics software

- STATA version 12.0

Ethical consideration

- The study was approved by the ethics committee of each participating hospital. Signed informed consent was obtained from all participants.

Results (1)

Total number of diagnosed with type 2 diabetes and HT inThailand
(N = 3,373,089)

Sample randomly selected
(n = 62,223)

514 could not collected

Collected with only DM, only HT and DMHT
(n = 61,709)

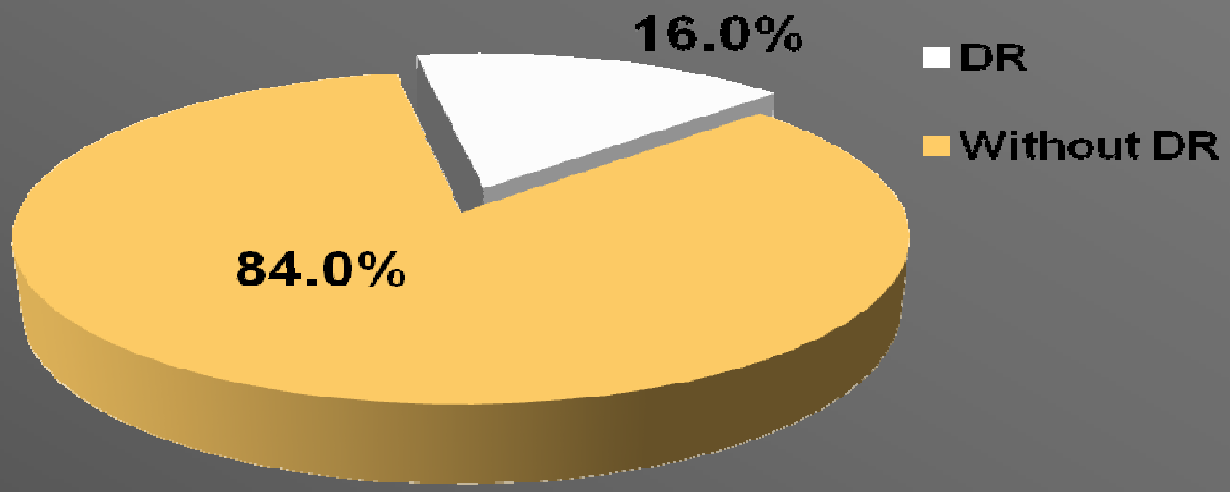
32,768 HT patients were excluded

Patients with DM and DMHT
(n = 28,941)

Results (2)

Demographic characteristics

Diabetic retinopathy



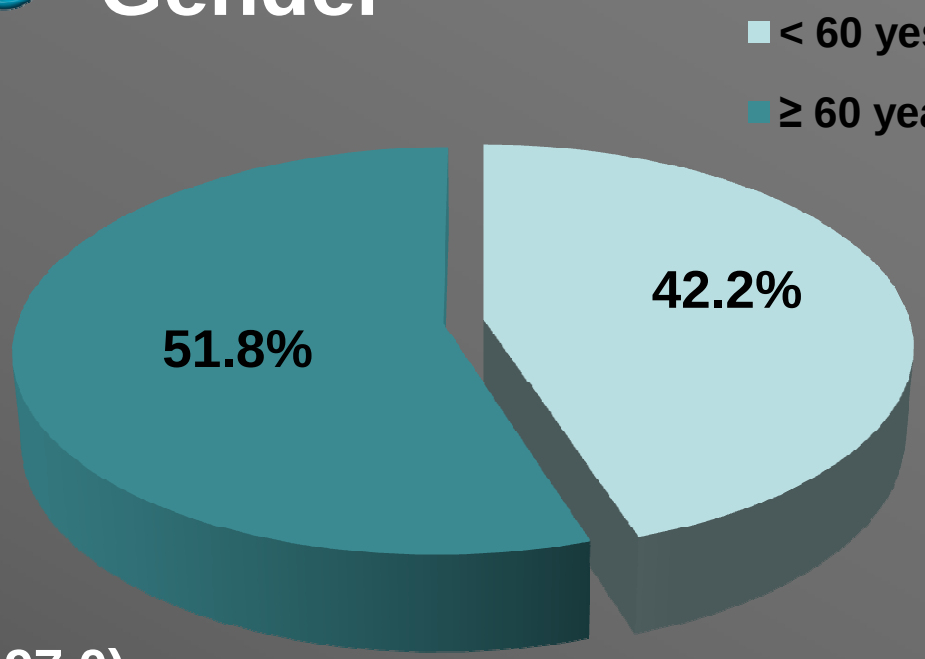
Results (3)

