Original articles

Correlation and agreement between OMRON VP-1000 Plus-derived cardiovascular risk and SCORE2/SCORE2-OP in a high-risk cardiology population

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Abstract

Objectives: To evaluate the correlation and agreement between the cardiovascular risk indices measured by the OMRON VP-1000 Plus device and those assessed by the SCORE2 and SCORE2-OP scoring systems.

Methods: A cross-sectional descriptive study was conducted on 78 patients (aged 40 - 89 years) with no history of atherosclerotic cardiovascular disease at the Department of Cardiology, Hue University of Medicine and Pharmacy Hospital, from March to December 2025. Clinical and laboratory data were collected to calculate SCORE2/SCORE2-OP scores. Simultaneously, automated indices (10-year cardiovascular risk, ABI, baPWV) were measured using the OMRON VP-1000 Plus device.

Results: The study identified a strong positive correlation between the 10-year cardiovascular risk estimated by the OMRON VP-1000 Plus and that of the SCORE2/SCORE2-OP systems (Spearman's $\rho = 0.954$, $p < 0.001$; Pearson $r = 0.90$). Notably, the brachial-ankle pulse wave velocity (baPWV) showed a good ability to discriminate the high and very high-risk categories. At a cut-off value of baPWV > 1555 cm/s, the area under the ROC curve (AUC) was 81.2%, with a sensitivity of 81.2% and a specificity of 77.8%. Patients with baPWV > 1555 cm/s had 15.08-fold higher odds of being classified into the high/very-high cardiovascular risk category defined by SCORE2/SCORE2-OP (OR 15.08; 95% CI 2.80 - 81.17; $p = 0.002$).

Conclusions: There is a high degree of concordance in 10-year cardiovascular risk quantification between the OMRON VP-1000 Plus device and the SCORE2/SCORE2-OP scoring systems. The baPWV index is significantly associated with the cardiovascular risk categories, suggesting its potential utility in assisting the classification and stratification of high and very high-risk patients within the SCORE2/SCORE2-OP framework. As a cross-sectional analysis, these findings do not establish the ability of baPWV to predict actual cardiovascular events.

Keywords: *Cardiovascular risk; SCORE2; SCORE2-OP; OMRON VP-1000 Plus; baPWV, ABI.*

1. INTRODUCTION

Atherosclerotic cardiovascular disease is the leading cause of mortality globally as well as in Vietnam, imposing a substantial burden on the healthcare system [1, 2]. Accurate risk stratification plays a pivotal role in prevention strategies. Recently, the European Society of Cardiology (ESC 2021) recommended utilizing the SCORE2 and SCORE2-OP scoring systems to replace the previous SCORE system to comprehensively estimate the 10-year risk of cardiovascular events (both fatal and non-fatal), thereby more accurately reflecting the actual disease burden [3].

Alongside models based on traditional risk factors, the direct assessment of vascular damage using non-invasive devices is being increasingly emphasized. Currently, the automated hemodynamic monitor OMRON VP-1000 Plus not only measures early markers of atherosclerosis and arterial stiffness, such as the ankle-brachial index (ABI) and brachial-ankle pulse wave velocity (baPWV), but also integrates an automated algorithm to estimate the 10-year cardiovascular risk rate. Although this device demonstrates high applicability in screening, the degree of concordance between this automated risk index and novel standardized scoring systems like SCORE2/SCORE2-OP has yet to be fully elucidated. The majority of previous domestic and international studies have been limited to the isolated investigation of vascular indices or evaluations based on the outdated SCORE system [4-6].

Therefore, we conducted this study to investigate and evaluate the correlation between the 10-year cardiovascular risk index measured by the OMRON VP-1000 Plus device and the risk level calculated using the SCORE2/SCORE2-OP scoring systems. The

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results of this study are expected to provide scientific evidence to support the application of a rapid and simple screening tool, aiding in the optimization of cardiovascular disease prevention in clinical practice.

2. PATIENTS AND METHODS

2.1. Study Population

The study was conducted on 78 patients treated at the Department of Cardiology, Hue University of Medicine and Pharmacy Hospital, from March 2025 to December 2025.

