



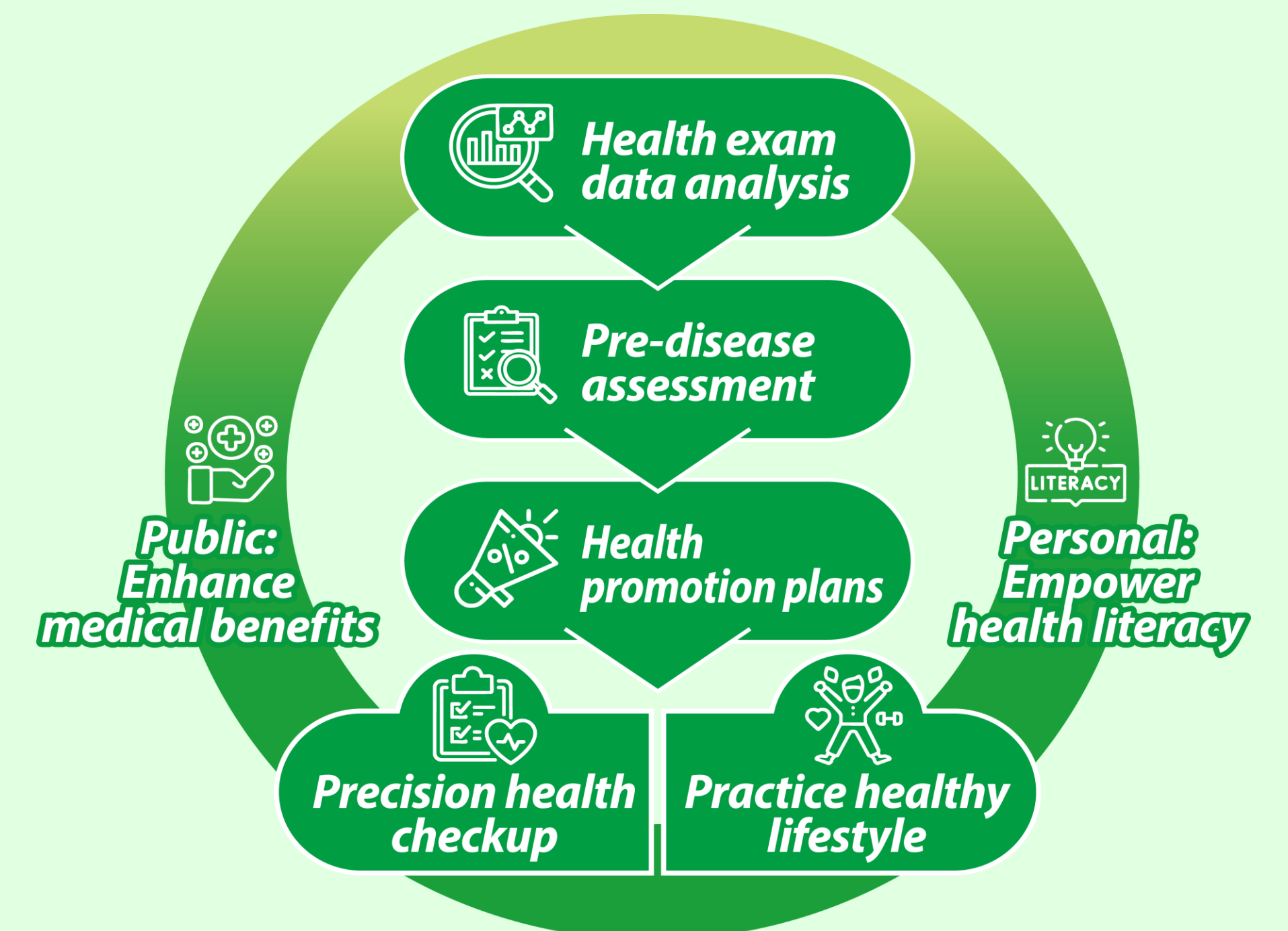
Data-Driven Precision Health for Early-Onset Colorectal Cancer Prevention: An Analysis of Health Examination Data in Adults under Aged 50

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Background

In Taiwan, the free fecal occult blood testing (iFOBT) programs will be offered to aged 45-74 and those aged 40–45 with a family history of Colorectal Cancer (CRC), based on positive iFOBT results, individual will allow colonoscopes to facilitate early prevention and control of early-onset colorectal cancer (EOCRC). Respond the policy of CRC, we analyzed health examination data (HED) to explore the association between metabolic risk factors and colorectal adenomas, the objective is to provide actionable health information to enhance individual health literacy and early motivate health promoting behaviors.



Methods

We enrolled 38,378 adults aged <50 (54.0% males; 46.0% females; average age 37.9 years) (Table 1) who received colonoscopy from a HED cohort in Taiwan between 2021 and 2023. For individual, we referral recommendations, screening frequency guidelines, health consultations, and dietary planning services based on personalized reports. The HED analysis results were disseminated through social media to empower the public to understand the importance of colonoscopy screening and healthy lifestyles.