Demographic characteristics

69.7%

30.3%

Gender



Age

Mean(SD) = 60.0(10.7)

Median(Min:Max) = 60.0(20.0:97.0)

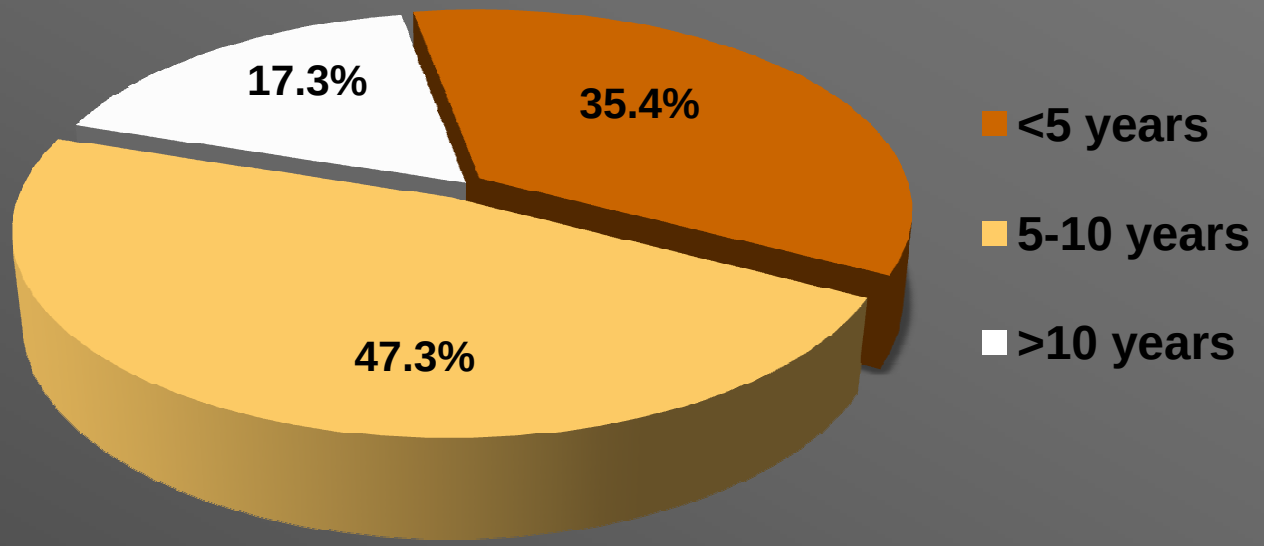
Results (4)

