Scientific Writing: Presentation Of Results

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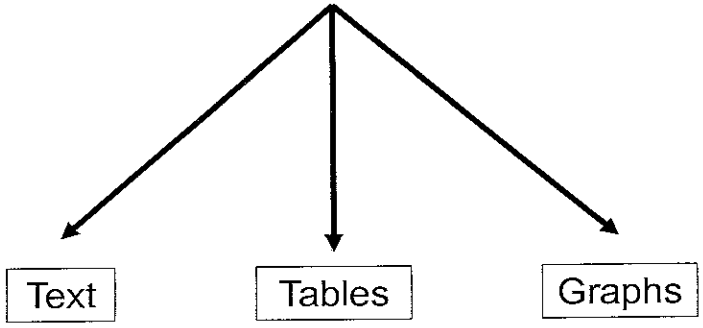
Presenting Results

- Scientists are excited about results but write dull manuscripts
- Present results interestingly
- Never start the results with a page of number-heavy text – boring
- Make it easy to read
- Summarize in tables, reader-friendly and easily understandable graphs

Usual Mode of Presenting Results



Principle 1: Do Not Repeat Results

- Keep the results as organized and as simple as possible

Repetition in the text

- Do not repeat in the text in detailed information given in tables and graphs unless necessary to stress
- Text – highlight the important features
- Text – summarize the demographic characteristics of the subjects

Evaluation 1: Repetition

- Job strain — √
- Nephropathy — √

Principle 2: A Table or A Summarized Flowchart

- Include a table or a summarized flowchart describing the study participants if necessary

Schematic summary

- Information needs to be provided about population from which this sample was taken
- Schematic summary showing the number of patients or participants at each stage of the study
- Eligible/ willing to participate/ declined/ drop-outs/ completed/ loss to follow-up/ response rate

Evaluation 2: Schematic summary

- Job strain — NA
- Nephropathy — NA

Principle 3: Tables and Graphs

- Design user-friendly tables and graphs

Tables and graphs

- Number of observations – state for each results in a table
- Tables/ graphs – linked to the text/ research questions(s)/ hypotheses
- Number of tables and graphs depends on the journal

Tables and Graphs

- Do not duplicate the graphs and tables for same information
- apply appropriate graphs based on the type of variables (examples: bar chart for a categorical variable, histogram for a continuous variable)
- Keep graphs simple, but scientifically and statistically sound

Evaluation 3: Tables and graphs

Job strain	√
Nephropathy	X (too many tables, should be combined)

Table I. Differences in psychosocial job factors, and occupational and sociodemographical factors in HUSM laboratory technicians.

Variable	High strain[a]		Non-high strain[a]		p value[b]
	Mean (SD)	No. (%)	Mean (SD)	No. (%)	
Psychosocial job factors:					
Job insecurity	6.2 (1.8)		5.4 (2.3)		0.05
Coworker support	12.8 (2.2)		12.5 (1.1)		0.21
Supervisor support	12.4 (4.9)		12.6 (4.4)		0.83
Social support	24.4 (6.5)		25.1 (4.2)		0.55
Physical exertion	2.7 (0.4)		2.5 (0.7)		0.26
Hazardous conditions	4.5 (2.9)		2.8 (2.3)		0.36
Toxic exposures	2.9 (2.0)		2.2 (1.5)		0.12
Total psychological stressors	42.2 (2.8)		35.9 (4.4)		0.01
Total physical hazard	9.4 (4.4)		7.2 (3.6)		0.21
Total physical stressors	11.0 (4.7)		9.7 (3.9)		0.18
Occupational and socio-demographical factors:					
Average duration of work (hr)	49.3 (15.3)		43.6 (12.0)		0.08
Duration of employment (mth)	106.6 (89.6)		97.1 (92.4)		0.44
Total duration of employment (yr)	10.7 (8.0)		9.2 (8.7)		0.49
Age (yr)					
18 – 34		15 (53.6)		39 (53.4)	0.72
35 – 44		11 (39.3)		19 (33.9)	
45 – 55		2 (7.1)		7 (12.5)	
Sex					
Female		18 (64.3)		28 (50.0)	0.22
Male		10 (35.7)		28 (50.0)	
Ethnic group					
Non-Malay		4 (14.3)		11 (19.6)	0.55
Malay		24 (85.7)		45 (80.4)	
Marital status					
Non-married		11 (39.3)		19 (33.9)	0.63
Married		17 (60.7)		37 (66.1)	
Education level					
Non-university		0 (0.0)		3 (5.4)	0.55[c]
University		28 (100.0)		54 (94.6)	
Income per month (in ringgit)					
700 – 1300		11 (39.3)		27 (48.2)	0.54
1301 – 1900		9 (32.1)		12 (21.4)	
1901 – 3000		8 (28.6)		17 (30.4)	

[a] These other job strain categories: low-strain, active, and passive.

[b] Significance for group difference (Independent t-test for all psychosocial job factors, average duration of work, duration of employment, and total duration of employment; χ^2 for all others).

[c] Fisher's exact test.

Table II. Risk factors of job strain in 84 HUSM laboratory technicians.

Risk factors	Crude OR[a]	Adjusted OR[b]	95% CI	p value
Job insecurity	1.1	2.4	1.2 – 5.7	<0.01
Physical exertion	1.4	1.7	1.1 – 2.9	0.03
Total psychological stressors	1.5	3.6	1.8 – 7.1	<0.01
Hazardous conditions	1.1	1.5	0.9 – 2.1	0.06

[a] Simple logistic regression.

[b] Multiple logistic regression.

[c] Likelihood-ratio (LR) test, α<0.05.

OR: odds ratio, CI: confidence interval.

Table 1: Characteristics of cases and controls

Descriptions	Cases (%) n=72	controls (%) n=72	χ^2 / paired-t test	df	p
Race					
Malays	51 (70.8%)	41 (56.9%)	χ^2 =3.951	1	0.413
Non Malays	21 (29.2%)	31 (43.1%)			
Age(min years)	47.14 ± 5.63	46.78 ± 5.55	Paired t test =1.658	71	0.102
Education level					
Not schooling	4 (5.6%)	1 (2.8%)	χ^2 =7.748	3	0.560
Primary school	32 (44.4%)	34 (47.2%)			
Secondary school	35 (48.6%)	33 (45.8%)			
University	1 (1.4%)	3 (4.4%)			
Income	927.28 ± 647.88	1008.60 ± 607.01	Paired t test = 0.904	71	0.365
Marital status					
Married	67 (93.0%)	66 (91.7%)	χ^2 =17.243	2	0.008*
Widow	2 (2.8%)	2 (2.8%)			
Bachelor	3 (4.2%)	3 (5.5%)			

Significant at $p < 0.05$

Table 2: Diabetic symptoms amongst cases and controls

Symptoms	Cases (%)	Control (%)	χ^2_{MN} # (n=71 pairs)	p
Polyuria	57(79.2)	50 (70.4)	1.71	0.189
Polydipsia	52(72.7)	47 (66.2)	0.552	0.458
Lethargy	19(26.4)	8 (11.3)	5.26	0.019*
Loosing weight	15(20.8)	16 (22.5)	0	1.000

