

## Supplemental Figure content

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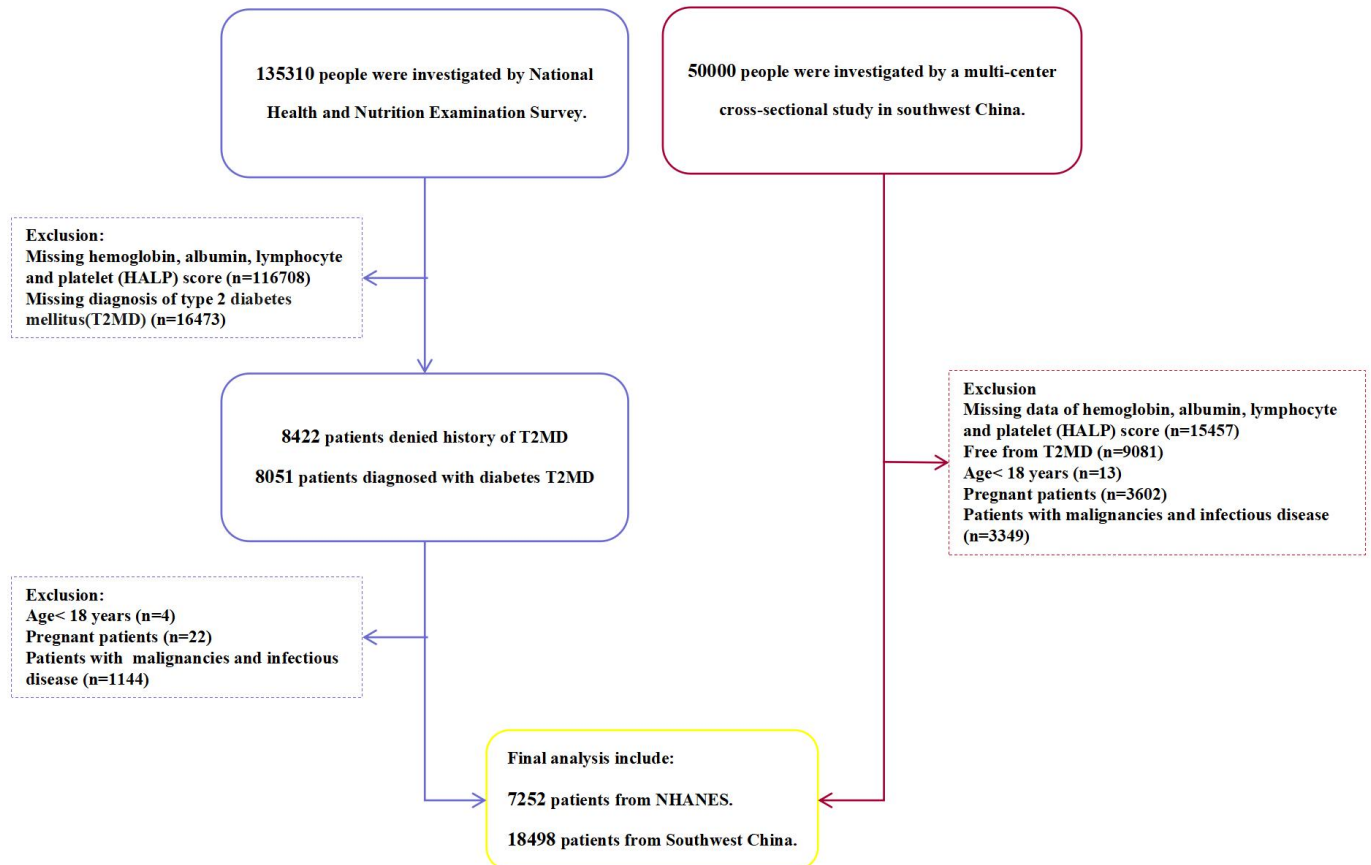
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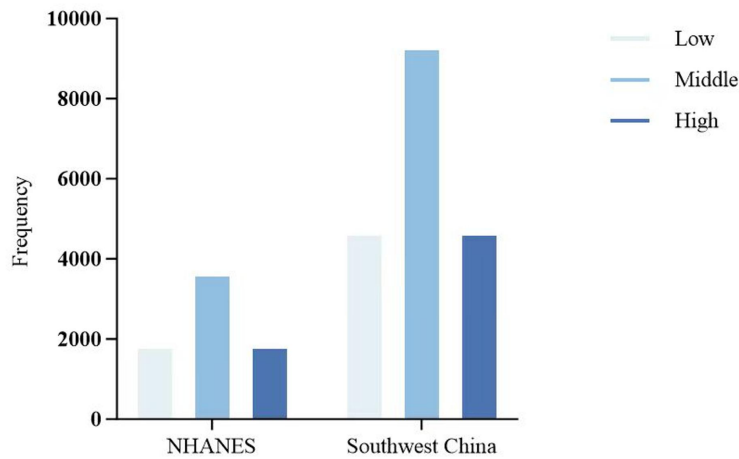
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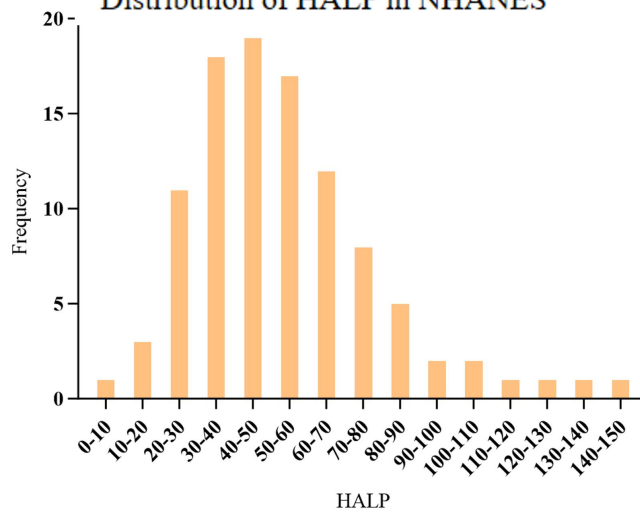


