Complications of Type 2 Diabetes in the Philippines**Mia Fojas**

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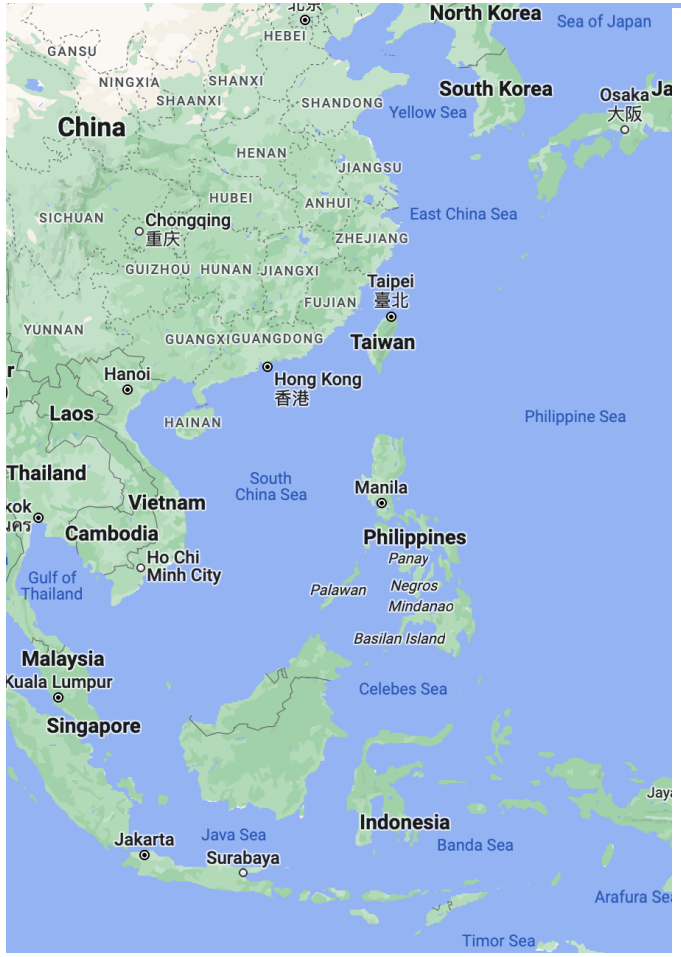
Objectives

- To present current statistics of Type 2 Diabetes in the Philippines
- To show data on the micro and macrovascular complications of T2DM in the Philippines, in relation to its neighbours
- Current projects of the organizations and government to address T2DM and its complications