Demographic characteristics

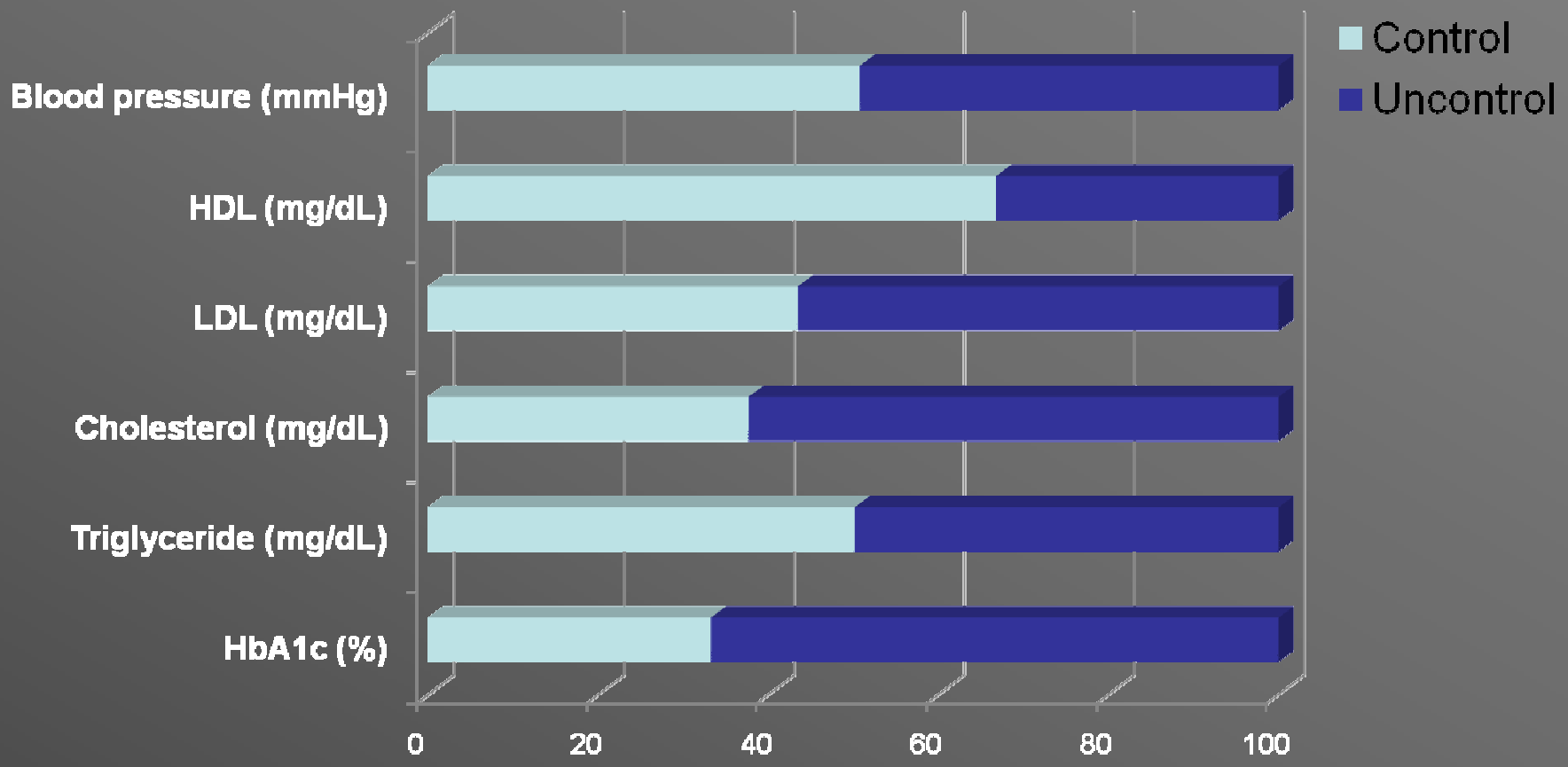
Duration of DM

Mean(SD) = 6.8(4.6)

Median(Min:Max) = 6.0(0.0:54.0)



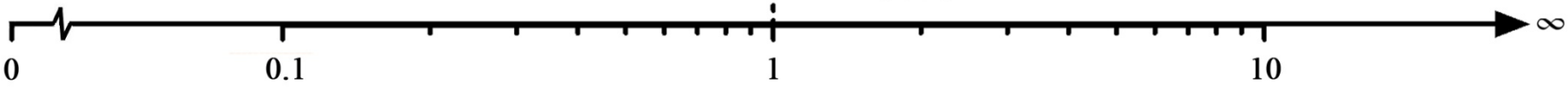
Results (5)