**Supplementary Fig. 1**—Flowchart of the current study.

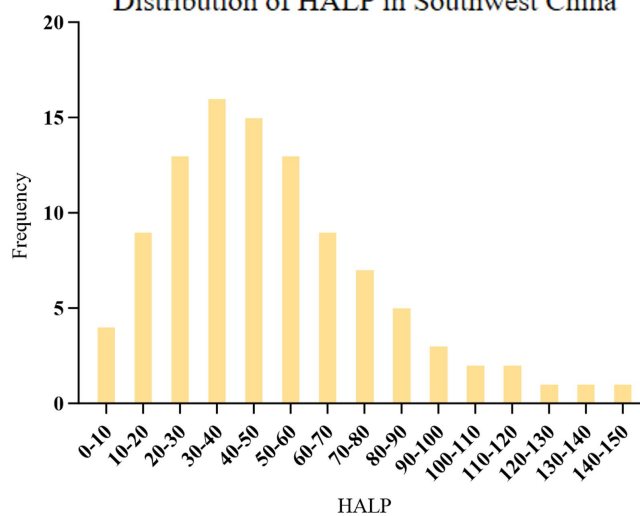
**A.** Distribution of HALP in NHANES and Southwest China



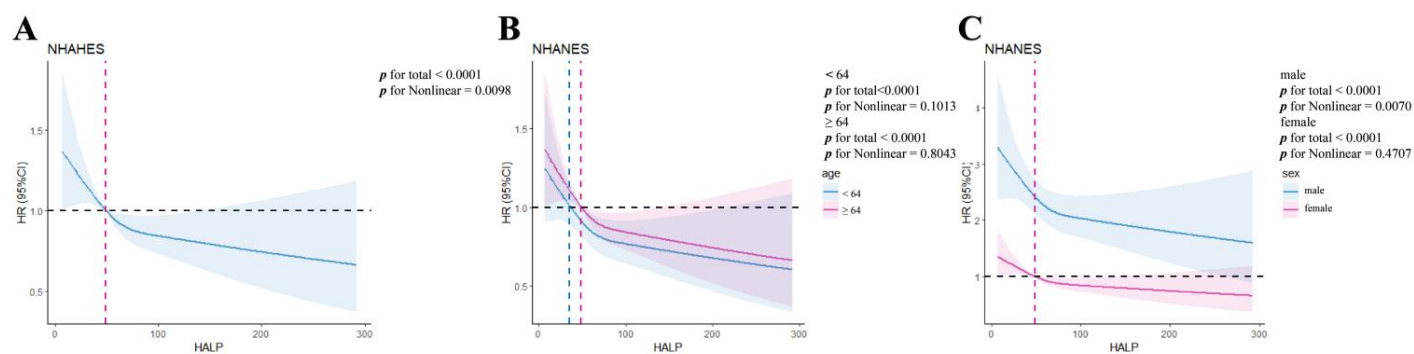
**B.** Distribution of HALP in NHANES



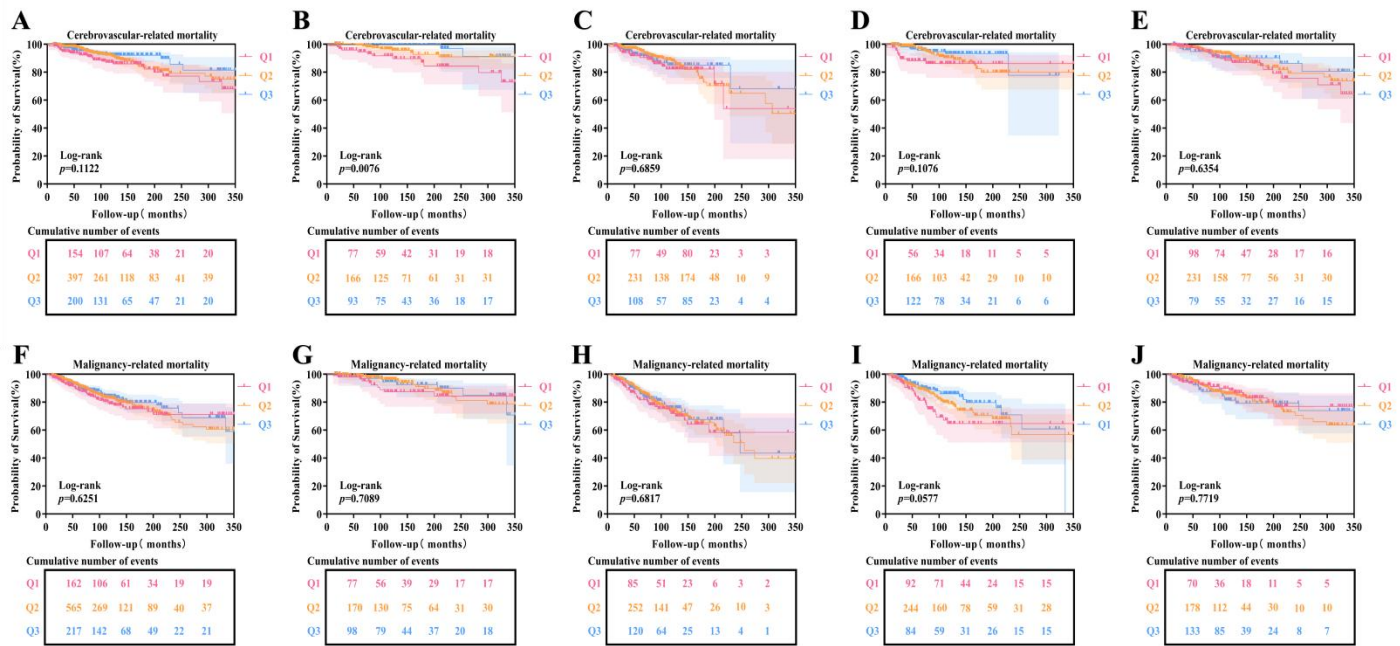
**C.** Distribution of HALP in Southwest China



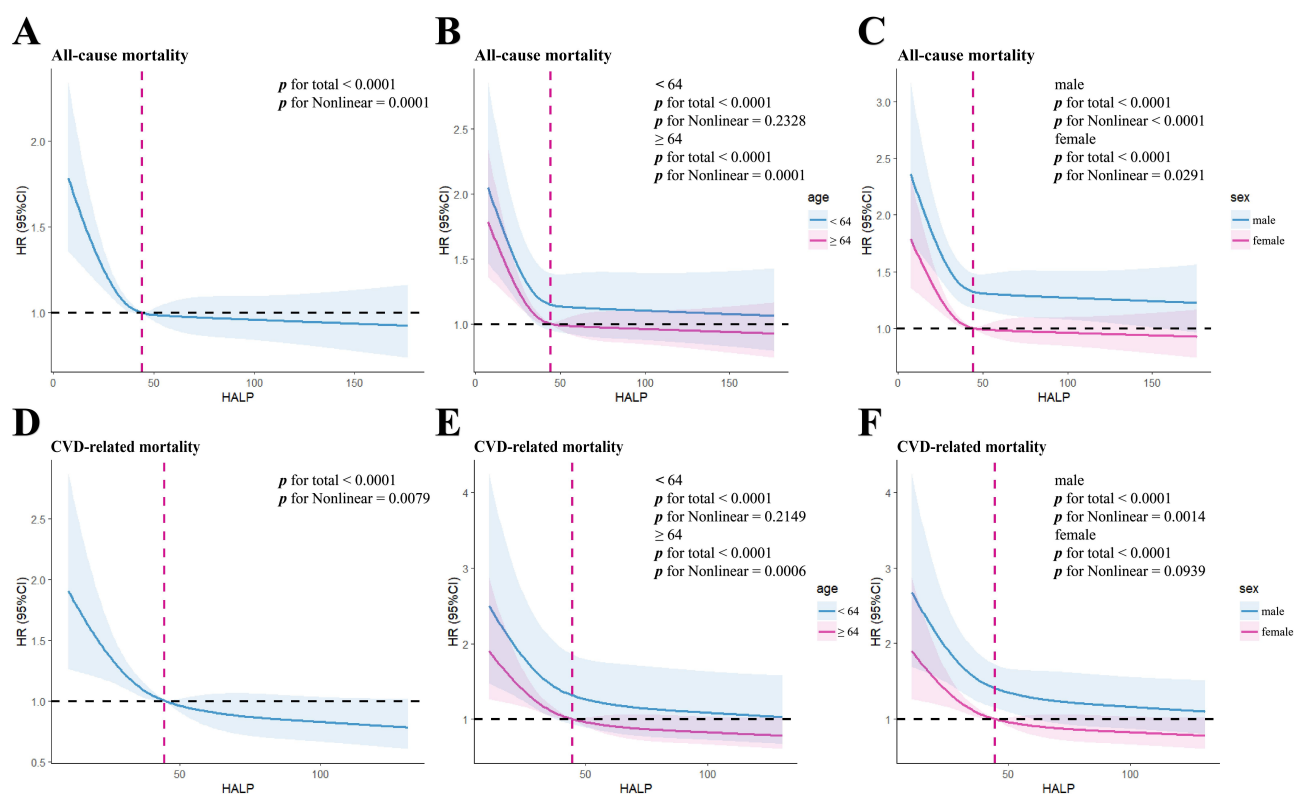
**Supplementary Fig. 2**—Histograms show the population distribution of HALP score. **(A)** Frequency distribution of HALP score stratification in two cohorts. **(B)** Frequency distribution of HALP score at baseline in NHANES. **(C)** Frequency distribution of HALP score at baseline in Southwest China. Abbreviations: NHANES, the National Health and Nutrition Examination Survey; Southwest China, the multi-center cross-sectional study in southwest china.