Philippines, Demographics



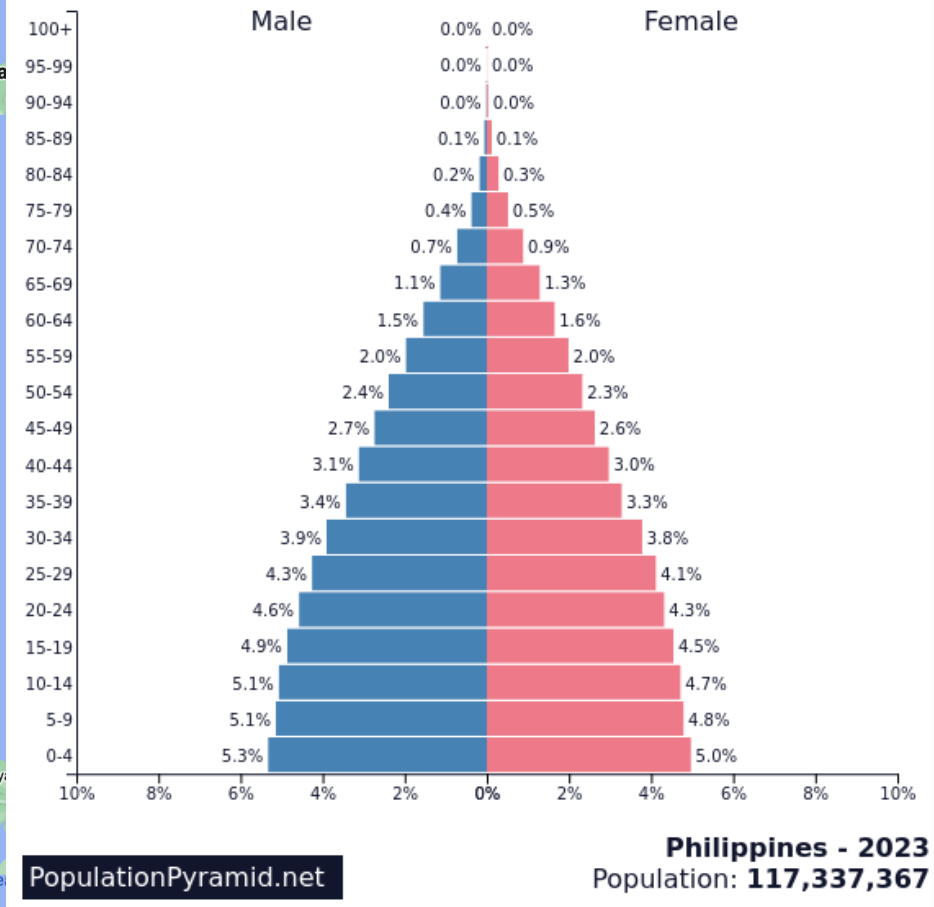
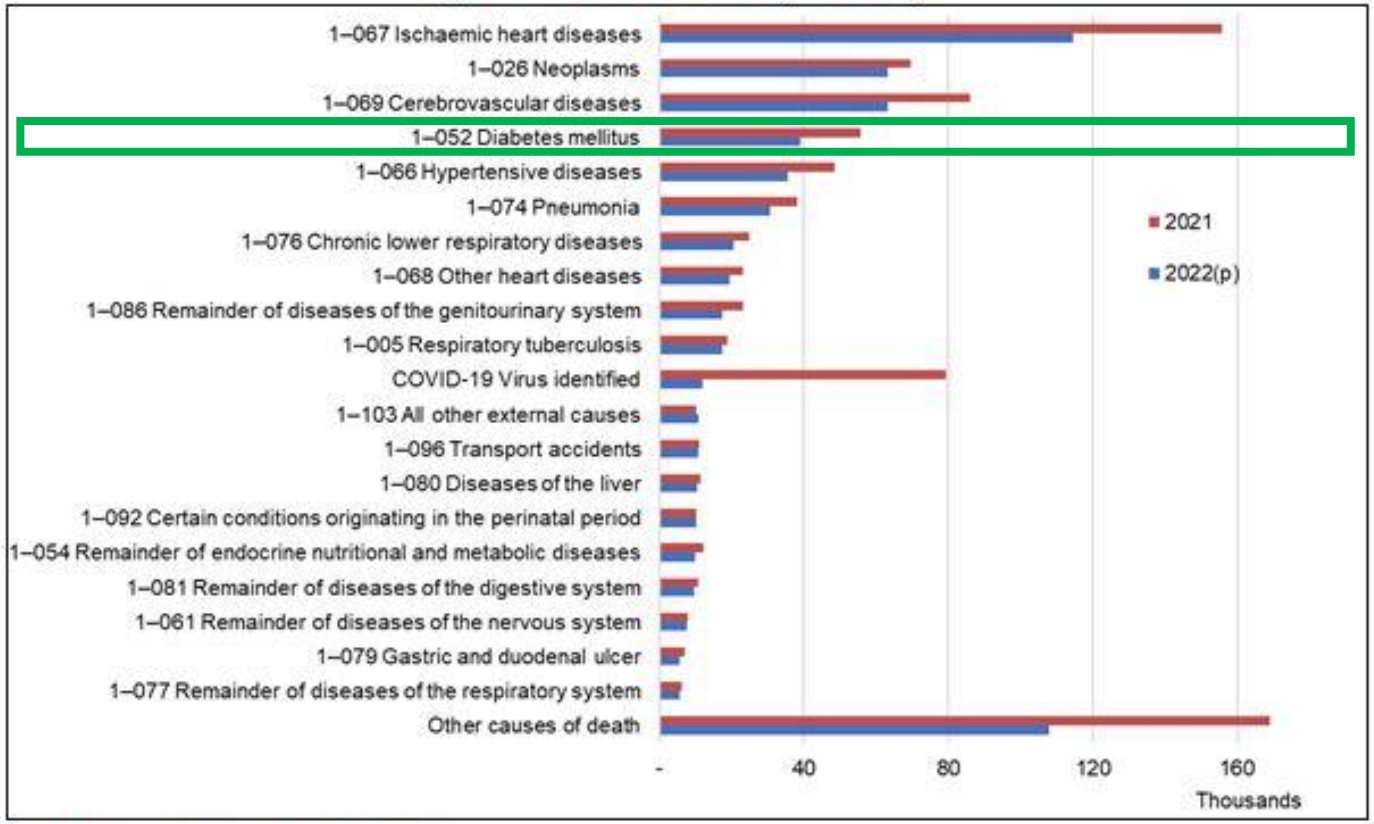


Figure 1. All Causes of Mortality (Top 20), Philippines: January to December, 2021 and 2022(p) (as of 28 February 2023)



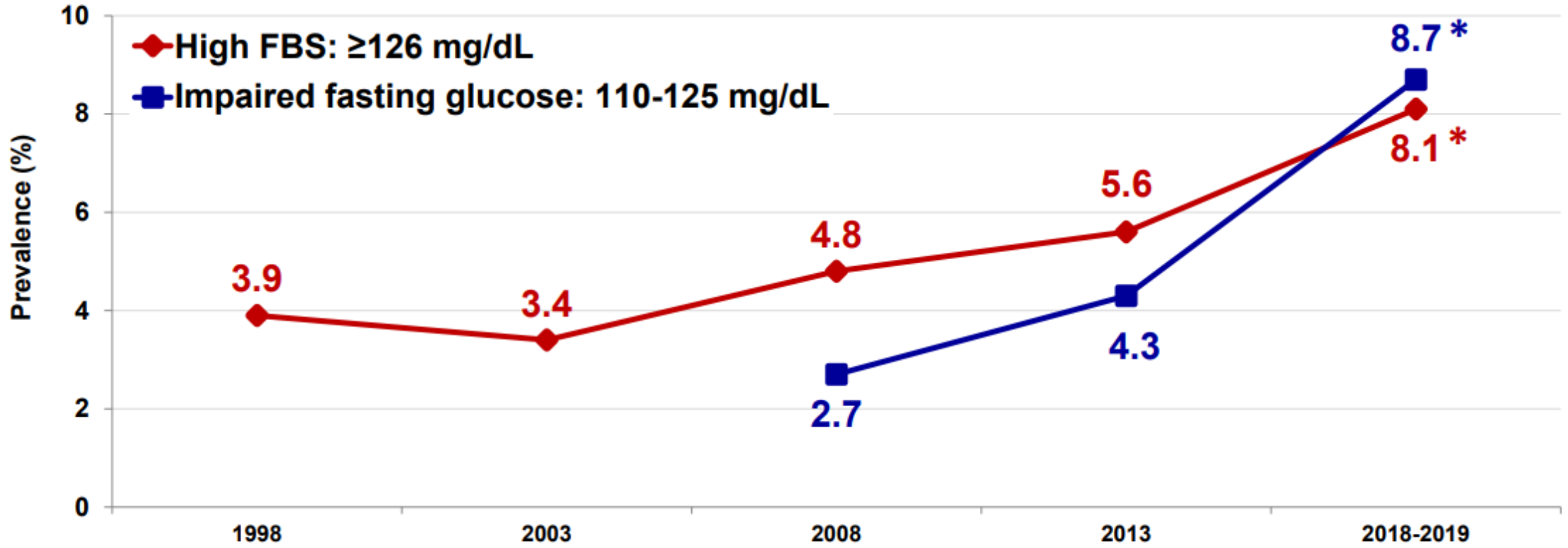
Source: Philippine Statistics Authority

Note: Symptoms, signs, and abnormal clinical and laboratory findings, not elsewhere classified (R00-R99) are not included in the analysis due to the unspecified nature of these causes.