- **Inclusion criteria:** Patients aged 40 to 89 years; with no history of atherosclerotic cardiovascular disease (such as myocardial infarction, stroke, symptomatic coronary artery disease, peripheral arterial disease); capable of undergoing measurements on the OMRON VP-1000 Plus device, and providing informed consent to participate in the study. The majority of patients in our study were admitted with a diagnosis of hypertension or dyslipidemia.
- **Exclusion criteria:** Patients under 40 or over 89 years of age; currently suffering from severe acute illnesses (infection, shock, acute exacerbation of COPD, decompensated heart failure); having arrhythmias (such as atrial fibrillation) that could alter measurement results; missing or deformed limbs; currently using high-dose vasoactive drugs; or refusing to participate in the study.

2.2. Study Methods

- **Study design:** A cross-sectional descriptive study utilizing convenience sampling.
- **Clinical and laboratory data collection:** Collection of anthropometric characteristics (age, gender, height, weight, BMI, waist circumference, hip circumference, waist-to-hip ratio), hemodynamic parameters (blood pressure, heart rate), and risk factors (smoking, alcohol consumption, exercise habits, comorbidities).
- **Recorded laboratory results included:** Blood lipid profile (specifically non-HDL-C), venous glucose, and creatinine.
- **SCORE2/SCORE2-OP score calculation:** The 10-year cardiovascular risk was calculated based on age, gender, smoking status, systolic blood pressure, and non-HDL cholesterol. SCORE2 was applied to individuals aged 40 - 69 years, while SCORE2-OP was used for those aged ≥ 70 years. The SCORE2/SCORE2-OP algorithms stratify cardiovascular risk into three categories: low-to-moderate, high, and very high. Officially released by the ESC in 2021, these predictive tools have been recommended for clinical application by the Vietnam National Heart Association (VNHA) for the Vietnamese population, categorized as a lower-middle-income country.
- **Measurement using the OMRON VP-1000 Plus device:** Patients rested for 10 minutes prior to measurement. The device utilized four-limb cuffs to measure ABI and baPWV. The 10-year cardiovascular risk (%) was automatically calculated by the machine from clinical factors (age, gender, BMI, history of hypertension, diabetes mellitus, dyslipidemia) combined with the newly measured hemodynamic parameters (ABI, baPWV).

The validity and reproducibility of the baPWV and ABI measurements obtained with the VP-1000 Plus (Omron Colin, Japan) have been established in the seminal validation study by Yamashina et al. [7]. The 10-year cardiovascular risk index provided by the device is based on the manufacturer's proprietary parameters, combining age, sex and baPWV with a Framingham-based model, as described in the manufacturer's operation manual [8]. Because the specific weighting of this algorithm is proprietary and has not been fully published in peer-reviewed literature, the present study evaluated only the correlation and agreement between the device output and the SCORE2/SCORE2-OP scores, and did not aim to validate the internal algorithm of the device.

2.3. Statistical Analysis

Data were managed using Microsoft Excel 2019 and statistically analyzed using SPSS version 26.0 software. Quantitative variables were presented as mean ± standard deviation (SD), while qualitative variables were presented as frequencies and percentages (%).

The sample size was estimated for the primary objective of assessing the correlation between the 10-year cardiovascular risk estimated by the OMRON VP-1000 Plus and the SCORE2/SCORE2-OP score, using the Fisher z-transformation: $n = [(Z_{1-\alpha/2} + Z_{1-\beta}) / C]^2 + 3$, where $C = 0.5 \times \ln[(1 + r)/(1 - r)]$. The expected correlation coefficient was taken from Saigusa et al. (BMC Cardiovasc Disord. 2022;22:365) [9], in which baPWV correlated with the 10-year Suita cardiovascular risk score at r = 0.373; this value was adopted as a conservative assumption. With $\alpha = 0.05$ (two-sided) and an expected r = 0.373, the minimum sample size was 55 subjects for 80% power and 72 subjects for 90% power. The 78 subjects actually enrolled exceeded both thresholds, providing a statistical power above 90%. For reference, a larger study (Sugawara et al., Hypertens Res. 2024, N = 7868) reported an even stronger correlation between baPWV and the Framingham risk score ($r \approx 0.64$) [10],

supporting r = 0.373 as a conservative assumption. The ROC and logistic regression analyses were pre-specified as secondary, hypothesis-generating objectives.