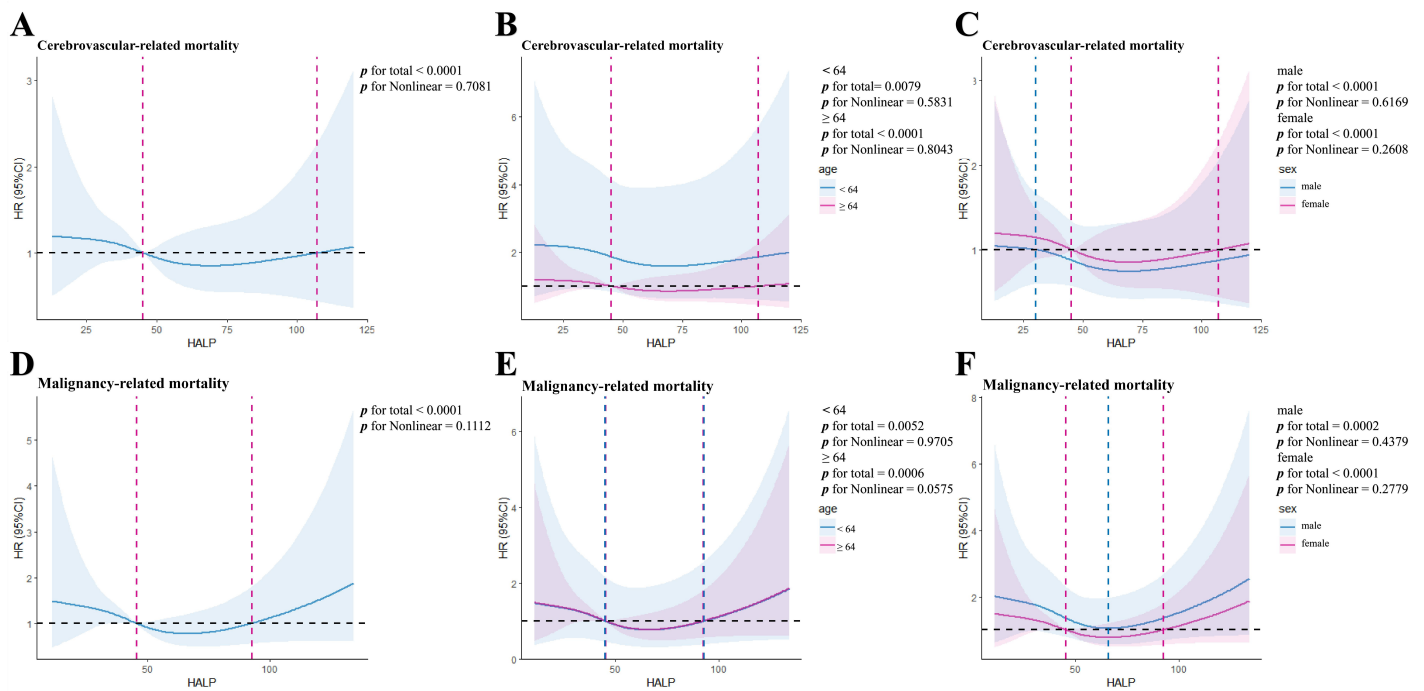
**Supplementary Fig. 3**—Restricted spline curves for the associations between HALP score and the risk of impaired kidney function in T2DM in NHANES. Lines represent the HR (hazard ratio), and transparent areas represent the 95% confidence intervals. HR (95% CI) were adjusted for various adverse events in Cox analysis using Model 3. **(A)** Restricted spline curves for the associations between HALP score and the risk of impaired kidney function; **(B)** Restricted spline curves for the associations between HALP score and the risk of impaired kidney function categorized by age; **(C)** Restricted spline curves for the associations between HALP score and the risk of impaired kidney function categorized by sex.