(p) - *Preliminary*

Current Statistics on Mortality 2021, 2022

Trends in the Prevalence of High Fasting Blood Sugar among Adults, 20 years old and above, 1998 to 2018-2019



* *significantly different at 5% level of significance between 2013 and 2018-2019*

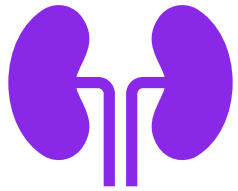
Philippine Data, 2000

- Lantion-Ang, L et al. Diabetes Res Clin Pract. 2000 Oct:50 Suppl 2:S29-34.

Status of complications

	N^a	Proportion of patients (%)
Renal function		
Serum creatinine (>180 mmol/l)	1622	5
Urine microalbumin	359	
Normal (<20 mg/l)		50
Microalbuminuria (20–300 mg/l)		50
Macroalbuminuria (>300 mg/l)		1
Proteinuria (>500 mg/24 h)	1834	14
Eye complications		
Photocoagulation	2571	7
Cataract	2537	26
Retinopathy	2398	18
Advanced eye disease	2454	4
Feet complications		
Foot pulse	2505	0
Healed ulcer	2638	8
Acute ulcer/gangrene	2630	2
Neuropathy	2635	42
Angioplasty	2626	0
Severe late complications		
Legal blindness	2624	4
MI/CABG/angioplasty[b]	2657	3
Cerebral stroke	2660	6
Renal failure	2655	1
Leg amputation	2659	2

[a] *N*, number of patients used in the analysis.
[b] MI/CABG/angioplasty, myocardial infarction/coronary artery bypass graft/angioplasty.



65%

18%

42%

Dyslipidemia, 2000

- Lantion-Ang, L et al. Diabetes Res Clin Pract. 2000 Oct:50 Suppl 2:S29-34.

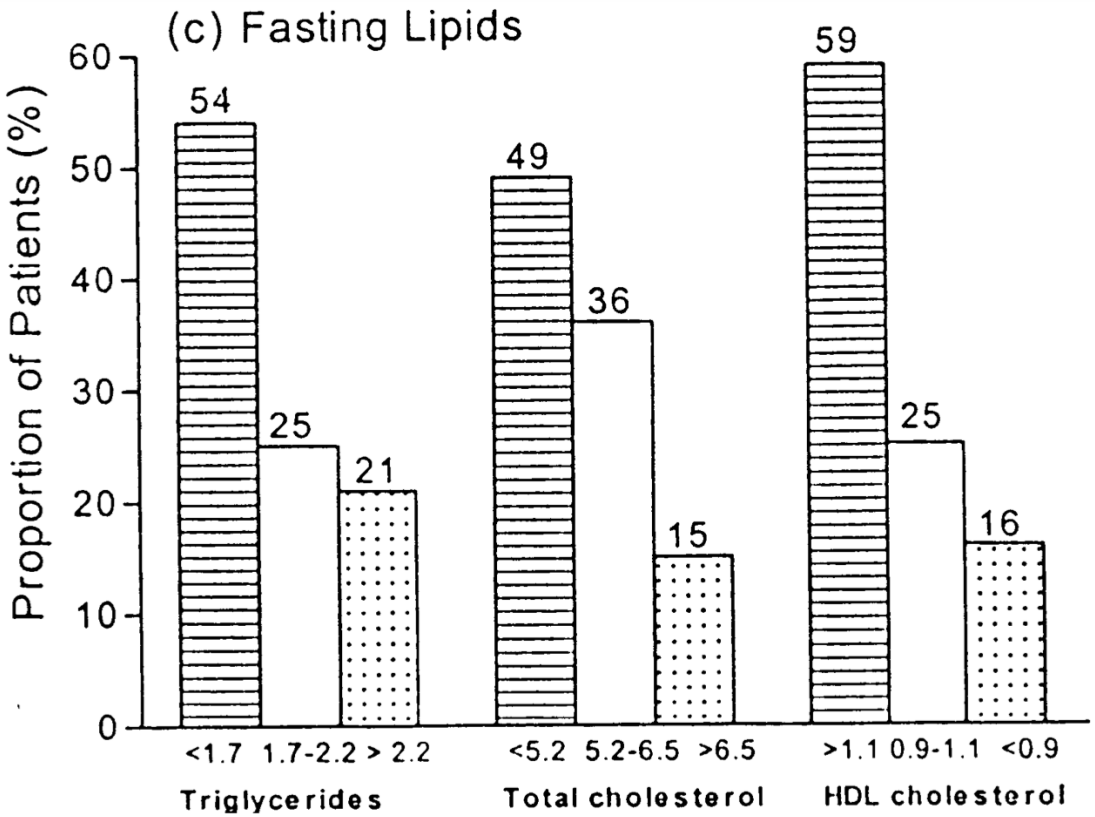
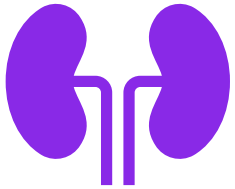


Fig. 1. Biochemical parameters.