Agreement between the cardiovascular risk estimates obtained from the OMRON VP-1000 Plus device and the SCORE2/SCORE2-OP systems was evaluated using Bland–Altman analysis, including calculation of the mean difference and limits of agreement (±1.96 SD). Non-parametric analyses were employed, including the Mann-Whitney U test for group differences and Spearman's correlation for evaluating relationships between variables. The diagnostic performance of baPWV was evaluated using Receiver Operating Characteristic (ROC) curve analysis and binary logistic regression. Key metrics, including the area under the curve (AUC), optimal cut-off value, sensitivity, specificity, and odds ratio (OR), were determined. Statistical significance was established at $p < 0.05$.

For the binary logistic regression, the dependent variable was the SCORE2/SCORE2-OP risk category, coded binarily (1 = high/very-high risk; 0 = low-to-moderate risk). The independent variable was baPWV dichotomised at the ROC-derived cut-off (1 = baPWV > 1555 cm/s; 0 = baPWV ≤ 1555 cm/s). A univariate binary logistic regression model was used, with dichotomised baPWV as the sole variable of interest. The clinical variables that constitute the SCORE2/SCORE2-OP score (age, sex, systolic blood pressure, smoking, non-HDL cholesterol) were deliberately not entered as independent predictors, because doing so would introduce circularity and severe multicollinearity with the outcome. In addition, with only 9 subjects in the low-to-moderate risk group, the events-per-variable constraint (≈ 10) permitted only about one independent predictor. The univariate model was therefore pre-specified to isolate the discriminative value of baPWV, a haemodynamic parameter that is not part of the SCORE2/SCORE2-OP formula.

2.4. Ethical Considerations in Medical Research

The study was approved by the Ethics Committee of Hue University of Medicine and Pharmacy prior to implementation (Ethical approval No. H2023/030, approved on May 10, 2023). All participants were fully informed of the study objectives and procedures and received detailed explanations regarding the voluntary nature of their participation.

3. RESULTS

The study included 78 patients (30 males, 48 females) with a mean age of 67.41 ± 11.90 years (Table 1). Cardiovascular risk stratification utilizing the SCORE2/SCORE2-OP scoring systems revealed that 69 patients were classified into the high and very high-risk categories (88.5%), while only 9 patients were categorized as low-to-moderate risk (11.5%) (Table 1).

Several factors, including the waist-to-hip ratio and baPWV, demonstrated statistically significant differences between the two cardiovascular risk groups as defined by the SCORE2/SCORE2-OP systems (Table 1).

Table 1. General, clinical, and laboratory characteristics of the study population

Characteristics	Risk group according to SCORE2/SCORE2-OP		Total (n = 78) ($\overline{X}$ ± SD)	p-value
	High - very high risk (n = 69) ($\overline{X}$ ± SD)	Low - moderate risk (n = 9) ($\overline{X}$ ± SD)		
Age (years)	69.57 ± 10.85	50.89 ± 3.29	67.41 ± 11.90	< 0.001
BMI (kg/m²)	21.85 ± 3.30	21.80 ± 1.96	21.85 ± 3.17	0.92
Waist-to-hip ratio	0.99 ± 0.03	0.92 ± 0.02	0.98 ± 0.04	< 0.001
Systolic blood pressure (mmHg)	143.04 ± 16.65	113.33 ± 8.66	139.62 ± 18.54	< 0.001
Diastolic blood pressure (mmHg)	78.23 ± 10.93	71.11 ± 6.01	77.41 ± 10.70	0.04
Heart rate (beats/min)	79.93 ± 16.21	70.33 ± 9.72	78.82 ± 15.86	0.04
Total cholesterol (mmol/L)	5.25 ± 1.26	4.14 ± 0.93	5.12 ± 1.27	0.01
Triglycerides (mmol/L)	2.15 ± 1.19	1.92 ± 0.71	2.12 ± 1.14	0.94
HDL-Cholesterol (mmol/L)	1.39 ± 1.43	1.26 ± 0.29	1.37 ± 1.35	0.70
LDL-Cholesterol (mmol/L)	3.53 ± 1.20	2.36 ± 0.86	3.40 ± 1.22	0.01
Non-HDL Cholesterol (mmol/L)	4.02 ± 1.28	2.88 ± 0.86	3.89 ± 1.29	0.01