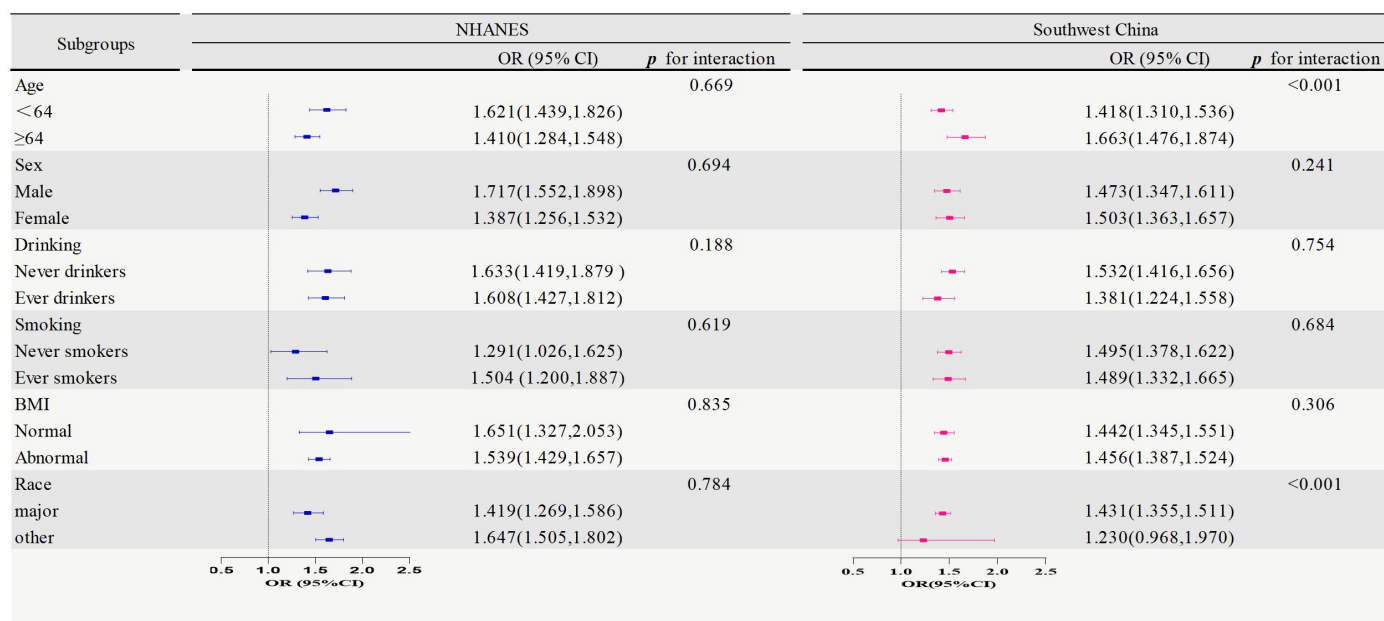
**Supplementary Fig. 4**—Kaplan-Meier curves of the risk of death caused by cerebrovascular-related mortality and malignant neoplasms based on HALP score. Patients were divided into three categories: Q1 ( $\text{HALP} \leq 32.12$ ), Q2 ( $32.12 < \text{HALP} \leq 60.43$ ), and Q3 ( $\text{HALP} > 60.43$ ). **(A)** Kaplan-Meier curves of the risk of death caused by cerebrovascular-related mortality; **(B)** Kaplan-Meier curves of the risk of death caused by cerebrovascular-related mortality in patients under 64 years of age; **(C)** Kaplan-Meier curves of the risk of death caused by cerebrovascular-related mortality in patients over 64 years of age; **(D)** Kaplan-Meier curves of the risk of death caused by cerebrovascular-related mortality in male patients; **(E)** Kaplan-Meier curves of the risk of death caused by cerebrovascular-related mortality in female patients; **(F)** Kaplan-Meier curves of the risk of death caused by malignant neoplasms; **(G)** Kaplan-Meier curves of the risk of death caused by malignant neoplasms in patients under 64 years of age; **(H)** Kaplan-Meier curves of the risk of death caused by malignant neoplasms in patients over 64 years of age; **(I)** Kaplan-Meier curves of the risk of death caused by malignant neoplasms in male patients; **(J)** Kaplan-Meier curves of the risk of death caused by malignant neoplasms in female patients.