Blood pressure (mmHg)
HDL (mg/dL)
LDL (mg/dL)
Cholesterol (mg/dL)
Triglyceride (mg/dL)
HbA1c (%)
0
20
40
60
80
100
Control
Uncontrol

Results (6)

Factor associate with DN

Factors	Adj.OR	95%CI	p - value
Duration of diabetes >10 years (Ref : <5 years)	2.25	1.91 to 2.64	<0.001
Duration of diabetes 5-10 years (Ref : <5 years)	1.31	1.14 to 1.50	<0.001
Blood pressure ≤ 130/80 mmHg (Ref : >130/80 mmHg)	1.22	1.09 to 1.37	<0.001
HDL < 40mg/dL (Ref : ≥ 40 mg/dL)	1.30	1.15 to 1.46	<0.001
Triglyceride ≥ 150 mg/dL (Ref : <150 mg/dL)	1.27	1.13 to 1.43	<0.001
HbA1c ≥ 7.0% (Ref : <7.0%)	1.06	0.94 to 1.20	0.368
Age ≥ 60 years (Ref : <60 years)	1.49	1.33 to 1.67	<0.001
Male	1.39	1.23 to 1.57	<0.001
Diabetic Retinophaty	1.96	1.70 to 2.27	<0.001



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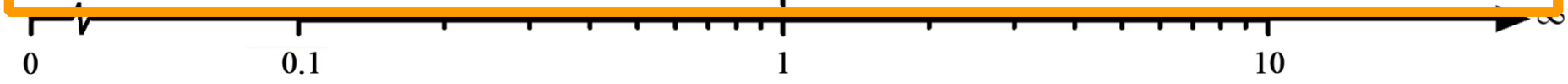

Results (6)

Factor associate with DN

DR

(adj.OR = 1.96; 95%CI :1.70-2.27; p<0.001)

Diabetic Retinophaty	1.96	1.70 to 2.27	<0.001

Results (6)

Factor associate with DN

Factors	Adj.OR	95%CI	p - value
Duration of diabetes >10 years (Ref : <5 years)	2.25	1.91 to 2.64	<0.001
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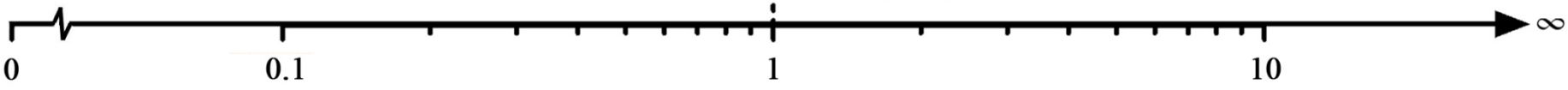

Results (6)

Factor associate with DN

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Duration of DM > 10 years

(adj.OR = 2.25; 95%CI :1.91-2.64; p<0.001)

Duration of DM 5-10 years

(adj.OR = 1.31; 95%CI :1.14-1.50; p<0.001)

Discussion (1)

In 2007, the Kidney Disease Outcomes Quality Initiative (KDOQI) suggesting that DR plays an important role in the diagnosis of DN.(KDOQI, 2007 ; Remuzzi et al.,2002)

And DR is well correlated with overt nepropathy (Pedro et al., 2010). DR is useful in diagnosing or screening for DN in patients with type 2 diabetes and renal disease. Proliferative diabetic retinopathy may be a highly specific indicator for DN (He F et al.,2013).

This study showed DR was significantly associated with DN. Patients with DR were 1.60 times more likely to be DN than patients without DR

Discussion (2)

There are a number potential limitations to our study. Patients in this study had missing data about DN diagnosed, did not available in the medical record more than 50%. However, those lost data did not differ from those who were diagnosed to demographic characteristics of patients at baseline.

And best-worst case scenario test compare with baseline were not a significantly. It assumed that missing data were missing at random .