Venous glucose (mmol/L)	7.32 ± 2.98	6.20 ± 1.19	7.19 ± 2.85	0.35
Serum creatinine (µmol/L)	76.70 ± 27.92	69.33 ± 9.68	75.85 ± 26.53	0.83
eGFR (mL/min/1.73 m²)	82.25 ± 21.50	92.27 ± 13.66	83.41 ± 20.93	0.26
baPWV (cm/s)	2108.42 ± 655.39	1553.11 ± 331.63	2044.35 ± 650.10	0.002
ABI	1.03 ± 0.14	1.05 ± 0.07	1.04 ± 0.13	0.48

ABI: ankle-brachial index; baPWV: brachial-ankle pulse wave velocity; BMI: body mass index; HDL: high-density lipoprotein; LDL: low-density lipoprotein; eGFR: estimated glomerular filtration rate; SCORE2/SCORE2-OP: Systematic Coronary Risk Evaluation 2/2-Older Persons; SD: standard deviation; X̄: mean. p-values from the Mann-Whitney U test.

Regarding the 10-year cardiovascular risk, the study identified a strong positive correlation between the 10-year risk estimated by the OMRON device and the risk calculated using the SCORE2/SCORE2-OP scoring systems (Spearman's ρ = 0.954; p < 0.001; Pearson r = 0.90) (Figure 1).

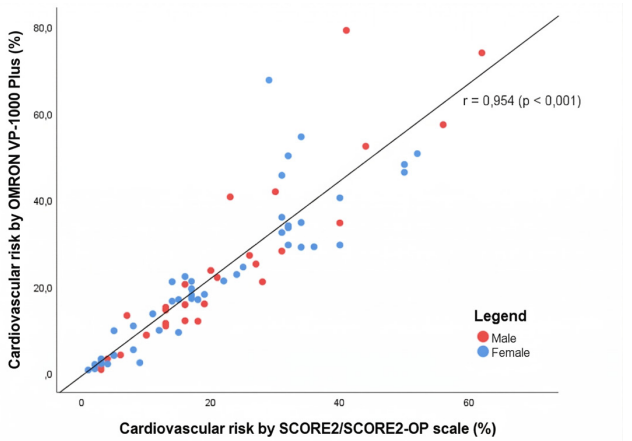

Figure 1. Correlation between the 10-year cardiovascular risk estimated by the OMRON VP-1000 Plus device and the 10-year cardiovascular risk calculated by the SCORE2/SCORE2-OP scoring systems

baPWV: brachial-ankle pulse wave velocity; SCORE2/SCORE2-OP: Systematic Coronary Risk Evaluation 2/2-Older Persons. Correlation assessed using Spearman's rank correlation coefficient (ρ).

Bland-Altman analysis revealed a high level of agreement between the OMRON VP-1000 Plus and SCORE2/SCORE2-OP systems. The OMRON device showed a slight tendency to overestimate risk, with a positive mean bias of 1.93%. Although most data points remained within the 95% limits of agreement, increased variability was observed at higher risk levels compared to the strong concordance noted at levels < 20% (Figure 2).

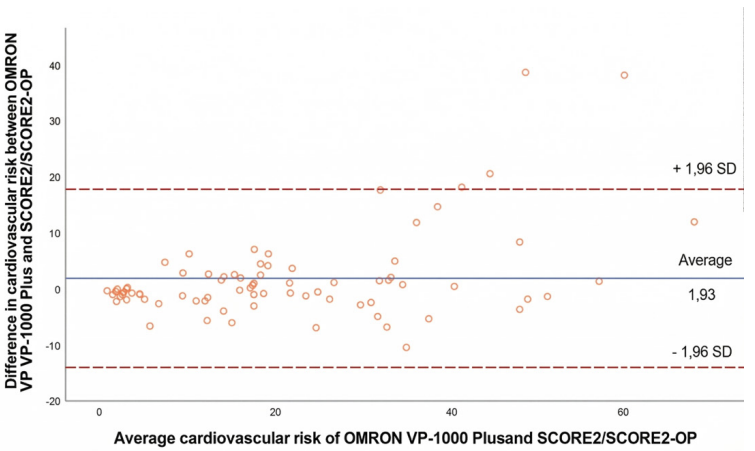

Figure 2. Agreement between the 10-year cardiovascular risk estimated by the OMRON VP-1000 Plus device and the 10-year cardiovascular risk calculated by the SCORE2/SCORE2-OP scoring systems

SCORE2/SCORE2-OP: Systematic Coronary Risk Evaluation 2/2-Older Persons. Agreement assessed using Bland–Altman analysis (mean difference and 95% limits of agreement, ± 1.96 SD).