Complications and CV Risk Factors of **Newly-diagnosed** Patients in an Urban Population, 2009

Peripheral neuropathy 20%



Proteinuria 42%

Retinopathy 12%

Fojas, M et al. PJIM 2009

Complications and CV Risk Factors of **Newly-diagnosed** Patients in an Urban Population, 2009

- Peripheral Arterial Disease (ABI) 24%
- Hypertension 53%
- BMI (Mean) 25.41 kg/m^2
- WC 127 cm

	Mean (SD)
Total Cholesterol	231.12 (68.45)
HDL-Cholesterol	54.47 (18.41)
LDL-Cholesterol	149.12 (59.46)
Triglycerides	139.37 (67.69)
	n (%)
Total Cholesterol >200 mg/dL	114 (66)
HDL-Cholesterol <40 mg/dL	32 (19)
LDL-Cholesterol >100 mg/dL	138 (80)
Triglycerides >150 mg/dL	**65 (38)**

Fojas, M et al. PJIM 2009

Philippine Renal Disease Registry, 2016

New Dialysis Patients

PRIMARY RENAL DISEASE	HD	PD	TOTAL
Diabetic Nephropathy	**8,786 (42.29)**	**181 (23.85)**	**8,965 (41.63)**
Hypertensive Nephrosclerosis	**6,230 (29.99)**	**229 (30.17)**	**6,461 (30)**
Clinical	5,790	8	5798
Biopsy Proven	442	221	663
Chronic Glomerulonephritis	**3,278 (15.78)**	**263 (34.65)**	**3,541 (16.44)**
Clinical	3,144	254	3398
Biopsy Proven	134	9	143
Focal Segmental Glomerulosclerosis	*13*	*3*	*16*
IgA Nephropathy	*37*	*2*	*39*
Lupus Nephritis	*77*	*3*	*80*
Membranous GN	*1*	-	*1*
Mesangioproliferative Glomerulonephritis	*1*	*1*	*2*
Miminal Change	*1*	-	*1*
Renal Amyloidisis	*1*	-	*1*
Tubulointerstital Nephritis	*1*	-	*1*
Segmental Glomerulosclerosis	*2*	-	*2*
Chronic Pyelonephritis	**462 (2.22)**	**2 (.026)**	**464 (2.15)**
Clinical	370	2	*372*
Biopsy Proven	92		*92*
Autosomal Dominant Polycystic Kidney Disease	**226 (1.09)**	**2 (0.26)**	**228 (1.06)**
Unknown	**369 (1.78)**	**51 (6.72)**	**420 (1.95)**
Others	**1,425 (6.86)**	**31 (4.08)**	**1,456 (6.76)**
Obstructive Uropathy	*649*	*10*	*659*
Uric Acid Nephropathy/ Gouty Nephropathy	*456*	*13*	*469*
Drug Induced Nephropathy	*120*	-	*120*
Chronic Tubulo Interstitial Nephritis	*142*	*3*	*145*
Cardio renal Syndrome	*3*	*1*	*4*
Degenerative Nephropathy	*4*	-	*4*
Chronic Allograft Nephropathy	*7*	-	*7*
Hepatorenal Syndrome	*16*	-	*16*
Ischemic Nephropathy	*9*	-	*9*
Multiple Myeloma	*11*	-	*11*
Radiation Nephropathy	*1*	-	*1*
Renovascular Disease	*1*	-	*1*
Traumatic Kidney Injury	*2*	-	*2*
Congenital Kidney Disease	*4*	*4*	*8*
TOTAL	**20,776**	**759**	**21,535**

Statistics of New HD Patients, Age Distribution, 2016

Table 18. Summary Statistics for New Dialysis Patients Age according to Primary Renal Disease and Mode of Dialysis, 2016

MODE OF DIALYSIS	PRD	n	AGE		
			MEAN (SD)	MEDIAN (IQR)	(Min, Max)
HD	DN	8,786	59.99 (11.21)	60 (67,53)	(16, 98)
	HPN	6,230	57.87 (13.96)	58 (68, 49)	(11, 98)
	CGN	3,278	38.03 (14.79)	35 (46, 27)	(7, 92)
	CPN	462	49.34 (16.59)	50 (63, 36)	(12, 90)
	ADPKD	226	53.62 (15.00)	54 (64, 46)	(10,92)
	OTHERS	1,425	54.46 (20.28)	55 (70, 39)	(7, 98)
	UNKNOWN	369	52.75 (17.40)	54 (66,41)	(8,93)
TOTAL	**ALL**	**20,776**	**55.23 (15.22)**	**57 (66, 46)**	**(7, 98)**
PD	DN	181	57.46 (11.47)	57 (64, 50)	(26, 91)
	HPN	229	54.38 (14.18)	53 (64, 45)	(8, 89)
	CGN	263	29.87 (15.41)	28 (37, 20)	(0, 84)
	CPN	2	41.50 (23.33)	41.5 (50, 33)	(25, 58)
	ADPKD	2	30 (24.04)	30 (39, 22)	(13, 47)
	OTHERS	31	40.77 (19.67)	43 (53, 31)	(0, 73)
	UNK	51	48.31 (22.45)	53 (63, 36)	(2, 92)
TOTAL	**ALL**	**759**	**45.56 (19.20)**	**47 (60, 31)**	**(0, 92)**
OVER-ALL TOTAL		**21,535**	**54.89 (15.48)**	**57 (65, 46)**	**(0, 98)**

PRD, Primary Renal Disease; DN, Diabetic Nephropathy; CGN, Chronic Glomerulonephritis; HPN, Hypertensive Nephrosclerosis; CPN, Chronic Pyelonephritis; ADPKD, Autosomal Dominant Polycystic Kidney Disease; UNK, Unknown;

Table 15. Frequency of New Hemodialysis Patients according to Primary Renal Disease, 2016