* Significant at $p < 0.05$ # a control did not response

Table 3: Distribution of smoker among cases and controls

Categories	Cases(n=72)	Controls(n=72)	χ^2_{MN} / paired t-test	p
Smoker	16 (22.2%)	21 (29.2%)	χ^2_{MN} = 0.84	0.359
Ex-smoker	15 (20.8%)	15 (20.8%)	χ^2_{MN} = 0	1.000
Mean duration smoking (months)	246.00±82.43	173.62±89.63	Paired t = 2.688	0.014*
Min cigarettes per day (stick)	15.81±8.5	18.10±14.4	Paired t = -0.523	0.607
Smoking < 10 packs/year and non smoker	49 (68.1)	55 (76.4)	χ^2_{MN} =1.136	0.286
Smoking≥ 10 packs/year	23 (31.9)	17(23.6)		

*Significant at $p < 0.05$

Table 4: Distribution of hypertension and treatment among case and control

Categories	Cases (n=72)	Control (n=72)	χ^2_{MN} / paired t-test	p
Hypertension	32 (44.4%)	23 (31.9%)	χ^2_{MN} =2.06	0.151
Min duration of hypertension	148 months	60 months	Paired t =5.430	0.000*
Diastolic hypertension	22 persons	18 persons	χ^2_{MN} =3.56	0.059
Systolic hypertension	23 persons	11 persons	χ^2_{MN} =4.32	0.025*

* Significant at $p < 0.05$

Table 5: Distribution of HbA1c and obesity

Categories	Case (%) n=72	control (%) n =72	χ^2_{MN}	P
HbA1c level				
Good	17 (23.6)	30 (41.7)	4.97	0.026*
Poor (>8%)	55 (76.4)	42 (58.3)		
Nutritional status				
Normal	30 (41.7)	32 (44.4)	0.026	0.871
obese	42 (58.3)	40 (55.6)		

* significant at $p < 0.05$

Table 6: Logistic regression model to predict diabetic nephropathy

Variables	Regression coefficient (β)	Standard error	p	OR	CI (95%)
Constant	-4.7978	1.4618	0.0010*		
Systolic hypertension	1.3362	0.4204	0.0015*	3.80	1.67 – 8.67
Lack of diet knowledge	1.0216	0.4380	0.0197*	2.78	1.18 – 6.55
Lethargy symptom	1.6666	0.5563	0.0027*	5.29	1.78 – 15.75
Body mass index	0.0989	0.0430	0.0213*	1.10	1.01 – 1.20
Duration of diabetes	0.0084	0.0039	0.0301*	1.01	1.01 – 1.02

* Significant at $p < 0.05$

Table 7: Attributable risk percent and population attributable risk percent to diabetic nephropathy

Risk factors	Proportion of expose population (%)	ARP (%)	CI (95%)	PARP (%)	CI (95%)
Systolic hypertension	29.2	73.3	67 - 81	45.0	37 - 53
Duration of diabetes	33.3	0.9	-0.2 - 2.4	0.2	-0.5 - 1.0
Presence of lethargy	11.0	81.1	74.7 - 87.5	32.6	25.0 - 40.3
Poor diet knowledge	25.0	64.0	56.2 - 71.8	30.8	23.2 - 38.3
Body mass index	56.0	9.4	4.6 - 14.2	5.5	1.7 - 9.2

Principle 4: Similarities and Differences

- Similarities/ differences between experiment and control groups at baseline
- Reduces reviewer's concerns about bias between/ among groups
- A table includes variables in comparison between groups
- Example: Patients randomized to two groups for a clinical trial were not significantly different in terms of age, hypertension and smoking history

Evaluation 4: Similarities/ differences

- Job strain ✓
- Nephropathy ✓

Table 1. Differences in psychosocial job factors, and occupational and sociodemographical factors in HUSM laboratory technicians.

Variable	High strain[a]		Non-high strain[a]		p value[b]
	Mean (SD)	No. (%)	Mean (SD)	No. (%)	
Psychosocial job factors:					
Job insecurity	6.3 (1.8)		5.4 (2.3)		0.25
Coworker support	12.0 (2.2)		12.5 (1.1)		0.21
Supervisor support	12.4 (4.0)		12.6 (4.1)		0.83
Social support	24.4 (6.9)		25.1 (4.3)		0.55
Physical exertion	2.7 (0.4)		2.5 (0.7)		0.26
Hazardous conditions	4.5 (2.9)		3.9 (2.3)		0.26
Toxic exposures	3.5 (2.0)		3.3 (1.5)		0.12
Total psychological stressors	42.2 (3.8)		35.8 (4.4)		0.01
Total physical hazard	8.4 (4.6)		7.2 (3.6)		0.31
Total physical stressors	11.6 (4.7)		9.7 (3.9)		0.10
Occupational and socio-demographical factors					
Average duration of work (hr)	49.3 (15.3)		43.6 (13.0)		0.08
Duration of employment (mth)	106.6 (89.6)		97.1 (93.4)		0.66
Total duration of employment (yr)	10.7 (8.8)		9.2 (8.7)		0.49
Age (yr)					
18 – 34		15 (53.6)		30 (53.6)	0.72
35 – 44		11 (39.3)		19 (33.9)	
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[a] These other job strain categories: low serial, active, and passive.

[b] Significance for group difference (Independent t-test for all psychosocial job factors, average duration of work, duration of employment, and total duration of employment; χ^2 for all others).

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Widow	2 (2.8%)	2 (2.8%)			
Bachelor	3 (4.2%)	3 (5.5%)			

Significant at $p < 0.05$

Principle 5: Citation of Figures and Tables

- Cite and summarize all tables and figures in the text

Evaluation 5: Citation of figures and tables in the text

- Job strain √
- Nephropathy √

RESULTS

Out of 102 subjects enrolled, 84 consented to participate in the study, giving a response rate of 82.4%. The majority of laboratory technicians were classified under the passive group (36.9%). A high proportion (33.3%) of laboratory technicians in HUSM belonged to the high strain group. Differences in psychosocial job characteristics, and occupational and demographical factors in 28 "high strain" and 56 "non-high strain" laboratory technicians in HUSM are shown in Table I.

The risk factors of job strain in 84 laboratory technicians in HUSM are shown in Table II. Controlling for age, sex, ethnic group, marital status, educational level, and income per month, the risk factors for job strain in 84 laboratory technicians in HUSM were job insecurity (adjusted OR 2.4, 95% CI 1.2-5.7), physical exertion (adjusted OR 1.7, 95% CI 1.1-2.9), and total psychological stressors (adjusted OR 3.6, 95% CI 1.8-7.1).

Smoking

There was a significant difference in the duration of smoking among the cases as compared to the controls of which the duration of smoking among cases was longer than the controls. However, there was no significant difference between cases and control in the number of cigarettes and packets of cigarettes/year smoked(Table 3).

