You are familiar with the wind chill effect due to wind convection in the winter. Will the wind chill be worse with dry air or humid air?

If the conditions are the same otherwise, the Nusselt number correlation will be the same, but the Prandtl number will be somewhat higher for humid air (better thermal diffusivity), and the thermal conductivity of humid air is also higher, resulting in a higher $h$ value. Thus, you will feel colder if the air is humid!