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This study present a paper-based microfluidic device that can quantitatively detect albuminuria as an alternative to a urine dipstick tester based on the conventional colorimetric determination. The conventional colorimetric determination method to analyze the extent of color change of dye for quantitative assay requires an electronic image analysis equipment. As a proof of concept, we fabricate a paper-based device that allows for quantitative detection of albuminuria by measuring the angle of the color changed without any electronic devices. The device is made from paper followed by printing the dye on a specific area of the paper. And we bring the bottom of paper into contact with the surface of urine in the test tube. By varying the concentration of albumin in the urine, we find the change of colored area depending on the amount of albumin in the urine. The device provides an inexpensive quantitative diagnosis of albuminuria to the Third World countries that can't afford to get high-priced electronic equipment.