The ensemble was founded in April 1984 as a result of the enlargement of the Polish Chamber Orchestra (PCO). The impulse to expand the ensemble was provided by the arrival of the legendary violinist Yehudi Menuhin at the invitation of Waldemar Dąbrowski and Franciszek Wybrańczyk, the director of the PCO. The first joint concerts quickly won the appreciation of the audience in Poland and abroad and Menuhin took over as the first guest conductor.

Over the years Sinfonia Varsovia performed in the world's most prestigious concert halls under the baton of such conductors as Claudio Abbado, Witold Lutosławski, Lorin Maazel, Emmanuel Krivine and Jerzy Maksymiuk, as well as soloists including Mstislav Rostropovich, Anne-Sophie Mutter, Alfred Brendel, Martha Argerich and Piotr Anderszewski. Sinfonia Varsovia has played over 4,000 concerts all over the world and made over 300 records.

Krzysztof Penderecki served as the Orchestra’s musical director from 1997, and as its artistic director from 2003 to 2020. In 2008-2012, the music director of Sinfonia Varsovia was Marc Minkowski. In 2004 Franciszek Wybrańczyk transferred the duties of Sinfonia Varsovia's director to the ensemble's long-time musician Janusz Marynowski, who still holds this position.

In September 2022 Aleksandar Marković was appointed principal guest conductor of Sinfonia Varsovia.