REGION	PRIMARY RENAL DISEASE							
	DN	HPN	CGN	CPN	ADPKD	OTH	UNK	TOTAL
NCR	2,076	1,546	665	94	82	276	65	**4,804**
I	452	333	141	23	10	60	25	**1,044**
II	204	270	138	14	12	43	15	**696**
III	1,453	752	526	57	21	190	76	**3,075**
IV-A	1,318	870	501	48	23	215	57	**3,032**
IV-B	79	41	17	1	1	9	4	**152**
V	272	240	151	34	6	58	25	**786**
VI	517	439	228	13	9	126	8	**1,340**
VII	518	394	207	48	13	83	21	**1,284**
VIII	210	122	82	24	5	42	2	**487**
IX	251	108	54	2	1	32	28	**476**
X	362	177	116	22	7	47	5	**736**
XI	525	484	224	33	6	112	19	**1,403**
XII	224	230	108	16	21	84	13	**696**
XIII	101	27	47	8	4	17	-	**204**
ARMM	7	3	8	-	-	-	-	**18**
CAR	215	196	65	25	4	32	6	**543**
TOTAL	**8,784**	**6,232**	**3,278**	**462**	**225**	**1,426**	**369**	**20,776**

CGN, Chronic glomerulonephritis; CPN, Chronic pyelonephritis; HPN, Hypertensive Nephrosclerosis; DN, Diabetic Nephropathy; ADPKD, Autosomal Dominant Polycystic Kidney Disease; OTH, Others and UNK, Unknown

Dialysis Care and Dialysis Funding in Asia

- Tang, SC et al. 10.1053/j.ajkd.2019.08.005

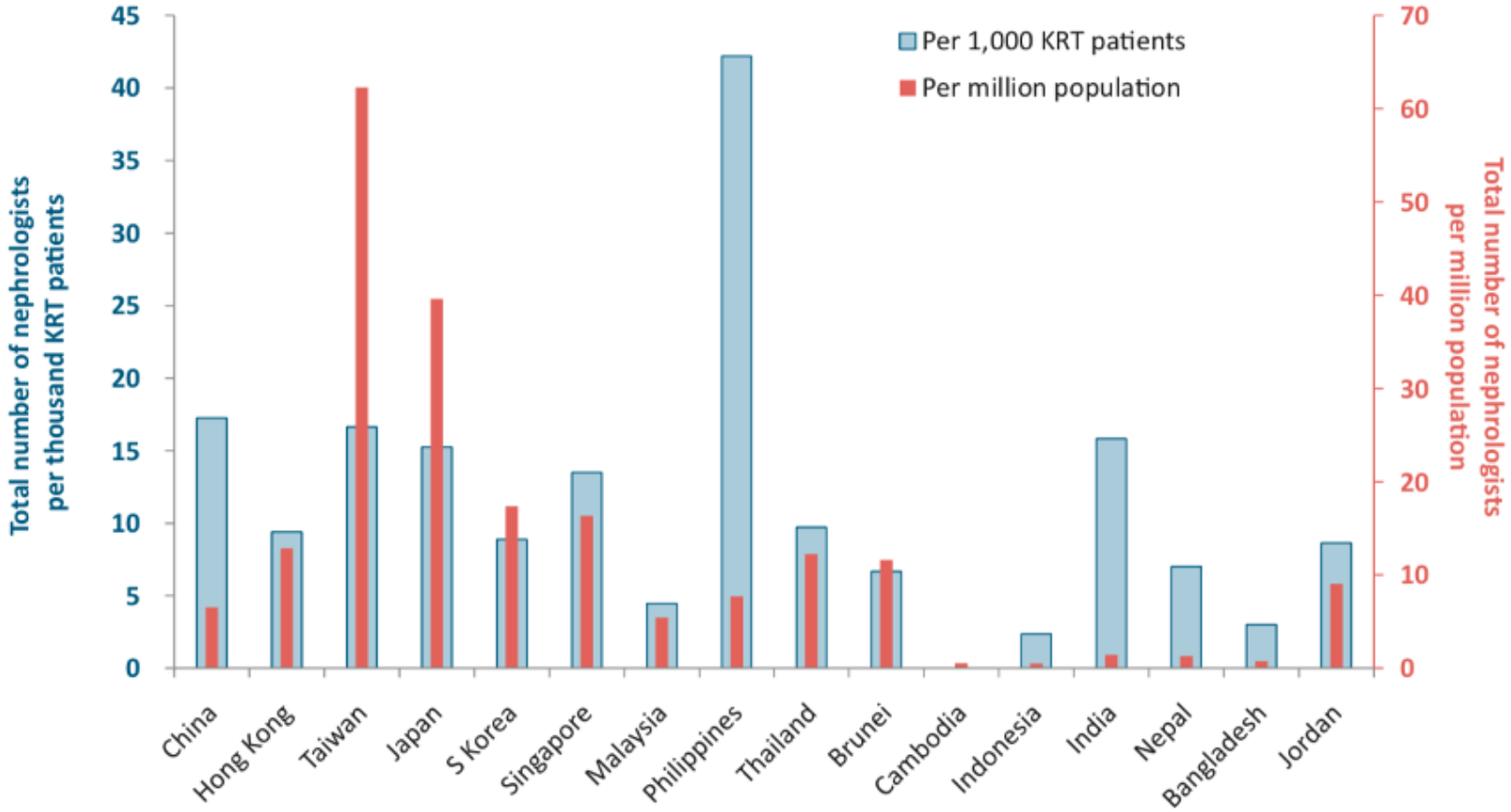
Table 1. Incidence and Prevalence of CKD and KRT in Relation to Population Size and National Income

