

A Way to Achieve Higher Quality of Blood Pressure Self-Measurement Data

J. Finderup

Department of Renal Medicine
Aarhus University Hospital
Aarhus, Denmark

S. Wagner

Department of Engineering
Aarhus University
Aarhus, Denmark

B. Jespersen, N.H. Buus

Institute of Clinical Medicine
Aarhus University
Aarhus, Denmark

Abstract—This medical perspective abstract discusses the potential for achieving higher data quality during blood pressure self-measurement by utilizing context-aware technology to identify contextual bias due to non-adherent device use.

Keywords—Blood pressure, adherence, telemedicine, context

I. BACKGROUND

Patients with hypertension are often required to self-measure their blood pressure (BP) at the hospital in a dedicated self-measurement room before consultation in order to avoid white coat hypertension [1,2].

Obtaining valid measurements and securing accurate patient self-reporting in current self-measurement-practice at the renal medicine department's outpatient clinic have been difficult, leading to misdiagnoses and inappropriate antihypertensive medication.

In a recent study we investigated BP self-measurement (BPSM) at the outpatient clinic using the ValidAid system. ValidAid is able to register relevant contextual parameters, including: legs crossed, back supported, noise level, and rest time. All of these parameters causes bias to the BP measurements. We found that out of 113 self-measuring patients using ValidAid, only 66% of patients self-reported data accurately. Also, all patients failed to follow one or more of the international guidelines on BP measurements correctly [3]. Findings from the study indicate that patient adherence to the international guidelines is low despite thorough patient instructions and training by healthcare staff.

Inappropriately treated hypertension is strongly associated with development of cardiovascular complications such as stroke, ischemic heart disease or heart failure and in patients with chronic kidney disease further loss of renal function. Thus, methods for better BP registration are called for. ValidAid appears useful for ensuring more accurate adherence.

II. OBJECTIVES

The aim of the study is to improve the quality of BPSM data and move the BPSM to the home setting, enabling the patient to allow for every second consultation to be performed as a telemedicine consultation, as well as acquiring more

frequent BP values. This is only possible if the BP values are reported accurately and if the patient is in adherence to the international guidelines.

III. METHODS

The study will be cross-sectorial and interdisciplinary, and performed in close cooperation with the patients. First step is to investigate patient barriers to non-adherence in relation to BPSM and identify solutions that could improve adherence. The ValidAid system is useful for this purpose, as it is able to identify patients who are non-adherent, by using context-aware sensors.

The ValidAid system is built using telemedicine technology and thus well-suited for remote monitoring as data can be delivered directly to the electronic patient record. This will free the BP values from reporting bias and should lead to more accurate data. However, further development of the ValidAid system is needed to assist the patients during measurement, including allowing the ValidAid system to act as an adherence aid for guiding the patient.

IV. PERSPECTIVES

Our objective is to improve the quality of BPSM to a standard of 100% accurate data self-reporting and at least 95 % of patients adhering to the international guidelines for BP measurements. In order to achieve this goal the next step is to move the BPSM process to the home setting, monitor the BP more frequently, and to perform every second consultation as a telemedicine home consultation. This could feasibly allow more patients to remain at home and continue working.

REFERENCES

- [1] Campbell NRC, McKay DW. Accurate blood pressure measurement: Why does it matter? *Can Med Assoc J* 1999;161(3):277-278.
- [2] Pierdomenico SD, Di Nicola M, Esposito AL, Di Mascio R, Ballone E, Lapenna D, et al. Prognostic value of different indices of blood pressure variability in hypertensive patients. *Am J Hypertens* 2009 Aug;22(8):842-847
- [3] Wagner S, Buus NH, Jespersen B, Toftegaard TS, Bertelsen O.W. Measurement Adherence in the Blood Pressure Self-Measurement Room. *Telemed JE Health* (in press), 2013