

This study highlights the prevalence and undertreatment of depressive symptoms in older Indians with and without MCI. Results indicate the need for better cognition and depression screening tools in developing countries. Further research is essential to elucidate the role of social networks in the context of the depression-MCI axis.

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FEASIBILITY AND ACCURACY OF NONINVASIVE ANEMIA SCREENING

To the Editor: Anemia is a prevalent condition that affects clinical outcomes and quality of life, especially in elderly adults.¹ Anemia is associated with greater morbidity and mortality, longer hospital stay, functional decline, and disability^{2,3} and warrants efficient methods for its detection and surveillance. Common hemoglobin (Hb) measuring methods use invasive technologies, such as venous puncture or finger stick capillary sampling. Their acceptance, especially for screening purposes, is low, which led to the development of more-comfortable, noninvasive methods.⁴⁻⁶ Noninvasive Hb testing is routinely used in blood donors and for Hb monitoring during surgery.^{4,6} This analysis is the first report on its use in anemia screening.

METHODS

The main objective of this study conducted at Innsbruck Medical University Hospital was to evaluate the accuracy and feasibility of anemia screening using noninvasive Hb measurement using a pulse oximeter (Masimo Pronto-7; Masimo Corp., Irvine, CA). This device uses a pulse oximetric sensor and transcutaneous spectrophotometry to measure total Hb (SpHb) in a fingertip. SpHb was compared using the local invasive reference method (HbRef) by venous puncture (sodium lauryl sulfate-Hb method; XE-2100, Sysmex Austria, Vienna, Austria). As part of their routine hematological follow-up, noninvasive Hb measurement was offered to 103 in- and outpatients after completion of the standard invasive Hb test. Phlebotomy was performed after at least 3 minutes of being seated, followed by the noninvasive Hb measurement.

RESULTS

All 103 individuals agreed to noninvasive Hb testing, which could not be performed in three individuals because of weak peripheral perfusion ($n = 2$) or calloused hands ($n = 1$). This analysis includes the remaining 100 individuals (97%; 64 male, mean age 64; 36 female, mean age 69).

SpHb and HbRef were highly correlated (correlation coefficient = 0.834, $P < .001$; Spearman rank correlation analysis). SpHb values tended to be higher than HbRef (mean 0.567 g/dL, median 0.9 g/dL; standard deviation 1.38 g/dL). The Bland-Altman plot (Figure 1) showed this systematic bias to be equal in width across the whole Hb range. Deviation of SpHb from HbRef was similar in both sexes (men: 0.5 g/dL Hb, interquartile range (IQR) 1.85 g/dL Hb; women: 0.8 g/dL Hb, IQR 1.3 g/dL Hb). Analysis of the distribution of deviation showed that approximately 25% of values were located around 1 g/dL Hb.

As a consequence of the systematically higher SpHb measurements, anemia prevalence was lower when anemia

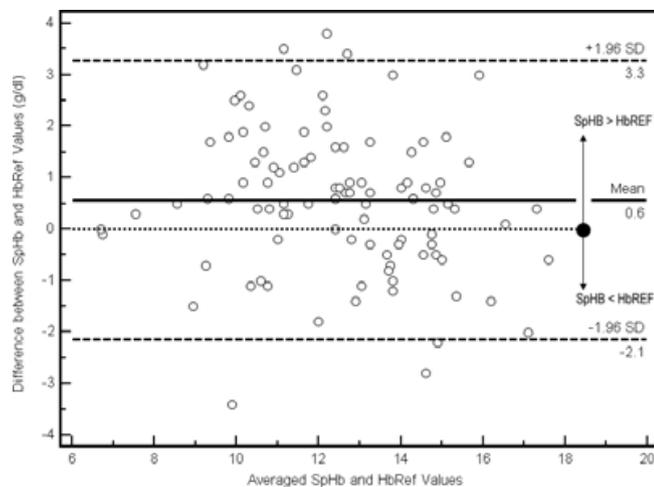


Figure 1. Bland-Altman plot for comparison of measurement of hemoglobin (Hb) using a pulse oximetric sensor and transcutaneous spectrophotometry (SpHb) and using venous puncture (HbRef). The Bland-Altman plot compares two clinical measurement methods to evaluate their agreement. The average of the Hb levels measured using both methods per participant (x-axis, g/dL) is plotted against their difference (y-axis, g/dL). Horizontal lines are drawn at the mean difference (solid line) and at the limits of agreement, which are defined as the mean difference plus and minus 1.96 times the standard deviation (SD) of the differences (dashed lines, 95% confidence interval). The plot shows a slight systematic bias of the mean (+0.6 g/dL), which indicates a tendency to produce systematically higher results than the reference method. The observed bias was of equal width across the whole measurement range. Six of the 100 values were outliers outside the 95% confidence band.

was defined using the noninvasive method than using the reference method. Using HbRef, according to World Health Organization criteria,⁷ anemia was detected in 52 individuals (29 men (45.3%), 23 women (63.9%)), 21 of whom were severely anemic (Hb < 10 g/dL). By contrast, SpHb showed 40 individuals (23 men (35.9%), 17 women (47.2%)) to be anemic. Thus, the noninvasive device had a sensitivity of 75% and a specificity of 97.9%, with a positive predictive value (PPV) of 0.975 and a negative predictive value (NPV) of 0.783. A PPV of 80.4% was calculated for community-living persons based on an anemia prevalence of 12% in this cohort.¹ Similarly, for inpatients, the PPV was 95.2% based on a prevalence of 40%.¹ The current study did not include enough individuals with severe anemia to test the PPV or NPV for that population.