**Supplementary Fig. 5**—Restricted spline curves for the associations between HALP score and Risk of all-cause and CVD-related mortality in diabetic kidney disease. Lines represent the HR (hazard ratio), and transparent areas represent the 95% confidence intervals. HR (95% CI) were adjusted for various adverse events in Cox analysis using Model 3. **(A)** Restricted spline curves for the associations between HALP score and all-cause mortality; **(B)** Restricted spline curves for the associations between HALP score and all-cause mortality categorized by age; **(C)** Restricted spline curves for the associations between HALP score and all-cause mortality categorized by sex; **(D)** Restricted spline curves for the associations between HALP score and CVD-related mortality; **(E)** Restricted spline curves for the associations between HALP score and CVD-related mortality categorized by age; **(F)** Restricted spline curves for the associations between HALP score and CVD-related mortality categorized by sex.

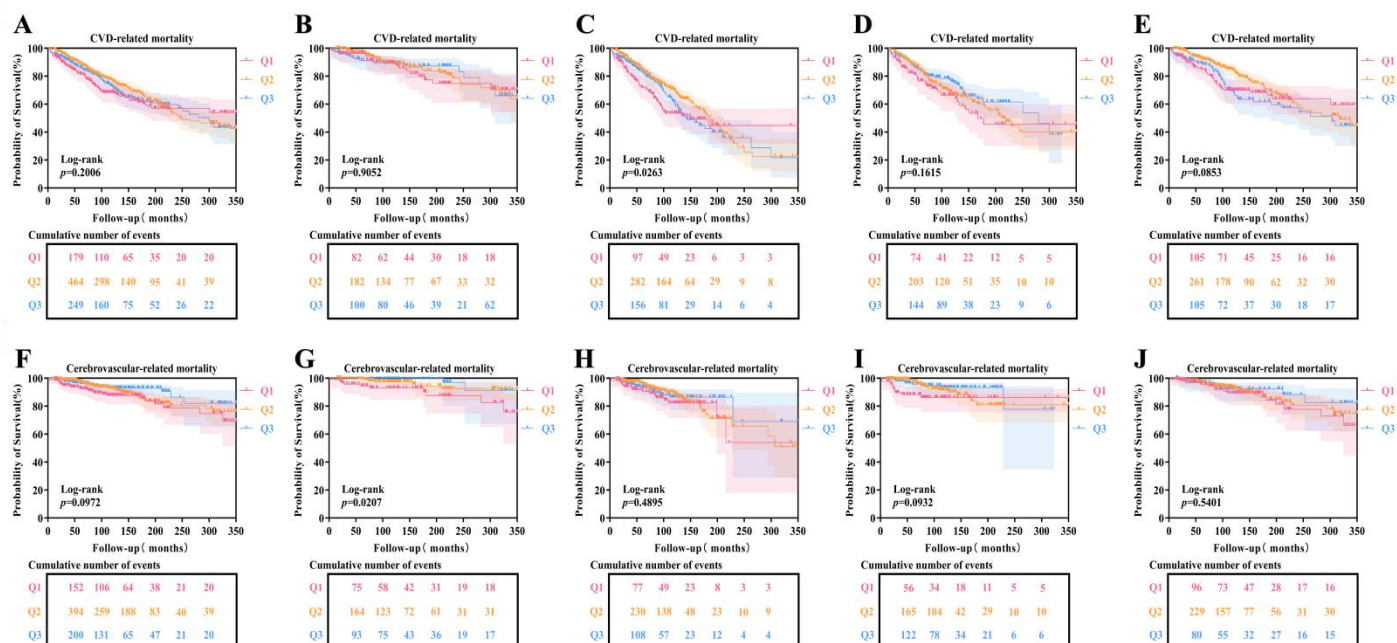


**Supplementary Fig. 6**—Restricted spline curves for the associations between HALP score and Risk of cerebrovascular-related and malignancy-related mortality in diabetic kidney disease patients. Lines represent the HR (hazard ratio), and transparent areas represent the 95% confidence intervals. HR (95% CI) were adjusted for various adverse events in Cox analysis using Model 3. **(A)** Restricted spline curves for the associations between HALP score and death of cerebrovascular-related mortality; **(B)** Restricted spline curves for the associations between HALP score and death of cerebrovascular-related mortality categorized by age; **(C)** Restricted spline curves for the associations between HALP score and death of cerebrovascular-related mortality categorized by sex; **(D)** Restricted spline curves for the associations between HALP score and malignancy-related mortality; **(E)** Restricted spline curves for the associations between HALP score and malignancy-related mortality categorized by age; **(F)** Restricted spline curves for the associations between HALP score and malignancy-related mortality categorized by sex.