Table 1. Colonoscopy Cases by Age Group, Sex and MetS

Age (years)	18-29	30-39	40-49	Total
Case number	4,296	17,343	16,739	38,378
Male	2,120	9,164	9,444	20,728
Female	2,176	8,179	7,295	17,650
Adenoma polyp (n)	145	1,196	2,079	3,420
Male (%)	94 (64.8)	734 (61.4)	1,435 (69.0)	2,263 (66.2)
Female (%)	51 (35.2)	462 (38.6)	644 (31.0)	1,157 (33.8)
MetS (%)	13 (9.0)	170 (14.2)	450 (21.6)	633 (18.5)
Non-MetS (%)	132 (91.0)	1,026 (85.8)	1,629 (78.4)	2,787 (81.5)

Results

Overall, 13.0% had hyperplastic polyps, 8.9% (n=3,420) were colorectal adenoma polyps (males 15.6% vs. females 10.0%) (Figure 1). Metabolic Syndrome (MetS) was strongly associated with colorectal adenomas (14.0% vs. 8.2% in non-MetS; OR=2.009, P<0.0001), (Figure 2) and behavioral risk-tobacco use (OR=1.358). Respectively, key risk factor in males aged 30-39 (n=9,164) were high triglycerides (OR=1.659); and females aged 40-49 (n=7,295) were low HDL-C (OR=1.431) (Table 2). Metabolic risk factors are strong associated with colorectal adenomas, therefore, early colonoscopy planning and practicing healthy lifestyle to reduce the progression of EOCRC are important way.