Hypertension

There were 32 cases (44.4%) and 23 controls (31.9%) giving history of hypertension. The duration of hypertension among the cases was 148 ± 57 months as compared to 60 ± 56 months among controls (paired t-test = 5.430, $p < 0.05$). There was a significant relationship between systolic hypertension and diabetic nephropathy where χ^2_{MH} = 4.32, $p = 0.038$, however no similar result was found for diastolic hypertension (Table 4).

Diabetic control and obesity

There was a significant relationship between HbA1c levels and nephropathy where $\chi^2_{MH} = 4.97$, $p = 0.026$. However, the body mass index (BMI) did not seem to influence nephropathy ($\chi^2_{MH} = 0.026$, $p = 0.871$) (Table 5).

Principle 6: Presenting Estimates and Confidence Intervals

- Examples of estimates:
- Prevalence and incidence
- Relative risk
- Odds ratio
- Hazards ratio
- Others: correlation coefficient, regression coefficient, mean, proportion, etc.

Evaluation 6: Estimates and confidence intervals

- Job strain √
- Nephropathy √

Table II. Risk factors of job strain in 84 HUSM laboratory technicians

Risk factors	Crude OR[a]	Adjusted OR[b]	95% CI	p value
Job insecurity	1.1	2.4	1.2 – 5.7	<0.01
Physical exertion	1.4	1.7	1.1 – 2.9	0.03
Total psychological stressors	1.5	3.6	1.8 – 7.1	<0.01
Hazardous conditions	1.1	1.5	0.9 – 2.1	0.06

[a] Simple logistic regression.
[b] Multiple logistic regression.
[c] Likelihood-ratio (LR) test, α<0.05.
OR: odds ratio, CI: confidence interval.

Table 6: Logistic regression model to predict diabetic nephropathy

Variables	Regression coefficient (β)	Standard error	p	OR	CI (95%)
Constant	-4.7978	1.4618	0.0010*		
Systolic hypertension	1.3362	0.4204	0.0015*	3.80	1.67 – 8.67
Lack of diet knowledge	1.0216	0.4380	0.0197*	2.78	1.18 – 6.55
Lethargy symptom	1.6666	0.5563	0.0027*	5.29	1.78 – 15.75
Body mass index	0.0989	0.0430	0.0213*	1.10	1.01 – 1.20
Duration of diabetes	0.0084	0.0039	0.0301*	1.01	1.01 – 1.02

* Significant at p < 0.05

Principle 7: Present *P*-values Professionally

- Provide exact ***P***-values
- Do not use "NS" (not significant) or inequalities (e.g. p<0.05)
- No need to add a column to state significant or not significant
- Can not or should not use exact ***P***-value in following situations
  - If highly significant (less than 0.001), then state as ***P***<0.001
  - If p-value is nearly 1.0, some software report "***P***>0.95" which is acceptable

Evaluation 7: *P*-value

- Job strain — √
- Ischemic heart — X (NS should not be used)
- Nephropathy — √

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[a] Simple logistic regression.
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Table 5: Distribution of HbA1c and obesity

Categories	Case (%) n=72	control (%) n =72	χ^2_{MN}	P
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Table 4 Age-adjusted* (mean ± s.e.m.) BMI, SBP, DBP, serum total cholesterol, high density lipoprotein cholesterol (HDL-cholesterol) and alcohol intake and cigarettes per day in subjects with and without ECG evidence of IHD

	Middle aged (35–59 years)			*Elderly (60–89 years)*			*Total (35–89 years)*		
	ECG evidence of IHD			*ECG evidence of IHD*			*ECG evidence of IHD*		
	Present	*Absent*	*P*	*Present*	*Absent*	*P*	*Present*	*Absent*	*P*
Men									
No. of subjects	18	294		58	269		76	493	
BMI (kg/m²)	23.2 ± 0.7	22.7 ± 0.2	NS	21.7 ± 0.3	21.5 ± 0.2	NS	22.1 ± 0.3	22.3 ± 0.1	NS
SBP (mm Hg)	141.6 ± 3.4	127.6 ± 1.0	<0.001	142.3 ± 2.5	136.6 ± 1.2	0.055	141.8 ± 2.1	133.2 ± 0.8	<0.001
DBP (mm Hg)	88.2 ± 2.5	79.7 ± 0.7	0.005	82.2 ± 1.4	79.4 ± 0.6	NS	83.6 ± 1.5	79.5 ± 0.5	0.002
Prevalence of hypertension†	38.9%	19.8%	0.004	44.8%	28.7%	0.020	43.4%	21.3%	<0.001
Total cholesterol (mmol/l)	5.38 ± 0.21	4.98 ± 0.06	NS	4.76 ± 0.11	4.74 ± 0.03	NS	4.94 ± 0.10	4.82 ± 0.04	NS
HDL-cholesterol (mmol/l)	1.49 ± 0.08	1.36 ± 0.02	NS	1.39 ± 0.05	1.37 ± 0.02	NS	1.42 ± 0.04	1.36 ± 0.02	NS
Alcohol (ml/day)‡	30.7 ± 6.1	29.8 ± 1.9	NS	22.4 ± 3.0	25.7 ± 1.4	NS	24.9 ± 2.8	27.5 ± 1.1	NS
Smoking (no./day)	14.5 ± 3.5	16.2 ± 1.0	NS	13.3 ± 1.7	13.7 ± 0.8	NS	13.7 ± 1.6	14.7 ± 0.6	NS
Women									
No. of subjects	19	219		86	305		105	524	
BMI (kg/m²)	23.1 ± 0.7	22.8 ± 0.2	NS	22.6 ± 0.4	22.6 ± 0.2	NS	22.6 ± 0.3	22.8 ± 0.1	NS
SBP (mm Hg)	130.4 ± 3.7	125.1 ± 1.1	NS	143.9 ± 2.6	136.6 ± 1.1	0.003	138.8 ± 1.8	132.5 ± 0.8	0.001
DBP (mm Hg)	77.8 ± 2.5	76.8 ± 0.7	NS	78.5 ± 1.2	76.9 ± 0.6	NS	77.9 ± 1.1	76.9 ± 0.5	NS
Prevalence of hypertension†	21.1%	11.9%	NS	48.5%	29.8%	0.005	41.9%	23.3%	<0.001
Total cholesterol (mmol/l)	5.14 ± 0.19	5.05 ± 0.06	NS	5.34 ± 0.09	5.31 ± 0.05	NS	5.22 ± 0.08	5.22 ± 0.04	NS
HDL-cholesterol (mmol/l)	1.47 ± 0.09	1.48 ± 0.02	NS	1.47 ± 0.04	1.46 ± 0.02	NS	1.48 ± 0.04	1.46 ± 0.02	NS
Alcohol (ml/day)‡	1.6 ± 1.2	3.5 ± 0.6	NS	2.9 ± 1.6	3.8 ± 0.9	NS	2.6 ± 1.3	3.6 ± 0.6	NS
Smoking (No./day)	1.1 ± 1.0	1.1 ± 1.0	NS	0.2 ± 0.2	0.3 ± 0.1	NS	0.5 ± 0.3	0.7 ± 0.1	NS

*Age was adjusted by covariate analysis using ANOVA.
†Hypertension defined as SBP = >160 mm Hg or DBP = >95 mm Hg or on antihypertensive medication.
‡Alcohol intake data was available in 547 men and 533 women.
χ^2 test was used to see the differences of prevalence of hypertension between age groups. NS: Non-significant.