The baPWV index showed a good ability to discriminate the high and very high cardiovascular risk category defined by SCORE2/SCORE2-OP (Tables 2 and 3). At a cut-off value of baPWV > 1555 cm/s, the area under the receiver operating characteristic (ROC) curve (AUC) was 81.2%, yielding a sensitivity of 81.2%, a specificity of 77.8%, and a positive predictive value of 96.6% (Table 3 and Figure 3). This cut-off is specific to the present sample and should be regarded as exploratory rather than as a prognostic threshold for cardiovascular events. As presented in Table 3, patients with a baPWV > 1555 cm/s had 15.08-fold higher odds of being classified into the high/very-high risk category defined by SCORE2/SCORE2-OP compared with their counterparts (OR 15.08; 95% CI 2.80–81.17; p = 0.002).

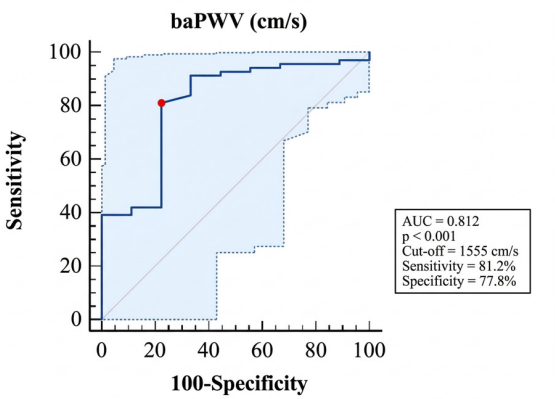

Figure 3. Receiver Operating Characteristic (ROC) curve of the baPWV index for discriminating the high/very-high cardiovascular risk category according to the SCORE2/SCORE2-OP scoring systems

AUC: area under the curve; baPWV: brachial-ankle pulse wave velocity; ROC: receiver operating characteristic; SCORE2/SCORE2-OP: Systematic Coronary Risk Evaluation 2 / 2-Older Persons.

Table 2. Distribution of baPWV among cardiovascular risk groups based on the cut-off value

		Risk group according to SCORE2/SCORE2-OP		Total
		High – very high risk	Low – moderate risk	
baPWV (cm/s)	> 1555	56	2	58
	≤ 1555	13	7	20
p-value		< 0.001		

baPWV: brachial-ankle pulse wave velocity; SCORE2/SCORE2-OP: Systematic Coronary Risk Evaluation 2/2-Older Persons. Cells show the number of patients (high–very high risk / low–moderate risk). p-value from the chi-square test.

Table 3. Association between baPWV and the high/very-high cardiovascular risk category according to the SCORE2/SCORE2-OP scoring systems (univariate binary logistic regression and ROC analysis)

	B	OR (95% CI)	p	Area under the curve (AUC)	Sensitivity	Specificity	Positive predictive value	Negative predictive value
baPWV > 1555 cm/s	2.71	15.08 (2.80 - 81.16)	0.002	81.2%	81.2%	77.8%	96.6%	35.0%

AUC: area under the curve; baPWV: brachial-ankle pulse wave velocity; CI: confidence interval; NPV: negative predictive value; OR: odds ratio; PPV: positive predictive value; SCORE2/SCORE2-OP: Systematic Coronary Risk Evaluation 2 / 2-Older Persons. The OR expresses the odds of belonging to the high/very-high SCORE2/SCORE2-OP category, not the risk of an actual cardiovascular event.

4. DISCUSSION

This study investigated a cohort of 78 patients. The mean age of the study population was 67.4 ± 11.9 years, which is consistent with findings from several other studies, such as the research by Hoang Anh Tien et al. evaluating the SCORE2/SCORE2-OP scoring systems in hypertensive patients, which reported a mean age of 67.9 ± 10.9 years [11]. This age distribution aligns with epidemiological studies on hypertension and atherosclerosis in Vietnam, where the prevalence of cardiovascular disease increases significantly after the age of 60 [2].

