

Supplementary File 1.

Table. Some results of women and <45 years old (n=5983)

	Renal_function_impairment (=0)	Renal_function_impairment (=1)
Obese_type_3gr (=1)	2372	74
Obese_type_3gr (=2)	3344	121
Obese_type_3gr (=3)	59	13

Traditional adjustment for odds ratio

$$\text{Odds ratio (Obese_type_3gr (=2) vs Obese_type_3gr (=1))} = \frac{2372.5 * 121.5}{74.5 * 3344.5} = 1.156897882$$

$$\text{Odds ratio (Obese_type_3gr (=3) vs Obese_type_3gr (=1))} = \frac{2372.5 * 13.5}{74.5 * 59.5} = 7.225480796$$

Penalized logistic regression for model 1

logistf(formula = group ~ gr, data = tmp)

Model fitted by Penalized ML

Confidence intervals and p-values by Profile Likelihood Profile Likelihood Profile Likelihood

	coef	se(coef)	lower 0.95	upper 0.95	Chisq	p
(Intercept)	3.56829136	0.1237963	3.55713714	3.580294	Inf	0
gr2	0.07270674	0.1640589	0.05740142	0.088090	0	1
gr3	6.84079185	23.2058132	-6.44045815	14.731417	Inf	0

Likelihood ratio test=863.7972 on 2 df, p=0, n=5983

Wald test = 0.2822565 on 2 df, p = 0.8683779

Covariance-Matrix:

	[,1]	[,2]	[,3]
[1,]	0.01532553	-0.01532553	-0.01532553
[2,]	-0.01532553	0.02691531	0.01532553
[3,]	-0.01532553	0.01532553	538.50976616

nobs(fit)

[1] 5983

drop1(fit)

ChiSq df P-value

gr 863.7972 2 0

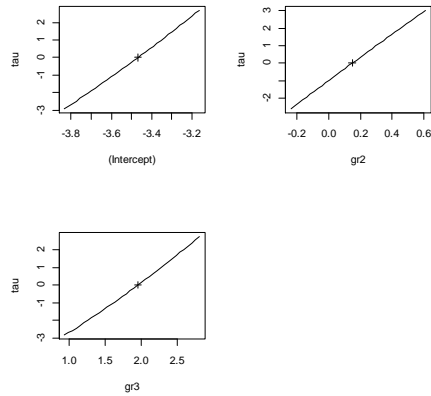


Figure. Likelihood plot of adjustment in model 1

Penalized logistic regression for model 2

logistf(formula = group ~ gr + MAP, data = tmp)

Model fitted by Penalized ML

Confidence intervals and p-values by Profile Likelihood Profile Likelihood Profile Likelihood Profile Likelihood

	coef	se(coef)	lower 0.95	upper 0.95	Chisq
(Intercept)	1.01057879	0.695825711	0.94198131	1.076287099	43.41446
gr2	-0.01891949	0.163258929	-0.03463120	-0.003249591	0.00000
gr3	6.40344649	22.600873369	-4.76841277	14.294071491	Inf
MAP	0.03272033	0.008972257	0.03187941	0.033611097	0.00000

p

(Intercept)	4.429035e-11
gr2	1.000000e+00
gr3	0.000000e+00
MAP	1.000000e+00

Likelihood ratio test=770.8779 on 3 df, p=0, n=5983

Wald test = 13.48895 on 3 df, p = 0.003690148

Covariance-Matrix:

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          [,1]      [,2]      [,3]      [,4]
[1,] 0.484173420 -0.0018091335 5.421797e-02 -0.0061455443
[2,] -0.001809133 0.0266534780 1.696661e-02 -0.0001730172
[3,] 0.054217971 0.0169666120 5.107995e+02 -0.0009069245
[4,] -0.006145544 -0.0001730172 -9.069245e-04 0.0000805014
nobs(fit)
[1] 5983
drop1(fit)
      ChiSq df P-value
gr 206.17588 2      0
MAP -94.58231 1      1

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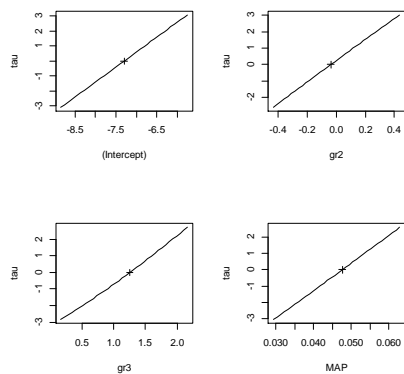


Figure. Likelihood plot of adjustment in model 2

Penalized logistic regression for model 3

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logistf(formula = group ~ gr + MAP + Fasting_glucose + CRP, data = tmp)
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Model fitted by Penalized ML

Confidence intervals and p-values by Profile Likelihood Profile Likelihood Profile Likelihood Profile Likelihood Profile Likelihood

	coef	se(coef)	lower 0.95	upper 0.95	Chisq	p
(Intercept)	-0.06363357	1.090246118	-0.17189894	0.03928907	0	1
gr2	-0.08052565	0.166258646	-0.09665287	-0.06458078	0	1
gr3	6.20044380	22.528281338	-4.93702267	14.09106880	Inf	0
MAP	0.02990680	0.009071667	0.02905015	0.03080735		
0	1					
Fasting_glucose	0.26004959	0.196671303	0.24143698	0.27937990	0	1

CRP 0.04058502 0.050252642 0.03590141 0.04560219 0
1

Likelihood ratio test=745.809 on 5 df, p=0, n=5983

Wald test = 15.55396 on 5 df, p = 0.008239918

Covariance-Matrix:

	[,1]	[,2]	[,3]	[,4]	[,5]
[1,]	1.188636598	0.0188387838	0.106580779	-4.935500e-03	-0.1652879931
[2,]	0.018838784	0.0276419373	0.021498700	-1.243653e-04	-0.0049023854
[3,]	0.106580779	0.0214986998	507.523460024	-7.639020e-04	-0.0123329332
[4,]	-0.004935500	-0.0001243653	-0.000763902	8.229515e-05	-0.0002774260
[5,]	-0.165287993	-0.0049023854	-0.012332933	-2.774260e-04	0.0386796014
[6,]	0.001904037	-0.0011187851	-0.006462245	-2.041809e-05	-0.0003678285

[,6]

[1,] 1.904037e-03

[2,] -1.118785e-03

[3,] -6.462245e-03

[4,] -2.041809e-05

[5,] -3.678285e-04

[6,] 2.525328e-03

nobs(fit)

[1] 5983

drop1(fit)

ChiSq df P-value

gr 196.65275 2 0

MAP -75.42210 1 1

Fasting_glucose -15.97047 1 1

CRP -10.95856 1 1

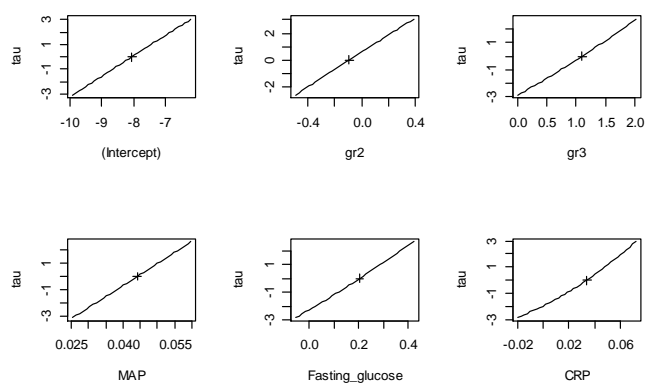


Figure. Likelihood plot of adjustment in model 3