Principle 8: Consistency in Presenting Numbers

- Use a consistent number of decimal places
- Percentages – one decimal place
- Odds ratios, relative risk, correlation coefficients, test statistics (e.g. X^2, t), mean and standard deviations, standard error → two decimal places (some journals use only one)
- 95% confidence intervals – some journals use one whereas some use two
- ***P***-values → normally three decimal places (some use two)

Tips

- 1 – percentage
- 3 – p-value
- 2 – the rest
  (mean, proportion, confidence interval, standard deviation, standard error, relative risk, odds ratio, hazards ratio, relative risk ratio, regression coefficient, correlation coefficient, Wald statistics, LR statistic, etc.)

Evaluation 8: Consistency in presenting numbers

- Job strain → √
- Nephropathy → X (many decimals used)

Table I. Differences in psychosocial job factors, and occupational and sociodemographical factors in HUSM laboratory technicians.

Variable	High strain[a]		Non-high strain		p value[b]
	Mean (SD)	No. (%)	Mean (SD)	No. (%)	
Psychosocial job factors:					
Job insecurity	6.3 (1.8)		5.4 (2.3)		0.05
Coworker support	12.0 (2.2)		12.5 (1.1)		0.21
Supervisor support	10.4 (4.0)		12.4 (4.1)		0.03
Social support	24.4 (6.0)		25.1 (4.3)		0.55
Physical exertion	2.7 (0.6)		2.5 (0.7)		0.26
Hazardous conditions	4.5 (2.9)		3.9 (2.2)		0.36
Toxic exposures	2.9 (2.0)		2.2 (1.5)		0.12
Total psychological stressors	42.2 (3.8)		35.9 (4.4)		0.01
Total physical hazard	9.4 (4.6)		7.2 (3.6)		0.21
Total physical stressors	11.0 (4.7)		9.7 (2.9)		0.18
Occupational and socio-demographical factors:					
Average duration of work (hr)	49.3 (15.3)		43.6 (13.0)		0.08
Duration of employment (mth)	106.6 (89.6)		97.1 (93.4)		0.66
Total duration of employment (yr)	10.7 (8.8)		9.2 (8.7)		0.48
Age (yr)					
18 – 24		15 (53.6)		20 (52.6)	0.72
35 – 44		11 (39.3)		19 (33.9)	
45 – 55		2 (7.1)		7 (13.5)	
Sex					
Female		16 (44.5)		36 (50.0)	0.22
Male		10 (35.7)		28 (50.0)	
Ethnic group					
Non-Malay		4 (14.3)		11 (19.6)	0.55
Malay		24 (85.7)		45 (80.4)	
Marital status					
Non-married		11 (39.3)		19 (33.9)	0.63
Married		17 (60.7)		37 (66.1)	
Education level					
Non-university		0 (0.0)		2 (3.6)	0.55[c]
University		28 (100.0)		54 (96.4)	
Income per month (in ringgit)					
700 – 1300		11 (39.3)		27 (48.2)	0.54
1301 – 1700		9 (32.1)		12 (21.4)	
1701 – 2000		8 (28.6)		17 (30.4)	

[a] Three other job strain categories: low strain, active, and passive.

[b] Significance for group difference (independent t-test for all psychosocial job factors, average duration of work, duration of employment and total duration of employment; χ^2 for all others).

[c] Fisher's exact test.

Table II. Risk factors of job strain in 84 HUSM laboratory technicians

Risk factors	Crude OR[a]	Adjusted OR[b]	95% CI	p value
Job insecurity	1.1	2.4	1.2 – 5.7	<0.01
Physical exertion	1.4	1.7	1.1 – 2.9	0.03
Total psychological stressors	1.5	3.6	1.8 – 7.1	<0.01
Hazardous conditions	1.1	1.5	0.9 – 2.1	0.06

[a] Simple logistic regression.

[b] Multiple logistic regression.

[c] Likelihood-ratio (LR) test, α<0.05.

OR: odds ratio, CI: confidence interval.

Table 6: Logistic regression model to predict diabetic nephropathy

Variables	Regression coefficient (β)	Standard error	p	OR	CI (95%)
Constant	-4.7978	1.4618	0.0010*		
Systolic hypertension	1.3362	0.4204	0.0015*	3.80	1.67 – 8.67
Lack of diet knowledge	1.0216	0.4380	0.0197*	2.78	1.18 – 6.55
Lethargy symptom	1.6666	0.5563	0.0027*	5.29	1.78 – 15.75
Body mass index	0.0989	0.0430	0.0213*	1.10	1.01 – 1.20
Duration of diabetes	0.0084	0.0039	0.0301*	1.01	1.01 – 1.02

* Significant at $p < 0.05$

Principle 9: Include Only Results

- Include only results in the results section

Evaluation 9: Include only results

- Job strain → √
- Nephropathy → √

Principle 10: Avoid Discussing the Results

- Discussion on the results should be written in discussion section only

Evaluation 10: Discussion on the results

- Job strain → √
- Nephropathy → √

Presenting inferential statistics

- Writing depends on the statistical tests applied (examples: Chi-square, t-test, Multiple Logistic Regression, etc.)
- Also depends on the format of the journal (example: some journals ask to include test statistic, degree of freedom, etc.)
- Should be comprehensive tables rather than presenting in many tables

Principle 11: Presenting Findings of Univariable Analysis

Evaluation 11: Univariable analysis findings

- Job strain
- √
- Nephropathy
- X (Too many tables)

Table 1. Differences in psychosocial job factors and occupational and sociodemographical factors in HUSM laboratory technicians.

Variable	High strain		Non-high strain[a]		p value[b]
	Mean (SD)	No. (%)	Mean (SD)	No. (%)	
Psychosocial job factors					
Job insecurity	6.2 (1.8)		5.6 (2.3)		0.25
Coworker support	12.0 (2.2)		13.5 (1.1)		0.21
Supervisor support	12.4 (4.0)		12.6 (3.1)		0.83
Social support	24.4 (6.9)		26.1 (4.2)		0.55
Physical exertion	2.7 (0.6)		2.5 (0.7)		0.26
Hazardous conditions	4.3 (2.9)		3.9 (2.3)		0.36
Toxic exposures	3.9 (2.0)		3.3 (1.5)		0.12
Total psychological stressors	42.3 (9.8)		38.8 (4.4)		0.01
Total physical hazard	8.4 (4.6)		7.2 (3.6)		0.21
Total physical stressors	11.0 (4.7)		9.7 (3.9)		0.18
Occupational and socio-demographical factors					
Average duration of work (hr)	49.3 (15.3)		43.6 (13.0)		0.08
Duration of employment (mth)	106.6 (89.4)		97.1 (99.4)		0.66
Total duration of employment (yr)	10.7 (8.8)		9.3 (8.7)		0.48
Age (yr)					
18 – 34		15 (83.4)		30 (53.6)	0.72
35 – 44		11 (39.3)		19 (33.9)	
45 – 55		2 (7.1)		7 (12.5)	
Sex					
Female		18 (64.3)		28 (50.0)	0.33
Male		10 (35.7)		28 (50.0)	
Ethnic group					
Non-Malay		4 (14.3)		11 (19.4)	0.55
Malay		24 (85.7)		45 (80.4)	
Marital status					
Non-married		11 (39.3)		19 (33.9)	0.63
Married		17 (60.7)		37 (66.1)	
Education level					
Non-university		0 (0.0)		3 (5.4)	0.55[c]
University		28 (100.0)		54 (94.4)	
Income per month (in ringgit)					
700 – 1300		11 (39.3)		27 (48.2)	0.54
1301 – 1700		9 (32.1)		12 (21.4)	
1701 – 2000		8 (28.6)		17 (30.4)	

[a] Three other job strain categories: low strain, active, and passive.
[b] Significance for group difference (Independent t-test for all psychosocial job factors, average duration of work, duration of employment, and total duration of employment; χ^2 for all others).
[c] Fisher's exact test.