Our study observed a high proportion of patients in the high and very high cardiovascular risk categories, reaching 88.5%. A study by Doan Pham Phuoc Long et al. (2024) utilizing the SCORE2/SCORE2-OP systems in prehypertensive subjects also yielded similar results, with the high to very high-risk group accounting for approximately 75% [6].

The study identified a very strong positive correlation (Spearman's ρ = 0.954; Pearson r = 0.90) between the 10-year cardiovascular risk measured by the OMRON device and the SCORE2/SCORE2-OP scoring systems. The consistency between traditional epidemiological models and direct hemodynamic parameters indicates that the OMRON algorithm reflects the overall risk burden well, serving as a rapid, non-invasive, and reliable screening tool in clinical practice. This finding aligns with the general trend in international medical literature when comparing cardiovascular risk assessment tools based on traditional risk factors with methods integrating subclinical vascular markers. A study by Tomiyama et al. demonstrated that cardiovascular risk models incorporating arterial stiffness indices (including baPWV) correlate strongly with standardized risk scores, particularly in middle-aged and elderly individuals [12]. Similarly, Mitchell et al. (2010) noted that indices reflecting early vascular damage aid in accurately reconstructing the global cardiovascular risk burden, which is typically estimated from models based on classical risk factors [13].

It should nevertheless be emphasised that the SCORE2/SCORE2-OP systems and the OMRON risk index share several common input variables (age, sex, blood pressure, smoking/hypertension and diabetes). Consequently, the very high correlation coefficient partly reflects this overlap of shared determinants rather than demonstrating that the two tools can fully replace one another. The relationship is therefore best interpreted as a strong correlation and agreement arising from shared determinants, rather than as evidence of interchangeability. The reported coefficient (Spearman's ρ = 0.954) is a rank correlation, consistent with the non-parametric approach stated in the Methods; the corresponding Pearson coefficient was r = 0.90.

The very strong concordance between the OMRON VP-1000 Plus measurements and SCORE2/SCORE2-OP scores can also be explained through the underlying pathophysiology of vascular stiffness. While traditional risk engines like SCORE2 aggregate clinical variables (age, cholesterol, blood pressure) to estimate future risk, baPWV serves as a direct integrative biomarker of the cumulative damage these factors inflict on the arterial wall over time. Mechanistically, as arteries stiffen due to the loss of elastin and increased collagen deposition, the reflected pressure waves return earlier to the heart during systole rather than diastole, increasing afterload and compromising coronary perfusion. This process of vascular aging often precedes overt clinical manifestations of cardiovascular disease. According to Zieman et al. (2005), arterial stiffness is not merely a marker of existing atherosclerosis but a dynamic functional change that actively contributes to the progression of hypertension and target organ damage [14]. This helps explain why individuals in our study with high baPWV values (> 1555 cm/s) consistently fell into the high or very high-risk categories of the SCORE2 system, as both indices reflect different stages of the same cardiovascular continuum.

Beyond the strong correlation, the Bland-Altman analysis provides a more nuanced understanding of the agreement between the OMRON VP-1000 Plus and the SCORE2/SCORE2-OP systems. The observed mean bias of 1.93% suggests that while the OMRON device slightly overestimates risk compared to the manual scoring systems, this discrepancy is clinically marginal. Notably, our findings reveal a proportional bias trend: the agreement is remarkably tight at lower risk thresholds (< 20%) but exhibits greater dispersion as the mean risk increases. This phenomenon may be explained by the increased arterial stiffness often present in high-risk individuals, which may affect the oscillometric algorithms of the VP-1000 Plus differently than the static variables used in SCORE2. Similar findings were reported by Romero-Ante JD et al. (2024), who noted that automated vascular screening tools often show higher variability in patients with advanced atherosclerotic changes [15]. However, since both methods consistently categorize these patients into high or very high risk groups, the observed variance does not alter the fundamental clinical management strategy. Further prospective

studies with larger sample sizes are needed to determine the clinical relevance of this deviation.