Strength

The present study recruited a large DM patients. The sampling method was proportional to size, stratified cluster sampling of the patients for each hospital from across the country. This is a large enough sample size to see the characteristics and burden of diabeticin Thai population.

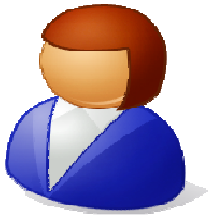
Limitation

Screening for DN may be more serious, some patient had not been tested for urine albumin excretion is due to financial limitation and different methods for measure urine albumin excretion for DN diagnosed. Insufficient data and missing values in the data (secondary data).

Conclusions

DR was associated with DN. DR was an important role in the diagnosis of DN.

Thanks you



dn_gr	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
1.dr_gr	1.195032	.1171105	1.82	0.069	.9861973	1.44809
age3						
1	1.121719	.1781836	0.72	0.470	.8216213	1.531427
2	1.166982	.1917896	0.94	0.347	.845614	1.610484
1.hba1c	.9728457	.071014	-0.38	0.706	.843159	1.12248
1.serum_cr	4.5174	1.161074	5.87	0.000	2.729672	7.475955
1.trigly	.9495953	.0667439	-0.74	0.462	.8273903	1.08985
1.hdl_gr	.9236282	.0708594	-1.04	0.300	.7946836	1.073495
1.bp	1.002873	.0696134	0.04	0.967	.8753075	1.14903
dura_dm						
1	1.042382	.0823092	0.53	0.599	.8929225	1.216858
2	1.1261	.1142802	1.17	0.242	.9229847	1.373915
1.smoke	1.17991	.1360134	1.44	0.151	.941298	1.479008
micro_ab						
1	4.132334	.2891099	20.28	0.000	3.602823	4.739668
2	8.564653	2.194876	8.38	0.000	5.182879	14.153
_cons	.5071448	.0893217	-3.85	0.000	.3590977	.716228

Best case

dn_gr	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
1.dr_gr	1.452476	.1529387	3.54	0.000	1.18163	1.785403
age3						
1	1.148188	.2309516	0.69	0.492	.7741029	1.70305
2	1.607822	.3312962	2.30	0.021	1.073607	2.407855
1.hba1c	.9700557	.0843189	-0.35	0.727	.8181044	1.15023
1.serum_cr	3.166614	.5710634	6.39	0.000	2.223773	4.509203
1.trigly	1.11483	.0923235	1.31	0.189	.9478016	1.311294
1.hdl_gr	1.057024	.0927841	0.63	0.528	.8899536	1.255457
1.bp	1.013448	.0831829	0.16	0.871	.8628509	1.19033
dura_dm						
1	1.303923	.1276769	2.71	0.007	1.076228	1.57979
2	1.624746	.1907508	4.13	0.000	1.290778	2.045123
1.smoke	1.32997	.1688378	2.25	0.025	1.03701	1.705692
micro_ab						
1	4.517216	.4295766	15.86	0.000	3.74907	5.442746
2	13.15237	2.705085	12.53	0.000	8.788912	19.68217
_cons	.0518813	.0119326	-12.86	0.000	.0330549	.0814303

Worst case

dn_gr	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
1.dr_gr	1.592594	.2111231	3.51	0.000	1.228188	2.065119
age3						
1	1.191667	.2840773	0.74	0.462	.7468616	1.901384
2	1.661131	.4053487	2.08	0.038	1.02966	2.679871
1.hba1c	.9083662	.0946485	-0.92	0.356	.7405746	1.114174
1.serum_cr	6.253053	1.790579	6.40	0.000	3.56737	10.96064
1.trigly	1.101483	.1101462	0.97	0.334	.9054395	1.339974
1.hdl_gr	1.10204	.1169933	0.92	0.360	.8950213	1.356943
1.bp	1.030958	.1017256	0.31	0.757	.8496735	1.250921
dura_dm						
1	1.400934	.1648398	2.87	0.004	1.112402	1.764305
2	1.728673	.2434925	3.89	0.000	1.311646	2.27829
1.smoke	1.382489	.2087336	2.15	0.032	1.028357	1.858572
micro_ab						
1	7.15306	.7613572	18.49	0.000	5.806197	8.812356
2	23.74054	6.760516	11.12	0.000	13.58616	41.48436
_cons	.0693954	.0188783	-9.81	0.000	.0407165	.1182744