Table 2: Diabetic symptoms amongst cases and controls

Symptoms	Cases (%)	Control (%)	χ^2_{MN} # (n=71 pairs)	P
Polyuria	57(79.2)	50 (70.4)	1.71	0.189
Polydipsia	52(72.7)	47 (66.2)	0.552	0.458
Lethargy	19(26.4)	8 (11.3)	5.26	0.019*
Loosing weight	15(20.8)	16 (22.5)	0	1.000

* Significant at $p < 0.05$ # a control did not response

Table 3: Distribution of smoker among cases and controls

Categories	Cases(n=72)	Controls(n=72)	χ^2_{MN} / paired t-test	P
Smoker	16 (22.2%)	21 (29.2%)	$\chi^2_{MN} = 0.84$	0.359
Ex-smoker	15 (20.8%)	15 (20.8%)	$\chi^2_{MN} = 0$	1.000
Mean duration smoking (months)	246.00±82.43	173.62±89.63	Paired t = 2.688	0.014*
Min cigarettes per day (stick)	15.81±8.5	18.10±14.4	Paired t = -0.523	0.607
Smoking < 10 packs/year and non smoker	49 (68.1)	55 (76.4)	$\chi^2_{MN} = 1.136$	0.286
Smoking≥ 10 packs/year	23 (31.9)	17(23.6)		

*Significant at $p < 0.05$

Principle 12: Presenting Findings of Multivariable Analysis

- Make clear what was adjusted for with multivariable analysis
- Depends on type of multivariable analysis applied (examples: multiple linear regression, multiple logistic regression, Cox regression, etc.)
- Include parameter estimate (e.g. regression coefficient, odds ratio, relative risk, hazards ratio, etc.), its 95% confidence interval and p-value

Multivariable analysis findings

- Include necessary information regarding method, modeling procedures and results from those procedures as the footnote
- Examples: the name of multivariate method applied, good-ness-of-fit tests, test used for steps in modeling, abbreviations, etc.

Evaluation 12: Multivariable analysis findings

- Job strain
  - √
- Nephropathy
  - √

(Footnotes should have more information in both articles)

Table II. Risk factors of job strain in 84 HUSM laboratory technicians

Risk factors	Crude OR[a]	Adjusted OR[b]	95% CI	p value
Job insecurity	1.1	2.4	1.2 – 5.7	<0.01
Physical exertion	1.4	1.7	1.1 – 2.9	0.03
Total psychological stressors	1.5	3.6	1.8 – 7.1	<0.01
Hazardous conditions	1.1	1.5	0.9 – 2.1	0.06

[a] Simple logistic regression.
[b] Multiple logistic regression.
[c] Likelihood-ratio (LR) test, $\alpha<0.05$.
OR: odds ratio, CI: confidence interval.

Table 6: Logistic regression model to predict diabetic nephropathy

Variables	Regression coefficient (β)	Standard error	p	OR	CI (95%)
Constant	-4.7978	1.4618	0.0010*		
Systolic hypertension	1.3362	0.4204	0.0015*	3.80	1.67 – 8.67
Lack of diet knowledge	1.0216	0.4380	0.0197*	2.78	1.18 – 6.55
Lethargy symptom	1.6666	0.5563	0.0027*	5.29	1.78 – 15.75
Body mass index	0.0989	0.0430	0.0213*	1.10	1.01 – 1.20
Duration of diabetes	0.0084	0.0039	0.0301*	1.01	1.01 – 1.02

* Significant at $p < 0.05$

Pitfalls in reporting results

- Report results in the target journal's format
- Describe people sensitively and diplomatically
- Write comprehensively and convincing results in a reasonable length
- Acknowledge that you are aware of small cell sizes
- Do not include more than the average number of tables or graphs for the targeted journal
- Obtain written permission for figures or tables from published articles which are included in your manuscript

Pitfalls in reporting results

- Edit or redesign slide graphs before including them in the manuscript
- Create readable and clear tables and figures
- Use appropriate graphs to display distributions if necessary (example: histogram, Box and Whisker plot)
- Display normal range for laboratory and clinical data
- Be aware that final results is based on multivariable analysis rather than univariable analysis

Suggested mode of presentation

- Confidence interval (CI) should be reported instead of standard error (SE)
- Encourage to move away from current emphasis on statistical significance (p-value)
- Mean difference, 95% CI, test statistic, degree of freedom, p-value
- E.g., mean difference = 6.25 mmHg, 95% CI 1.15, 11.23; t-stat (df): 2.43 (198); p=0.002
- Mean, correlation coefficient, regression coefficient, relative risk, odds ratio, hazards ratio, etc…

Independent t test

❑ To determine the mean difference of growth between gender

Table 1: Comparison of mean growth between two groups (n=108)

Group (n)	Mean (SD)	Mean difference (95% CI)	t-statistic[a] (df)	p-value
male (64)	24.97 (2.90)	2.32 (1.27,3.37)	4.38 (106)	<0.001
female (44)	22.65 (2.40)			

[a] Independent t-test was applied

Paired t test

❑ To determine the mean BMI difference before and after aerobic program

Table 1: Comparison of mean BMI of a paired sample (n=60 pairs)

Group	Mean (SD)	Mean difference (95% CI)	t-statistic[a] (df)	p-value
pre	24.48 (2.98)	2.82 (2.06,3.57)	7.47 (59)	<0.001
post	21.67 (1.68)			

[a] Paired t-test was applied

One-way ANOVA

❑ To determine the mean PEFR among three different drug groups

Table 1: Comparison of mean PEFR among three treatment groups (n=1258)

Comparison	Mean difference (95% CI)	p-value
Drug A vs. Drug B	38.03 (20.67, 55.38)	< 0.001
Drug A vs. Placebo	38.33 (20.18, 56.49)	<0.001
Drug B vs. Placebo	0.31 (-17.79, 18.41)	>0.950

One-way ANOVA test was applied followed by Post-hoc multiple comparison test Scheffe's procedures
F (df) = 18.78 (2), p<0.001

Mann-Whitney test

❑ To determine the comparison of median insulin levels between two treatment groups