DISCUSSION

For the purpose of anemia screening, the tested method provided moderate but clinically acceptable accuracy, regardless of Hb range and sex. It was comfortable and feasible in 97% of the elderly subjects approached. These findings are consistent with previous reports that found significant correlations between SpHb and HbRef,^{4,5} with deviations tending toward higher SpHb values.⁴⁻⁶ With this systematic bias, the method is likely to produce some false negatives. According to the PPV and NPV found, the non-

invasive method appears to be useful for the detection of anemia but lacks sensitivity, although in certain settings (e.g., anemia awareness programs at senior fairs), it is of clinical value to know Hb to within 1 to 2 g/dL immediately. Suppressed SpHb levels should be verified using a reference method, and individuals should undergo a standard evaluation for anemia. In addition, the noninvasive method has some practical limitations that are important in older adults. Because the technology uses oximetric sensors, all states influencing translucence and oxygen flow, such as calloused skin, nail polish, poor peripheral blood flow, and blood viscosity, limit its use. Especially in elderly adults, dehydration and overhydration are common, and the effect of blood viscosity on SpHb has not been clearly established.^{8,9}

In summary, initiatives for anemia screening are increasingly gaining interest. Health literacy among the general population, including elderly adults, is increasing, warranting new, practicable methods of maintaining health, including anemia monitoring. Noninvasive Hb testing meets the expectations for a convenient, fast screening tool for anemia with reasonable accuracy, sensitivity, and specificity.

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PHYSICIAN SEX IS A PREDICTOR OF REPORTING DRIVERS WITH MILD COGNITIVE IMPAIRMENT AND MILD DEMENTIA TO TRANSPORTATION AUTHORITIES

To the Editor: Most individuals with dementia continue to drive at the onset of their illness and keep driving even as their cognitive impairment progresses.¹ Ontario is one of nine Canadian jurisdictions with mandatory reporting of potentially medically unfit drivers,² but compliance with this is low,³ and approximately one-third of physicians are hesitant to report medically unsafe drivers.⁴ A modified Delphi study was conducted with 38 Ontario physicians with expertise in dementia to determine which patient- and physician-related factors best predicted reporting to transportation authorities (manuscript in revision). The purpose of this letter is to examine physician-related predictors of reporting individuals with mild cognitive impairment (MCI) and mild dementia to transportation authorities.

Detailed methodology is outlined in the manuscript in revision, but briefly, 26 case scenarios describing individuals with MCI and mild dementia were constructed, each presenting variations of clinical details. Geriatric psychiatrists, geriatricians, cognitive neurologists, and family physicians with expertise in dementia or care of elderly adults were randomly selected and electronically reviewed the scenarios over five iterations. They indicated whether they would report the individuals to transportation authorities and whether they would recommend a specialized on-road driving test. The outcome variable for the present study was the percentage of cases that each physician recommended to report to the transportation authorities across all five iterations. Predictor variables included physician sex, years in practice, specialty, rural versus urban community of practice, and scores on the Risk-Taking Scale (RTS), which assesses physician participants' risk-taking and risk-aversion, the Stress from Medical

Uncertainty Scale (SUS), and the Fear of Malpractice Scale (FMS).⁵ A five-point Likert scale was used for RTS and SUS and a six-point scale for FMS, in error, instead of five points for FMS and six points for RTS and SUS.

Descriptive analyses were completed for the predictor and outcome variables. Analysis of variance, Spearman correlations, and linear regression with tolerance statistics for multicollinearity were used after normality confirmation using Shapiro Wilk tests.

The 38 individual physicians varied in the percentage of case scenarios that they indicated they would report to the transportation authorities (1.6–78.3%, mean $45.6 \pm 19.2\%$). Male physicians indicated that they would report $53.8 \pm 19\%$ of all cases, compared with $39.0 \pm 17\%$ for female physicians ($F_{1,37} = 6.413, P = .02$). Cognitive neurologists indicated that they would report more cases than other specialties and urban physicians more than rural, but these differences were not statistically significant (Table 1). Similarly, those with 8 years or less in practice showed a nonsignificant tendency to report more individuals than more-experienced physicians. There were also no significant correlations between percentage of cases reported and years in practice, RTS, SUS, or FMS.

Sex was the only significant physician-related predictor of reporting to emerge. Only the RTS and SUS changed the sex parameter estimate in the linear regression model by more than 10%. Sex alone predicted 15.1% of the variance in reporting, but sex together with RTS and SUS predicted a cumulative 27.7% of the variance in reporting ($F_{1,34} = 10.65, P = .003$).

Table 1. Case Scenarios Reported According to Group

Variable	Percentage of Case Scenarios Reported, Mean \pm Standard Deviation	Analysis of Variance
Male (n = 17)	53.8 (18.9)	$F_{1,37} = 6.41, P = .02$
Female (n = 21)	39.0 (17.2)	
≤ 8 years in practice (n = 9) ^a	52.5 (17.6)	$F_{1,37} = 1.54, P = .22$
> 8 years in practice (n = 29)	43.5 (19.4)	
Family medicine (n = 11)	42.1 (19.3)	$F_{3,37} = 1.85, P = .16$
Geriatric psychiatry (n = 12)	44.5 (16.0)	
Geriatric medicine (n = 10)	41.7 (17.2)	
Cognitive neurology (n = 5)	63.6 (25.2)	$F_{1,37} = 0.69, P = .41$
Rural (n = 7) ^b	40.1 (18.2)	
Urban (n = 31)	46.8 (19.5)	

^aThe 25th percentile for years in practice was 7.75 for this sample, and years in practice was dichotomized to 8 years or less versus more than 8 years in practice.

^bUrban communities were defined as having a population of at least 1,000 people and density of at least 400 people per square kilometer;⁹ rural communities did not meet these criteria or were at least 25 kilometers from the nearest urban center.