Region	Population (million)	GDP (billion)	Estimated CKD Prevalence	KRT		Leading Cause of Kidney Failure
				Incidence (pmp)	Prevalence (pmp)	
East Asia						
China (Mainland)	1,395	$13,608	10.8%	NA	NA	GN
China (Hong Kong)	7.4	$341	NA	164	1,388	DM
Taiwan	23	$579	11.9%	493	3,392	DM
Japan	127	$4,872	13.0%	310	2,599	DM
South Korea	51	$1,415	10%	310	1,816	DM
Southeast Asia						
Singapore	5.6	$310	NA	332	1,596	DM
Malaysia	32	$297	9.1%	251	1,345	DM
Philippines	105	$314	NA	164	607	DM
Thailand	68	$455	17.6%[28]	338	1,307[31]	DM[31]
Brunei	0.4	$12	NA	387	1,814	DM
Cambodia	15	$23	NA	NA	40	Uncertain
Indonesia	265	$1,015	12.5%	161[a]	452[a]	HTN
South Asia						
India	1,340	$1,939	7%-9%	226	134	DM
Nepal	26[b]	$25	10.6%[29]	NA	1,500	DM
Bangladesh	167	$249	16%-18%	210-250	NA	GN
Central Asia						
Mongolia	3.2	$12	18%[30]	80-120[c]	390	GN
Western Asia (Middle East)						
Jordan	9.7	$40	5.5%	30	530	DM

Note: Values are according to the latest available data. Currency values expressed in US dollars.
Abbreviations: CKD, chronic kidney disease; DM, diabetes mellitus; GDP, gross domestic product; GN, glomerulonephritis; HTN, hypertension; KRT, kidney replacement therapy; NA, not available; pmp, per million population.
[a]Indonesia Renal Registry 2017.
[b]This number is from the Central Bureau of Statistics, 2015, based on a national census in 2011. According to other sources, the population was 29.3 million in 2017.
[c]Estimate.

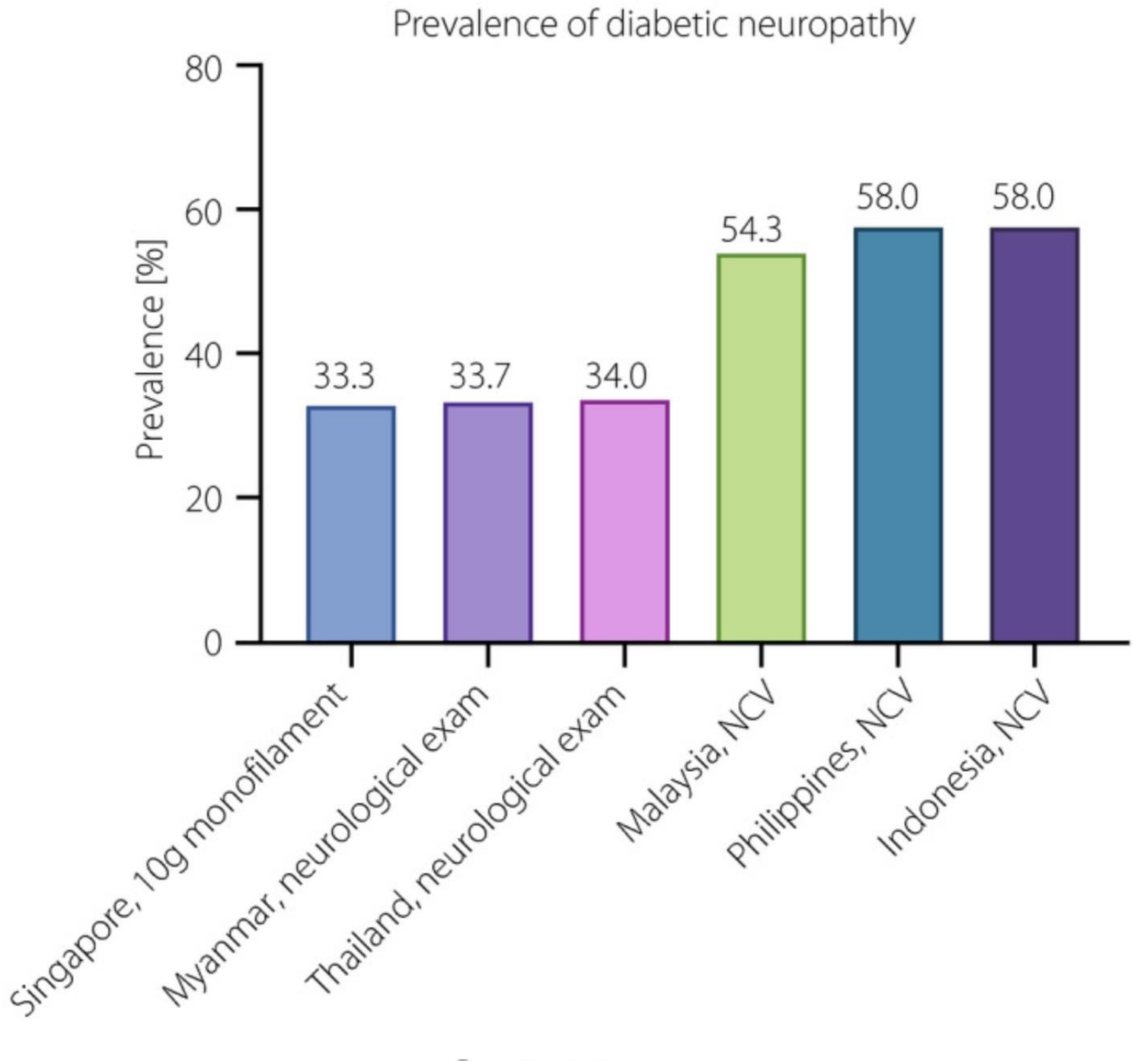
Nephrologists and KRT patients

- Tang, SC et al. 10.1053/j.ajkd.2019.08.005



Peripheral Neuropathy

Malik RA, et al. J Diabetes Investig. 2020 Sep; 11(5): 1097–1103.