Table 1: Comparison of median insulin levels between two treatment groups (n=23)

Group (n)	Median (IqR)	Z-statistic[a]	p-value
Control (11)	32.50 (8.65)	-2.56	0.011
previous GDM (12)	48.13 (14.06)		

[a] Mann-Whitney Test was applied

Wilcoxon Signed Rank Test

❑ To determine the difference in median CD4 cell count between before and after therapy

Table 1: Comparison of median CD4 cell count in a paired sample (n=7 pairs)

Group	Median (IqR)	Z-statistic[a]	p-value
pre	169.00 (78.00)	-2.37	0.018
post	315.00 (228.00)		

[a] Wilcoxon Signed Rank Test was applied

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Kruskal Wallis Test

❑To determine the comparison of median serum level among three treatment groups

Table 1: Comparison of median serum level among three treatment groups

Groups	n	Median (IqR)	χ^2-statistic (df)	p-value[a]
Control	10	0.25 (0.08)		
Seronegativized Children	14	0.57 (0.73)	7.77 (2)	0.021
HIV Positive Patient	6	0.42 (0.60)		

[a] Kruskal Wallis Test was applied
Control vs Seronegativized Children, p=0.019
Control vs HIV Positive Patient, p=0.011
Seronegativized Children vs HIV Positive Patient, p=0.772
Multiple Mann-Whitney Test with Bonferroni correction was applied
(α/no of pairs = 0.05/3 = 0.017)

Multiple Linear Regression

❑ Relationship between (age, weight, height) and PEFR (Peak Expiratory Flow Rate)

Table 1: Associated factors of PEFR amongst patients admitted to HUSM (n=1369)

Variables	Simple linear regression		Multiple linear regression	
	b[a] (95% CI)	p-value	b[b] (95% CI)	p-value
Age (years)	-3.29 (-4.07,-2.51)	<0.001	-2.33 (-3.08,-1.58)	<0.001
Weight (Kg)	4.19 (3.51, 4.87)	<0.001	2.69 (1.98, 3.40)	<0.001
Height (cm)	3.57 (2.97, 4.16)	<0.001	2.57 (1.96, 3.19)	<0.001

[a] Crude regression coefficient
[b] Adjusted regression coefficient
Forward multiple linear regression method applied. Model assumptions are fulfilled.
There were no interactions amongst independent variables. No multicollinearity detected.
Coefficient of determination (R^2) = 0.162

Final model equation
PEFR= -63.93 – (2.33*Age) + (2.69*Weight) + (2.57*Height)

Multiple Logistic Regression

❑To determine the factors that associated with coronary artery disease

Table 1: Associated factors of coronary artery disease by Multiple Logistic Regression model

Variable	Regression coefficient (b)	Adjusted Odds Ratio [a] (95%CI)	Wald statistic	p-value
diastolic blood pressure (mmHg)	0.05	1.05 (1.04,1.06)	212.62	<0.001
serum cholesterol (mmol/l)	0.14	1.15 (1.07,1.23)	15.66	<0.001
gender of the patient				
women	0	1		
men	0.40	1.49 (1.24,1.78)	18.55	<0.001

[a] Backward LR Multiple Logistic Regression model was applied
Multicollinearity and interaction term were checked and not found
Hosmer-Lemeshow test, (p=0.212), classification table (overall correctly classified percentage=86.4%) and area under the ROC curve (70.9%) were applied to check the model fitness

Cox Proportional Hazards Regression

❑To determine the prognostic factors for survival time amongst patients with breast cancer

Table 1: Prognostic factors of cancer breast by multiple cox proportional hazards model

Variable	Regression coefficient (b)	Adjusted Hazards Ratio [a] (95%CI)	Wald statistic	p-value
Pathologic tumor size	0.45	1.57 (1.21, 2.03)	11.57	0.001
Number of positive lymph nodes	0.14	1.15 (1.05,1.26)	8.37	0.004
Progesterone receptor status				
Negative	0	1	-	-
Positive	-0.67	0.51 (0.27, 0.99)	4.00	0.045

[a] Backward Stepwise Cox Proportional Hazards Regression model was applied
Log-minus-log plot, hazard function plot and partial residuals were applied to check the model assumption and found fulfilled

Footnote:

- Multinomial logistic regression was applied
- Linearity of continuous variable was checked and reported to be linear
- Interaction and multicollinearity were not reported
- Overall fit of the model was checked and reported to be Hosmer-Lemeshow test (logit function 1: p=0.711; logit function 2: p=0.876), Pearson chi-square test (logit function 1: p=0.985; logit function 2: p=0.694), overall correctly classified percentage (logit function 1: 74.7%; logit function 2: 76.6%), Area under the ROC curve (logit function 1: 0.794; logit function 2: 0.687)
- Regression diagnostic was performed by estimated logistic probability (p), Leverage (h), covariate pattern (n), Hosmer and Lemeshow Delta chi-squared influence statistic (dx2), Hosmer and Lemeshow Delta-D influence statistic (dd) and Pregibon Delta-Beta influence statistic (db)
- Influential outliers were identified by checking percent changes in regression coefficient set at 20%

Multinomial Logistic Regression

❑To determine the factors associated of mammography experience (never, within one year , over one year)

Table 1: Associated factors of mammogram experience within 1 year and over 1 year compared to never have mammogram experience (n=350)

Logit function	Variable	Regression coefficient (b)	Adjusted Relative Risk Ratio (95% CI)	p-value
1	pb	-0.272	0.762 (0.653,0.889)	0.001
	hist			
	yes	0	1	
	no	1.382	3.983 (1.664,9.532)	0.002
	detcd			
	not likely	0	1	
	likely	0.903	2.467 (1.165,5.224)	0.018
	symptd			
	agree	0	1	
	disagree	2.036	7.662 (2.884,20.360)	<0.001
2	pb	-0.157	0.855 (0.730,1.001)	0.051
	hist			
	yes	0	1	0.018
	no	1.106	3.022 (1.204,7.588)	
	detcd			
	not likely	0	1	0.989
	likely	-0.005	0.995 (0.513,1.932)	
	symptd			
	agree	0	1	0.006
	disagree	1.067	2.906 (1.356,6.227)	

Ordinal Logistic Regression

❑To determine the associated factors of low birth weight babies

Table 1: Associated factors of heavier versus a lighter birth weight babies (n=189)

Variables	Regression coefficient (b)	Adjusted Odds Ratio (95% CI)	p-value
lwt	0.01	1.01 (1.003, 1.021)	0.009
race			
white	0	1	
black	-1.50	0.22 (0.097, 0.498)	<0.001
others	-0.96	0.39 (0.206, 0.747)	0.004
smoke			
no	0	1	
yes	-1.14	0.34 (0.184, 0.615)	<0.001
ui			
no	0	1	
yes	-1.12	0.38 (0.177, 0.820)	0.014

Footnote:

- Backward stepwise logistic regression was applied
- Linearity of continuous variable was checked and reported to be linear
- Interactions and multicollinearity were not reported
- Assumptions of similarity between proportional model and unconstrained baseline logit, proportional odds assumption and parallel regression assumption were checked and found to be fulfilled
- Overall fit of the model was checked and reported to be Hosmer-Lemeshow test (first model: p=0.892; second model: p=0.243; third model: p=0.186), Pearson chi-square test (first model: p=0.229; second model: p=0.138; third model: p=0.216), correctly classified percentage (first model: 63.9%; second model: 64.4%; third model: 71.4%), Area under the ROC curve (first model: 0.64; second model: 0.70; third model: 0.85)
- Regression diagnostic was performed by estimated logistic probability (p), Leverage (h), covariate pattern (n), Hosmer and Lemeshow Delta chi-squared influence statistic (dx2), Hosmer and Lemeshow Delta-D influence statistic (dd) and Pregibon Delta-Beta influence statistic (db)
- Influential outliers were identified by checking percent changes in regression coefficient set at 20% and covariate pattern 25 was deleted

Conditional Logistic Regression

❑To determine the risk factors of low birth weight babies

Table 1: Risk factors of low birth weight babies (n=56 pairs)

Variable	Regression coefficient (b)	Adjusted Odds Ratio (95% CI) [a]	p-value
smoke			
no	0	1	
yes	1.71	5.53 (1.78, 17.11)	0.003
ptd			
no	0	1	
yes	1.97	7.20 (1.61, 32.17)	0.010
weight (kg)	0.10	1.11 (1.03, 1.19)	0.009

Matching was done based on age of the mother
[a] Backward stepwise Conditional Logistic Regression model was applied
Linearity of continuous variable was checked and was found linear
Interaction terms were checked and not found
Regression diagnostic was done by using leverage (h), lack of fit diagnostic (dx2), Delta-Beta influence statistics (dbeta)
Outliers were identified by percent change of coefficient set at 20%
Individual fitness was checked and pair 41 was deleted

Multifactorial ANOVA

❑To determine the effect of three or more factors (independent variable) on mean difference of one numerical outcome (dependent variable)

Table 1: Adjusted mean and 95% confidence interval of the main effects of race, history of premature labor and presence of uterine irritability on the infant's birth weight

Factors		Mean (95% CI)	Adjusted MD (95% CI) [a]	p-value
Race	White	2801.66 (2615.69, 2987.64)	White vs black: 391.58 (29.58, 753.58)	0.029
	Black	2410.08 (2117.94, 2702.22)	White vs other: 266.55 (5.41, 527.70)	0.044
	Other	2535.11 (2336.64, 2733.57)	Black vs other: -125.03 (-503.90, 253.85)	>0.95
History of premature labor	No	2747.30 (2585.97, 2908.64)	330.04 (59.10, 600.97)	0.017
	Yes	2417.26 (2160.18, 2674.35)		
Presence of uterine irritability	No	2836.26 (2680.93, 2991.59)	507.95 (228.87, 787.03)	<0.001
	Yes	2328.31 (2063.29, 2593.33)		

[a] Multifactorial ANOVA test was applied with adjusted mean difference with Bonferroni adjustment
Race, F-stat(df): 4.99 (2), p-value:0.008
History of premature labor, F-stat(df): 5.78 (1), p-value:0.017
Presence of uterine irritability, F-stat(df): 12.90 (1), p-value: <0.001

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ANCOVA

❑To determine the significant differences of mean blood pressure between males and females when age and weight are controlled

Table 1: Comparison of blood pressure between male and female with and without adjustment of age and weight

Gender	Mean	Mean difference (95% CI)	p value
Female (n = 395)	[a] 130.54 (30.47)	-5.52 (-9.35, -1.69)	0.005 [b]
Male (n = 605)	[a] 136.06 (29.93)		
Female (n = 395)	131.90 (130.29, 133.51)	-3.27 (-5.34, -1.20) [c]	0.002 [d]
Male (n = 605)	135.17 (133.87, 136.47)		

[a] Mean (standard deviation)
[b] Independent t-test applied
[c] Adjusted mean difference (95% confidence interval) Bonferroni adjustment applied
[d] ANCOVA applied (adjusted for weight and age)

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MANOVA

❑To determine the difference in heart rate and systolic blood pressure based on the gender and type of ward patients was admitted

Table 1: Effects of gender and type of ward patient admitted on systolic blood pressure and heart rate of the patient

		Mean (95% CI)	Adjusted MD (95% CI)[a]	p-value
	Gender			
sbp	Male Female	130.60 (124.74, 136.46) 134.44 (126.99, 141.89)	-3.84 (-13.33, 5.65)	0.426
heart rate	Male Female	99.23 (94.70, 103.76) 100.05 (94.28, 105.81)	-0.82 (-8.16, 6.52)	0.827
	Ward			
sbp	Medical Surgical	129.34 (122.57, 136.12) 135.70 (129.25, 142.14)	-6.35 (-15.59, 2.88)	0.176
heart rate	Medical Surgical	108.41 (103.17, 113.65) 90.86 (85.88, 95.85)	17.55 (10.41, 24.69)	<0.001

MD = mean difference
[a] Adjusted mean difference (95% CI) with Bonferroni adjustment

MANCOVA

❑To determine the mean difference of systolic blood pressure and heart rate between gender and status of the patient after controlling the influence of age

Table 1: Effects of gender and status of the patient on systolic blood pressure and heart rate with adjustment for age

		Mean (95% CI)	Adjusted MD (95% CI)[a]	p-value
	Gender			
sbp	Male Female	129.77 (124.01, 135.53) 133.00 (125.66, 140.33)	-3.23 (-12.52, 6.06)	0.494
heart rate	Male Female	99.57 (94.97, 104.17) 101.43 (95.58, 107.29)	-1.87 (-9.28, 5.55)	0.620
	Status			
sbp	Well Sick	139.41 (133.38, 145.44) 123.35 (116.30, 130.41)	16.06 (6.86, 25.26)	0.001
heart rate	Well Sick	92.05 (87.23, 96.86) 108.96 (103.33, 114.59)	-16.91 (-24.25, -9.57)	<0.001

MANCOVA test was applied after adjustment for age
[a] Adjusted mean difference (95% CI) with Bonferroni adjustment

Repeated Measures ANOVA

(1) Within subject design (Time effect)
❑To determine the difference of mean blood pressure within group based on time

Table1: Comparison of blood pressure within each treatment groups based on time (Time effect)

Comparison	Drug		Relaxation		Control	
	MD(95% CI)	p-value	MD(95% CI)	p-value	MD(95% CI)	p-value
Week1-Month1	4.80(2.51, 7.09)	<0.001	3.80(1.25, 6.35)	0.004	-2.40(-4.60, -0.20)	0.031
Week1-Month3	10.60(6.00, 15.20)	<0.001	8.80(3.87, 13.73)	0.001	-4.20(-8.51, 0.11)	0.057
Week1-Month6	15.60(10.22, 20.98)	<0.001	14.20(7.08, 21.32)	0.001	-6.40(-11.20, -1.61)	0.009
Month1-Month3	5.80(1.73, 9.87)	0.006	5.00(2.30, 7.70)	0.001	-1.80(-4.54, 0.94)	0.350
Month1-Month6	10.80(6.18, 15.42)	<0.001	10.40(5.31, 15.50)	<0.001	-4.00(-7.33, -0.67)	0.017
Month3-Month6	5.00(2.30, 7.70)	0.001	5.40(1.78, 9.02)	0.004	-2.20(-3.41, -0.99)	0.001