Figure 1. Findings of Colonoscopy cases

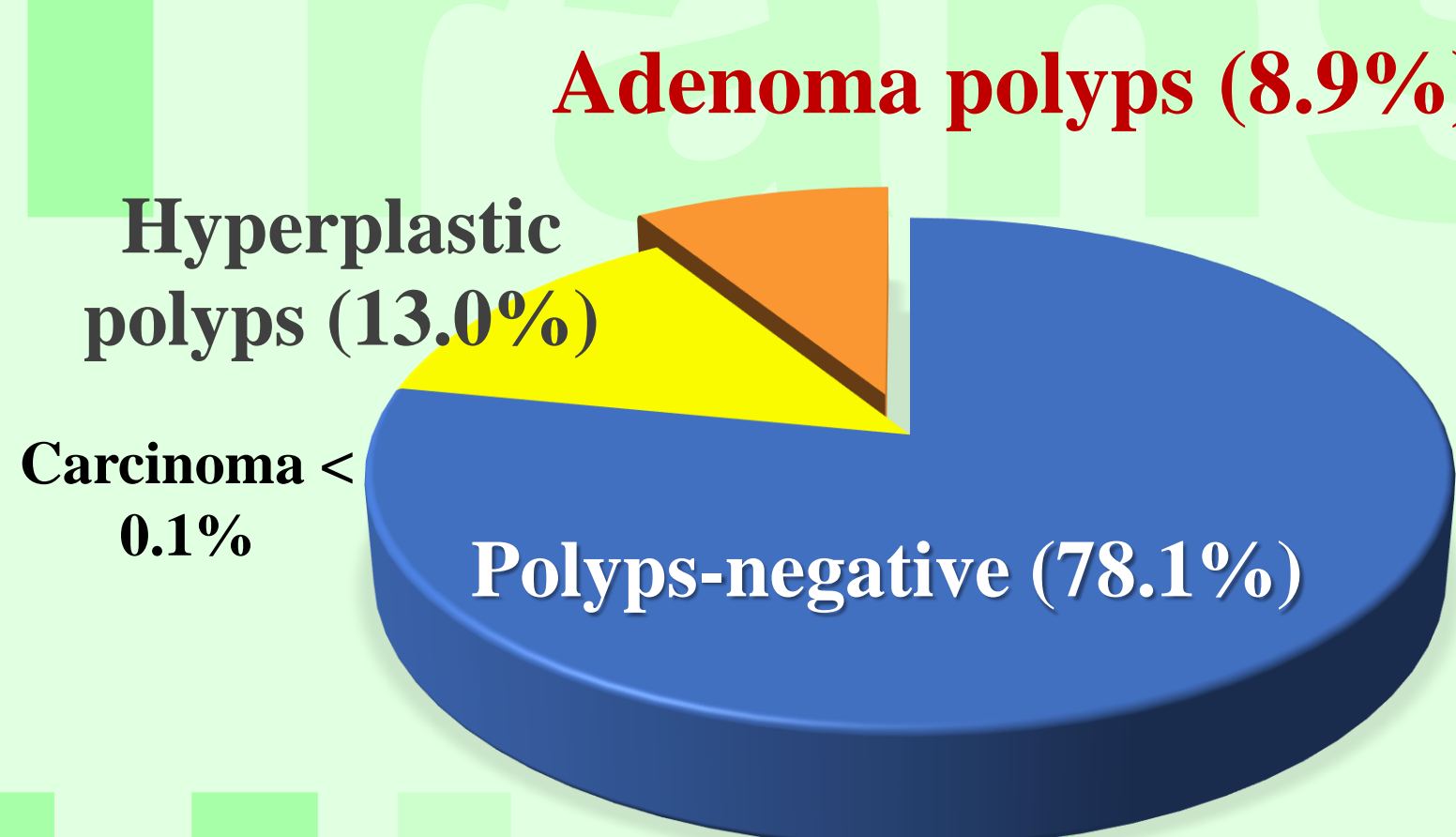


Figure 2. Colorectal Adenoma by Sex, Age and MetS

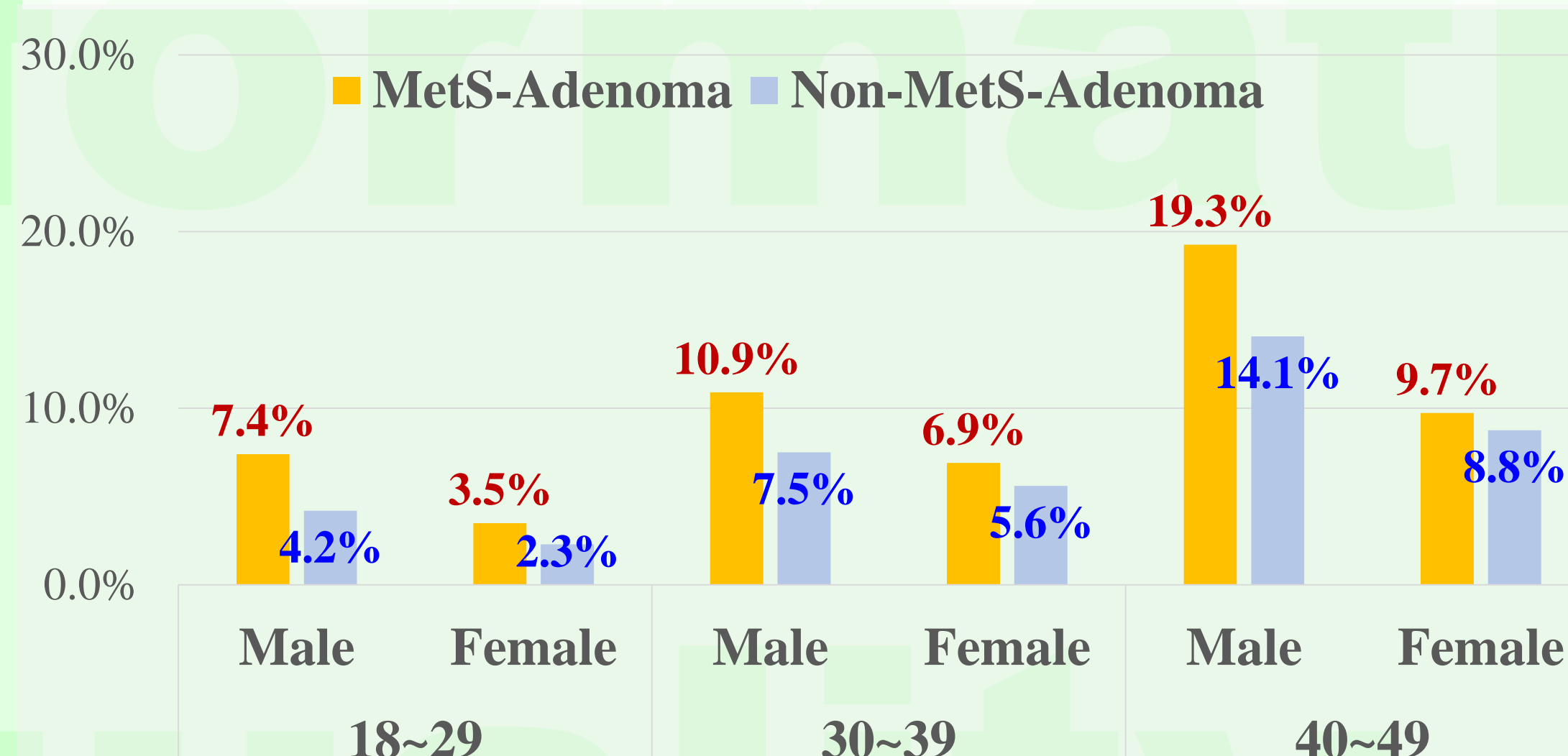


Table 2. Risk of Colorectal Adenomas in Subhealth Populations Aged < 50

Risk factors	OR
Metabolic syndrome	2.009
Tobacco use	1.358
High triglycerides (in males aged 30-39)	1.659
Low HDL-C (in females aged 40-49)	1.431

Conclusions

The analysis of HED provides important information for early intervention in sub-healthy populations. Future research will focus on reducing the risk factor associated with MetS and colorectal adenoma in different population group, while developing actionable health plans to lessen the impact of EOCRC on individuals and society.