Our study recorded a baPWV cut-off value of > 1555 cm/s, which showed discriminative value for the high/very high-risk group according to SCORE2/SCORE2-OP. Research by Luong Thi Van Trang reported a baPWV cut-off of > 2506 cm/s, indicating that pulse wave velocity has diagnostic significance for identifying high risk according to the SCORE system [5]. This difference is reasonable because SCORE2/SCORE2-OP are designed to capture both fatal and non-fatal cardiovascular events, allowing for earlier risk detection; therefore, a lower baPWV threshold better reflects the early warning role of arterial stiffness. Compared to the older SCORE system, SCORE2/SCORE2-OP help reclassify many individuals from low/moderate risk to high/very high risk. This is consistent with a study by Tran Nguyen Phuong Hai (2025), which affirmed that SCORE2 identifies the actual atherosclerotic burden better than the SCORE system [16].

The practical relevance of this study lies in supporting the potential use of the OMRON VP-1000 Plus as an adjunctive point-of-care screening tool. In high-volume settings such as cardiology departments or primary care clinics, the rapid acquisition of 10-year cardiovascular risk estimates alongside baPWV measurements streamlines patient triage. The baPWV cut-off identified here (> 1555 cm/s) may serve as an exploratory threshold suggestive of subclinical vascular damage within this cohort, particularly in patients with borderline SCORE2 results, pending confirmation in longitudinal studies. This dual-assessment approach, which integrates conventional risk factors with real-time arterial stiffness data, may facilitate more personalized interventions. This is especially valuable in resource-limited settings like Vietnam, where access to advanced diagnostic imaging remains constrained.

Study Limitations

Despite significant findings, several limitations must be acknowledged. First, the cross-sectional design precludes establishing causal relationships between cardiovascular risk indices and long-term outcomes. Second, the single-center setting and relatively small sample size may limit the generalizability of our findings. Third, selection bias may exist, as the study predominantly enrolled high-risk patients, potentially overestimating risk prevalence. Finally, the lack of long-term clinical data limits the validation of the predictive accuracy of the baPWV cut-offs and the risk estimates from the SCORE2/SCORE2-OP systems and the OMRON device.

Furthermore, the 10-year risk index generated by the OMRON VP-1000 Plus is based on a proprietary algorithm whose exact weighting has not been fully published; therefore, this study assessed only its correlation and agreement with SCORE2/SCORE2-OP and could not validate the internal algorithm itself.

The distribution of the risk groups was also markedly imbalanced, with only 9 subjects (11.5%) in the low-to-moderate risk group versus 69 (88.5%) in the high/very-high risk group. This imbalance produced a very wide confidence interval for the odds ratio (2.80–81.17), rendering the estimate unstable. The specificity (77.8%) and negative predictive value (35.0%) were derived from the small low-to-moderate group and are therefore imprecise, whereas the high positive predictive value (96.6%) partly reflects the high prevalence of high-risk patients in the sample. This skewed distribution is characteristic of a high-risk cardiology outpatient population and further limits generalizability to the general or low-risk population. Larger and more balanced samples are required to confirm these findings.

Large-scale, prospective longitudinal studies with more diverse cohorts are warranted to validate these results and establish their clinical utility.

5. CONCLUSIONS

Our study confirms a very high degree of concordance in 10-year cardiovascular risk quantification between the automated non-invasive hemodynamic measurement device (OMRON VP-1000 Plus) and the SCORE2/SCORE2-OP scoring systems. In this cross-sectional study, the arterial stiffness index (baPWV) was significantly associated with, and helped classify, the cardiovascular risk categories defined by SCORE2/SCORE2-OP. These findings support baPWV as a useful marker for risk stratification within this framework, but do not establish its ability to predict actual cardiovascular events. Longitudinal follow-up studies are required to confirm any prognostic value.

Based on this evidence, the application of the OMRON VP-1000 Plus device in clinical practice offers practical value. It may serve as a rapid and simple supportive screening method to assist physicians in the early identification of subclinical vascular damage, thereby facilitating timely and personalized cardiovascular prevention strategies. Nevertheless, longitudinal follow-up studies with larger sample sizes and more diverse risk stratifications are necessary to confirm the long-term prognostic value of the device.

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Conflict of Interest

The authors declare that they have no conflicts of interest related to this study.

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