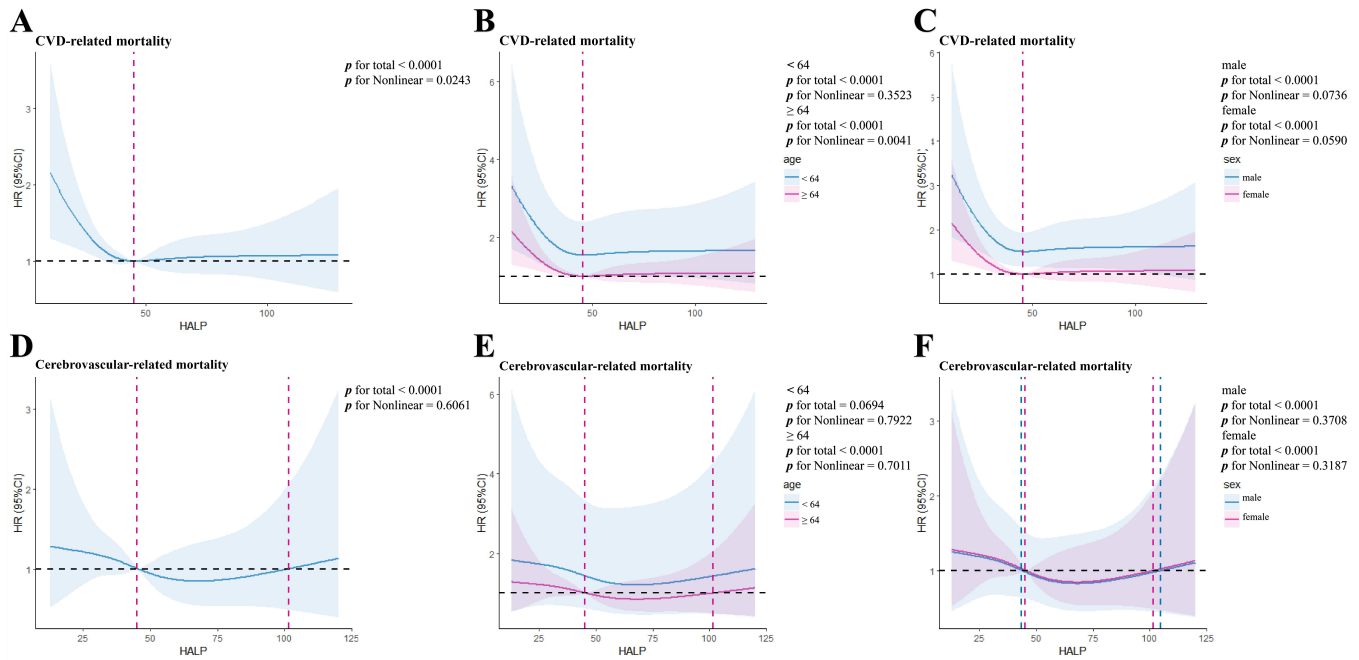
**Supplementary Fig. 7**—Subgroup analysis of association of HALP score with impaired kidney function in patients with type 2 diabetes mellitus. NHANES, National Health and Nutrition Examination Survey; Southwest China, A multi-center cross-sectional study in Southwest China; BMI, Body mass index; the major race in NHANES is non-Hispanic White people, other races include Mexican American people, other Hispanic people, non-Hispanic Black people and multi-racial people; the major race in Southwest China is the Han ethnic group, other races include the Tujia ethnic group, the Miao ethnic group, the Hui ethnic group and other ethnic minorities.



