

Title:

Does Nail Polish Have Significance on Pulse Oximetry Readings?: A Literature Review

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Session Title:

Evidence-Based Practice Poster Session 1

Slot (superslotted):

EBP PST 1: Friday, 28 July 2017: 10:00 AM-10:45 AM

Slot (superslotted):

EBP PST 1: Friday, 28 July 2017: 12:00 PM-1:30 PM

Keywords:

nail polish, oxygen saturation and pulse oximeter

References:

Can I wear nail polish during labour? - St Vincent's Private Hospital Melbourne. (2013, March 15). Retrieved December 01, 2016, from <http://blog.svpm.org.au/can-i-wear-nail-polish-during-labour/>

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Hakverdioğlu Yönt, G., Akin Korhan, E., & Dizer, B. (2014). The effect of nail polish on pulse oximetry readings. *Intensive & Critical Care Nursing*, 30(2), 111-115. doi:10.1016/j.iccn.2013.08.003

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Abstract Summary:

Pulse oximetry measures the amount of oxygen (SpO₂) carried by the hemoglobin molecules in the blood. Normal values range from 95-100 percent. Disease processes affecting perfusion and circulation can contribute to lowered SpO₂. This literature review focuses on the effect of nail polish on the accuracy of pulse oximetry readings.

Learning Activity:

LEARNING OBJECTIVES	EXPANDED CONTENT OUTLINE
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The learner will be able to state two findings on how nail polish colors effect pulse oximetry readings.	Each study analyzed for this literature review has provided varying data related to specific methods of obtaining results. Dark colors such as black, brown, blue, pink, and white had more effects on pulse oximetry readings in comparison to red and clear nail polish.
The learner will be able to reflect on their current clinical nursing practice and hospital policy and procedures for obtaining pulse oximetry readings.	Through the literature review, learners will reflect back to findings and consider significance or lack of from removal of nail polish.

Abstract Text:

Purpose: A patient asked “if I have nail polish on during labor and then have to go for an unplanned caesarian section does my nail polish need to be removed?” (St. Vincent’s Private Hospital Maternity Blog, 2013). In nursing, nail polish is routinely removed prior to surgery or a procedure, based on the hospital’s protocol. Patients are questioning this practice. The aim of the literature review was to discover if fingernail polish has a profound effect on the accuracy of the pulse oximeter readings.

Methods: A literature review was conducted using EBSCOhost database. Articles selected ranged from the year 2011 to 2016. Eight articles on SpO2 and nail polish were reviewed. The five selected research articles focused on how different colors and brands of nail polish affect SpO2 readings; articles omitted were those that accentuated other factors that didn’t include nail polish. Only subjects with SpO2 at 95 to 100 percent were included. Results were grouped into factors studied, and were compared and contrasted with respect to their methodology and data. Research has been ongoing about the effects that nail polish can have on the accuracy of the readings.

Results: Desalu (2013) conducted a study on fifty non-smoking participants using the Lifebox pulse oximeter. Four fingers of each hand were painted with clear, red, brown, and black nail polish. One finger on both hands remained free of nail polish as the control. Colors found not significantly different from the control mean are clear and red nail polish ($p=0.378$, $p=0.427$). Only 12% of the black nail polish and 64% of the brown nail polish were able to provide readings. The mean oxygen saturation values for black and brown nail polish were significantly different from their control mean ($p<0.001$).

Jakpor (2011) of University of Southern California performed three separate experiments, one which tested six colors of nail polish on 23 subjects using the Nonin Onyx pulse oximeter and the Nellcor N-395 pulse oximeter. Each nail in this study was painted with two coats of the color nail polish followed by a clear top coat, with one nail left alone as the control. The brand used had been Avon Quick Dry Nail Polish with the colors white (Snowflake), red (Red Red), blue (Sizzling Sky), pink (Carnival), wine (Red Wine), and clear. According to Jakpor, there were small, yet clinically insignificant drops in the readings with the application of blue, pink, and white nail polish with the Nonin pulse oximeter.

Yont (2013) conducted two phases for this study on 40 healthy, nonsmoking females. The first phase of the study comprised of pulse oximeter readings (model MD300C1) simultaneously on both left and right nail beds without nail polish. The second phase consisted of using ten different nail polish colors: dark red, yellow, dark blue, green, brown, purple, black, metallic, brown and light pink of the same brand. One coat of nail polish was applied onto the left hand while the right hand remained free of nail polish. The colors found to show significance ($p<0.05$) when compared to readings on the right hand were metallic, pink, yellow, green, blue, purple, black, brown and white. Red however did not show significance ($p>0.05$).

Diccini (2011) from Paulista Nursing School at the Federal University of São Paulo conducted a cross-sectional study testing four different nail polish colors on eighty healthy participants using a portable Dixtal DX-2405 pulse oximeter. The researchers used five colors on the left hand—plum on the thumb, red on the index finger, chocolate on the middle finger, coffee on the ring finger, and “coffee with milk” on the little finger—while the right hand was used as a control. It was discovered that the colors red and coffee showed much more significant differences in measurements than the controlled hand; as much as 0.19% and 0.22% respectively. Meanwhile plum, “coffee with milk”, and chocolate showed no significant differences.

Yeganehkah (2014) collected oxygen saturation readings from thirty healthy students with SpO₂ values from 95-100%. Each participant had sat on a chair at continuous resting position for ten minutes. Following this, baseline readings were obtained on all fingers as they remained unpolished. Ten different colors were then randomly selected for each participant, with the application of two coats on each nail. Once the nails were dried, SpO₂ readings were then re-measured. Nail polish colors, orange, pink, and purple did not have an effect on SpO₂, while the other colors did provide a statistical difference ($p < 0.05$). These readings however were clinically insignificant with $< 1.2\%$.

Conclusion: The results of the reviewed articles showed a variation on the effect that fingernail polish has on pulse oximeter readings. Each study varied depending on the color of nail polish used, the brand of the pulse oximeter, and the number of coats applied. On extensive review of the selected articles, it was found that colors such as black, brown, blue, pink, and white had more of an effect on pulse oximeter levels than colors such as red and clear. Although, red is noted to have the least significance in most of the articles, it was discovered in one study that red nail polish had a greater effect than other colors such as plum, “coffee with milk”, and chocolate (Diccini, 2011). The reason behind these contradicting results is not stated, however, may suggest that the color of nail polish is insignificant to pulse oximeter readings. Through review of these articles, differences were detected with colors that had the greatest impact on pulse oximeter readings. These differences, however, are clinically insignificant and not great enough to make a significant impact on pulse oximeter readings. Thus, it is concluded, through the extensive review of literature, that fingernail polish does not have a profound effect on the accuracy of pulse oximeter readings.