Diabetic Retinopathy

Fajardo-Gomez F et al.
Phil J of Ophthalmology
2005; 30(4):178-80

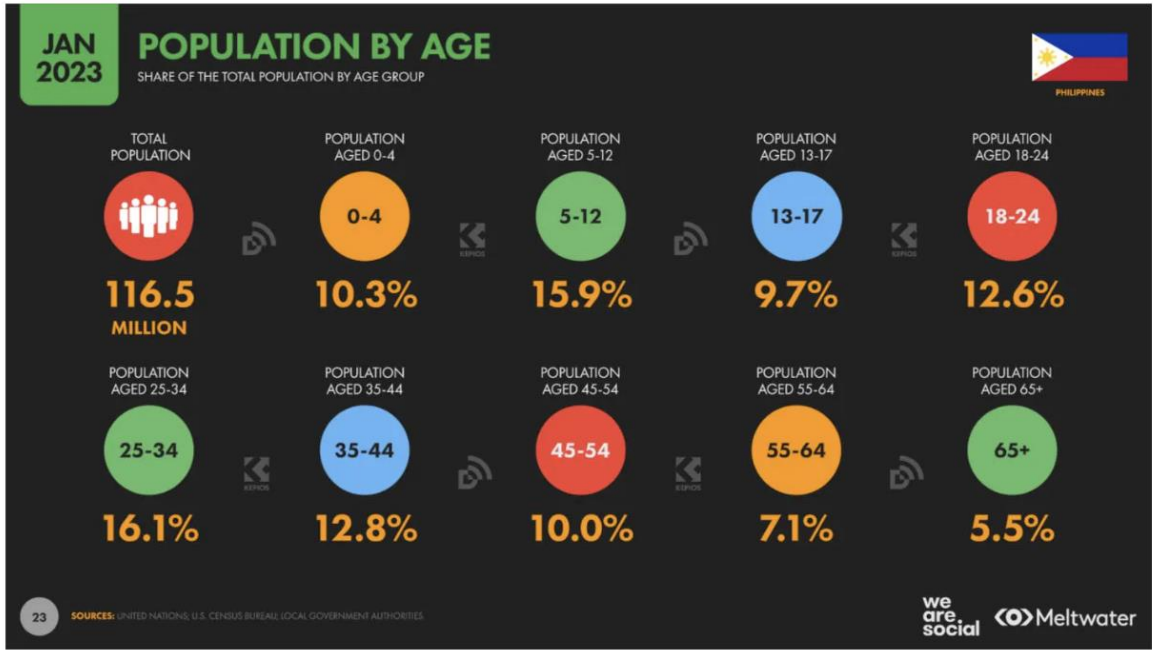
Diabetic-Retinopathy Grading	Clinical Examination (n = 241)	Stereo Fundus Photography and Fluorescein Angiography (n = 147)
No retinopathy	(85) 35.2	(22) 15.0
With retinopathy	(149) 61.8	(123) 83.6
NPDR[1] mild	(4) 16.4	(28) 18.6
NPDR moderate	(72) 29.9	(59) 40.3
NPDR severe	(21) 8.9	(7) 4.7
PDR[2] early	(1) 0.6	(16) 11.0
PDR high risk	(15) 6.1	(13) 8.6
Indeterminate	(7) 2.9	(2) 1.4

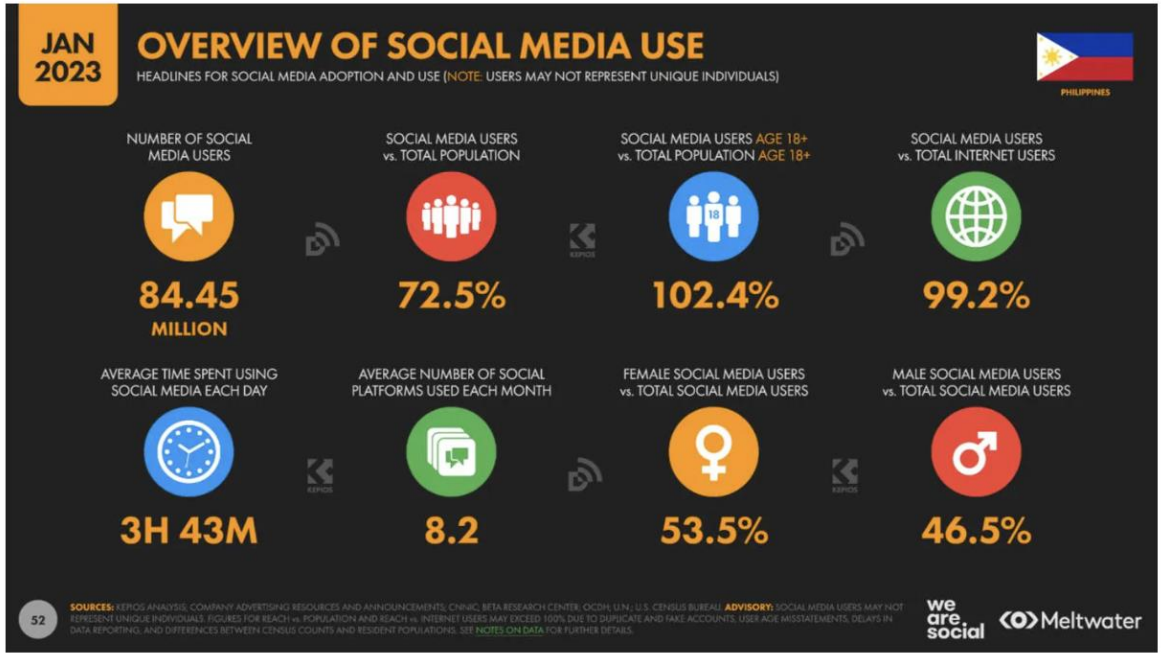
1. Nonproliferative diabetic retinopathy
2. Proliferative diabetic retinopathy

How are we addressing these problems?