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Repeated measures ANOVA within group analysis was applied followed by pairwise comparison with confidence interval adjustment by Bonferroni correction
MD = mean difference

Repeated Measures ANOVA

(2) Between subject design (Treatment effect)
❑To determine the difference of mean blood pressure between treatment groups regardless of time

Table 2: Mean difference of blood pressure among three treatment groups (Treatment effect)

Comparison	Mean difference (95% CI)	p-value
Drug-Relaxation	-1.45 (-10.86, 7.96)	0.924
Drug-Control	-10.60 (-20.01, -1.19)	0.025
Relaxation-Control	-9.15 (-18.56, 0.26)	0.058

Repeated measures ANOVA between group analysis was applied
F-stat (df) = 5.00(2), p-value = 0.014

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Repeated Measures ANOVA

(3) Within –between design (Time-treatment interaction)
❑To determine the difference of mean blood pressure between treatment groups with regard to time

Table 3: Comparison of blood pressure among three different treatment groups based on time (Time-treatment interaction)

Time	Treatment group	Mean blood pressure	95% CI
Week 1	drug	105.80	99.95, 111.65
	relaxation	106.20	100.35, 112.05
	control	105.40	99.55, 111.25
Month 1	drug	101.00	95.44, 106.56
	relaxation	102.40	96.84, 107.96
	control	107.80	102.24, 113.36
Month 3	drug	95.20	89.73, 100.67
	relaxation	97.40	91.93, 102.87
	control	109.60	104.13, 115.07
Month 6	drug	90.20	85.17, 95.23
	relaxation	92.00	86.97, 97.03
	control	111.80	106.77, 116.83

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Repeated measures ANOVA between group analysis with regard to time was applied
Assumptions of normality, homogeneity of variances and compound symmetry were checked and were fulfilled

Repeated Measures ANCOVA

(1) Within subject design (Time effect)
❑To determine the difference of mean blood pressure within group based on time

Table1: Comparison of blood pressure within each treatment groups based on time (Time effect)

Comparison	Drug		Relaxation		Control	
	MD(95% CI)	p-value	MD(95% CI)	p-value	MD(95% CI)	p-value
Week1-Month1	4.80(2.33, 7.27)	0.001	3.80(1.61, 6.00)	0.002	-2.40(-4.55, -0.25)	0.028
Week1-Month3	10.60(5.76, 15.44)	<0.001	8.80(4.39, 13.21)	0.001	-4.20(-8.45, 0.05)	0.053
Week1-Month6	15.60(9.70, 21.50)	<0.001	14.20(8.78, 19.62)	<0.001	-6.40(-11.20, -1.61)	0.010
Month1-Month3	5.80(1.45, 10.15)	0.010	5.00(2.40, 7.60)	0.001	-1.80(-4.64, 1.04)	0.350
Month1-Month6	10.80(5.76, 15.85)	<0.001	10.40(6.40, 14.40)	<0.001	-4.00(-7.49, -0.51)	0.024
Month3-Month6	5.00(2.42, 7.58)	0.001	5.40(2.30, 8.50)	0.002	-2.20(-3.52, -0.88)	0.002

Repeated measures ANCOVA within group analysis was applied followed by pairwise comparison with confidence interval adjustment
Potential covariate (age) was controlled by using repeated measures ANCOVA
MD = mean difference

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Repeated Measures ANCOVA

(2) Between subject design (Treatment effect)
❑To determine the difference of mean blood pressure between treatment groups regardless of time

Table 2: Mean difference of blood pressure among three treatment groups (Treatment effect)

Comparison	Mean diff (95% CI)	p value
Drug-Relaxation	-0.48 (-8.48, 7.52)	>0.950
Drug-Control	-9.35 (-17.64, -1.05)	0.086
Relaxation-Control	-8.87 (-16.44, -1.30)	0.070

F-stat(df) = 3.74(2), p-value = 0.037
Repeated measures ANCOVA between group analysis was applied followed by pairwise comparison with confidence interval adjustment by Bonferroni
Potential covariate (age) was controlled by using repeated measures ANCOVA
Level of significance was set at 0.05 (two-tailed)

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Repeated Measures ANCOVA

(3) Within –between design (Time-treatment interaction)
❑To determine the difference of mean blood pressure between treatment groups with regard to time

Table 3: Comparison of blood pressure among three different treatment groups based on time (Time-treatment interaction)

Time	Treatment group	Mean blood pressure	95% CI
Week1	Drug	106.01	99.62, 112.41
	Relaxation	106.13	100.13, 112.14
	Control	105.25	99.08, 111.43
Month1	Drug	101.57	95.52, 107.62
	Relaxation	102.22	96.54, 107.91
	Control	107.41	101.57, 113.25
Month3	Drug	95.94	90.00, 101.87
	Relaxation	97.17	91.60, 102.75
	Control	109.09	103.37, 114.82
Month6	Drug	91.65	86.39, 96.91
	Relaxation	91.55	86.61, 96.49
	Control	110.80	105.72, 115.88

Repeated measures ANCOVA between group analysis with regard to time was applied
Potential covariate (age) was controlled by using repeated measures ANCOVA
Assumptions of normality, homogeneity of variances , compound symmetry and homogeneity of regression were checked and were fulfilled

Table 4: Comparison of blood pressure among three different treatment groups based on time by comparing repeated measures ANOVA and repeated measures ANCOVA (Time-treatment interaction)

Time	Repeated measures ANOVA			Repeated measures ANCOVA		
	Group	Mean	95% CI	Group	Mean	95% CI
Week1	Drug	105.80	99.95, 111.65	Drug	106.01	99.62, 112.41
	Relaxation	106.20	100.35, 112.05	Relaxation	106.13	100.13, 112.14
	Control	105.40	99.55, 111.25	Control	105.25	99.08, 111.43
Month1	Drug	101.00	95.44, 106.56	Drug	101.57	95.52, 107.62
	Relaxation	102.40	96.84, 107.96	Relaxation	102.22	96.54, 107.91
	Control	107.80	102.24, 113.36	Control	107.41	101.57, 113.25
Month3	Drug	95.20	89.73, 100.67	Drug	95.94	90.00, 101.87
	Relaxation	97.40	91.93, 102.87	Relaxation	97.17	91.60, 102.75
	Control	109.60	104.13, 115.07	Control	109.09	103.37, 114.82
Month6	Drug	90.20	85.17, 95.23	Drug	91.65	86.39, 96.91
	Relaxation	92.00	86.97, 97.03	Relaxation	91.55	86.61, 96.49
	Control	111.80	106.77, 116.83	Control	110.80	105.72, 115.88

Repeated measures ANCOVA between group analysis with regard to time was applied
Potential covariate (age) was controlled by using repeated measures ANCOVA
Assumptions of normality, homogeneity of variances , compound symmetry and homogeneity of regression were checked and were fulfilled