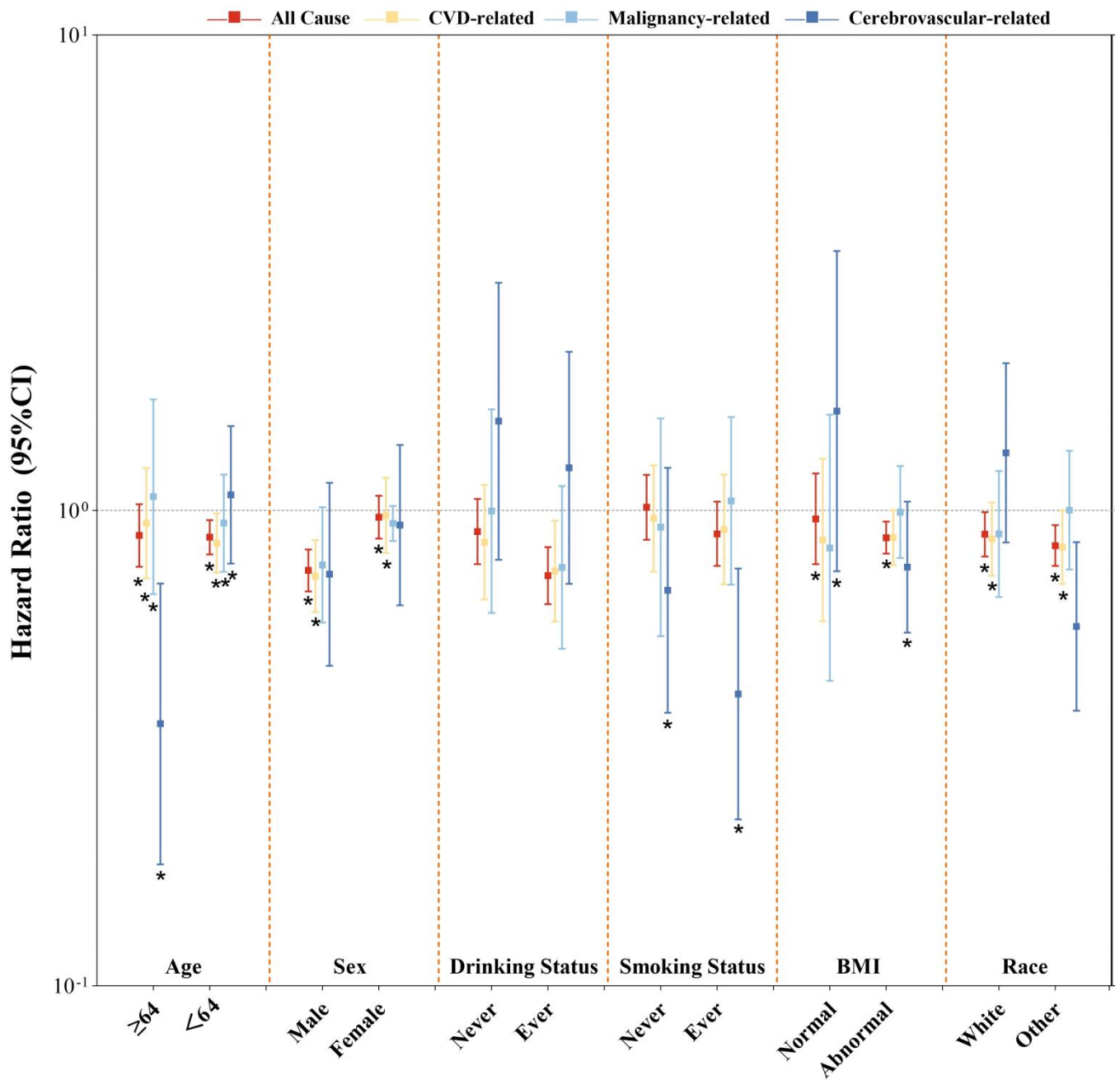


**Supplementary Fig. 8**—Kaplan-Meier curves of CVD-related mortality and the risk of death caused by cerebrovascular-related mortality based on HALP score after excluding participants with two items of CVD-related mortality and cerebrovascular-related mortality in baseline. Patients were divided into three categories: Q1 ( $\text{HALP} \leq 32.12$ ), Q2 ( $32.12 < \text{HALP} \leq 60.43$ ), and Q3 ( $\text{HALP} > 60.43$ ). (A) Kaplan-Meier curves of CVD-related mortality; (B) Kaplan-Meier curves of CVD-related mortality in patients under 64 years of age ; (C) Kaplan-Meier curves of CVD-related mortality in patients over 64 years of age; (D) Kaplan-Meier curves of CVD-related mortality in male patients; (E) Kaplan-Meier curves of CVD-related mortality in female patients; (F) Kaplan-Meier curves of the risk of death caused by cerebrovascular-related mortality; (G) Kaplan-Meier curves of the risk of death caused by cerebrovascular-related mortality in patients under 64 years of age; (H) Kaplan-Meier curves of the risk of death caused by cerebrovascular-related mortality in patients over 64 years of age; (I) Kaplan-Meier curves of the risk of death caused by cerebrovascular-related mortality in male patients; (J) Kaplan-Meier curves of the risk of death caused by cerebrovascular-related mortality in female patients.





**Supplementary Fig. 9**—Restricted spline curves for the associations between HALP score , CVD-related mortality and the risk of death caused by cerebrovascular-related mortality in DKD after excluding participants with two items of heart diseases and cerebrovascular-related mortality in baseline. Lines represent the HR (hazard ratio), and transparent areas represent the 95% confidence intervals. HR (95% CI) were adjusted for various adverse events in Cox analysis using Model 3. **(A)** Restricted spline curves for the associations between HALP score and CVD-related mortality; **(B)** Restricted spline curves for the associations between HALP score and CVD-related mortality categorized by age; **(C)** Restricted spline curves for the associations between HALP score and CVD-related mortality categorized by sex; **(D)** Restricted spline curves for the associations between HALP score and the risk of death caused by cerebrovascular-related mortality; **(E)** Restricted spline curves for the associations between HALP score and the risk of death caused by cerebrovascular-related mortality categorized by age; **(F)** Restricted spline curves for the associations between HALP score and the risk of death caused by cerebrovascular-related mortality categorized by sex.



**Supplementary Fig. 10**—Stratified analyses of the associations of HALP score with all-cause mortality and cause-specific death in T2DM with impaired kidney function in NHANES. The Hazard Ratio was derived using Cox proportional hazard regression. \*P for interaction <0.05.