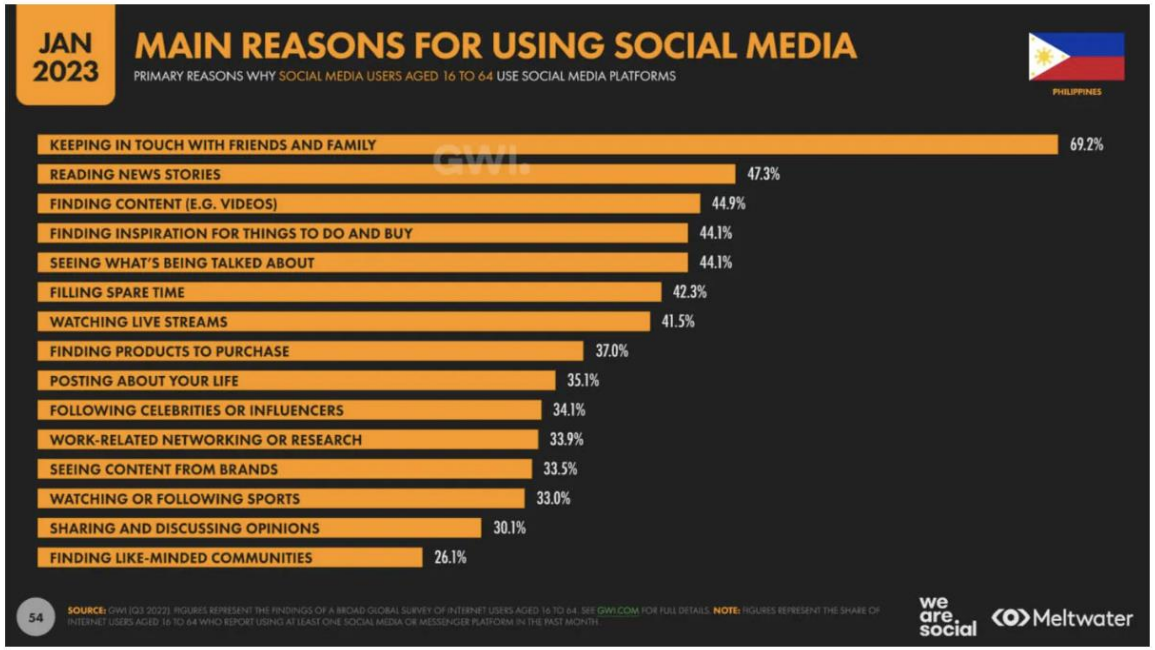
- Department of Health:
  - Diabetes Awareness Week - every fourth week of July by virtue of Proclamation No. 213 signed on July 23, 1993, by former President Fidel Ramos.
  - November 14 – World Diabetes Day
- Philippine College of Endocrinology Diabetes and Metabolism:
  - Lay fora for Luzon Visayas and Mindanao
  - Teaching Primary healthcare providers, Community Health Workers

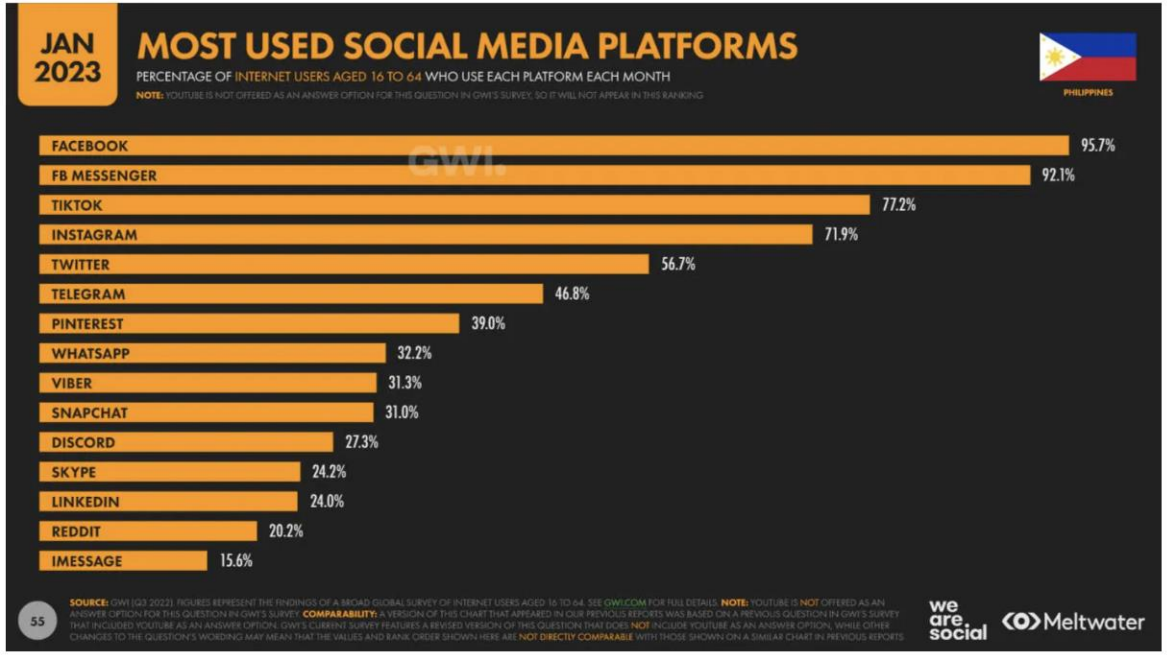
Social Media





Social Media





PEnS Project