Baseline

dn_gr	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
1.dr_gr	1.195032	.1171105	1.82	0.069	.9861973	1.44809
age3						
1	1.121719	.1781836	0.72	0.470	.8216213	1.531427
2	1.166982	.1917896	0.94	0.347	.845614	1.610484
1.hba1c	.9728457	.071014	-0.38	0.706	.843159	1.12248
1.serum_cr	4.5174	1.161074	5.87	0.000	2.729672	7.475955
1.trigly	.9495953	.0667439	-0.74	0.462	.8273903	1.08985
1.hdl_gr	.9236282	.0708594	-1.04	0.300	.7946836	1.073495
1.bp	1.002873	.0696134	0.04	0.967	.8753075	1.14903
dura_dm						
1	1.042382	.0823092	0.53	0.599	.8929225	1.216858
2	1.1261	.1142802	1.17	0.242	.9229847	1.373915
1.smoke	1.17991	.1360134	1.44	0.151	.941298	1.479008
micro_ab						
1	4.132334	.2891099	20.28	0.000	3.602823	4.739668
2	8.564653	2.194876	8.38	0.000	5.182879	14.153
_cons	.5071448	.0893217	-3.85	0.000	.3590977	.716228

Best case

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age3						
1	1.191667	.2840773	0.74	0.462	.7468616	1.901384
2	1.661131	.4053487	2.08	0.038	1.02966	2.679871
1.hba1c	.9083662	.0946485	-0.92	0.356	.7405746	1.114174
1.serum_cr	6.253053	1.790579	6.40	0.000	3.56737	10.96064
1.trigly	1.101483	.1101462	0.97	0.334	.9054395	1.339974
1.hdl_gr	1.10204	.1169933	0.92	0.360	.8950213	1.356943
1.bp	1.030958	.1017256	0.31	0.757	.8496735	1.250921
dura_dm						
1	1.400934	.1648398	2.87	0.004	1.112402	1.764305
2	1.728673	.2434925	3.89	0.000	1.311646	2.27829
1.smoke	1.382489	.2087336	2.15	0.032	1.028357	1.858572
micro_ab						
1	7.15306	.7613572	18.49	0.000	5.806197	8.812356
2	23.74054	6.760516	11.12	0.000	13.58616	41.48436
_cons	.0693954	.0188783	-9.81	0.000	.0407165	.1182744

Baseline

dn_gr	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
1.dr_gr	1.452476	.1529387	3.54	0.000	1.18163	1.785403
age3						
1	1.148188	.2309516	0.69	0.492	.7741029	1.70305
2	1.607822	.3312962	2.30	0.021	1.073607	2.407855
1.hba1c	.9700557	.0843189	-0.35	0.727	.8181044	1.15023
1.serum_cr	3.166614	.5710634	6.39	0.000	2.223773	4.509203
1.trigly	1.11483	.0923235	1.31	0.189	.9478016	1.311294
1.hdl_gr	1.057024	.0927841	0.63	0.528	.8899536	1.255457
1.bp	1.013448	.0831829	0.16	0.871	.8628509	1.19033
dura_dm						
1	1.303923	.1276769	2.71	0.007	1.076228	1.57979
2	1.624746	.1907508	4.13	0.000	1.290778	2.045123
1.smoke	1.32997	.1688378	2.25	0.025	1.03701	1.705692
micro_ab						
1	4.517216	.4295766	15.86	0.000	3.74907	5.442746
2	13.15237	2.705085	12.53	0.000	8.788912	19.68217
_cons	.0518813	.0119326	-12.86	0.000	.0330549	.0814303

Worst case