



A STUDY TO ASSESS THE RELIABILITY AND VALIDITY OF SELF-REPORTED SUN EXPOSURE QUESTIONNAIRE AMONG GENERAL POPULATION VISITING MEDICAL OPD IN SELECTED TERTIARY HOSPITAL, KELAMBAKKAM.

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ABSTRACT

Methodological design was followed to develop and analyse the validity and reliability of the self-reported sun exposure questionnaire. The questionnaire was developed based on an extensive review of literature then the questionnaire was administered among 50 general population who visited the medical OPD in selected tertiary hospital after thorough explanation about the study. The tool was evaluated by the experts by using content validity Index scale. Test retest method was used to assess the reliability and Cronbach's alpha was used to estimate the internal consistency of the questionnaire. The results revealed that overall internal consistency was 0.820 which showed that the questionnaire was highly reliable to assess the sun exposure. The study concluded that the cost effective sun exposure recall questionnaire is the easy way prior to assess the vitamin D status.

KEYWORDS : Methodological design, reliability, Validity, Sun Exposure Questionnaire

Introduction

Micronutrients are essential to intricate human body function. Like minerals, vitamins are needed only small amounts to keep the human organism in homeostasis or health. One of these essential vitamins include vitamin D, which the body needs but cannot manufacture in sufficient quantities to support its functioning. Vitamin D is consumed from food and supplements or synthesized from exposure to sunlight. The sun remains a free and high-quality source of vitamin D. Currently vitamin D deficiency is becoming a pandemic owing to the sophisticated lifestyle changes with practically nil exposure to sunlight in the modern world. Various factors like latitude, season and time of the day, pigmentation of the skin, ageing and the topical use of a sunscreen, influence the amount of synthesis of vitamin D in the skin¹.

Vitamin D is synthesised in the skin from exposure to the sun's UVB radiation which is ranging from 290-320 nanometers (nm). During exposure to sunlight, 7-dehydrocholesterol (7-DHC) located in the skin, is quickly converted to previtamin D₃ which then enters circulation. Vitamin D₃ undergoes its first hydroxylation in the liver by the 25-hydroxylase enzyme to 25(OH) D₃ and final hydroxylation occurs in the kidney by the 1 α -hydroxylase enzyme to 1, 25(OH) 2D₃². Vitamin D produced in the skin remains in circulation longer than vitamin D ingested from the diet. The production of vitamin D from sun is 100% bound to vitamin D binding protein (DBP), while vitamin D from food sources is only 60% bound to DBP².

Current scientific literature projected that outdoors direct sunlight skin exposure of the face, arms and hands for 5–10 minutes 2 or 3 times a week combined with vitamin D supplements is required to ensure vitamin D sufficiency³. Even though only small quantities are needed, this synergistic fat-soluble vitamin D deficiency has a ripple effect and associated with many chronic illnesses such as Type 2 Diabetes mellitus, Asthma, Cancer, and Hypertension among various populations.

Individual sunlight exposure can be measured with objective methods including observations, spectrophotometers, personal dosimetry using polysulphone film, skin swabbing using spectrophotometer^{4,5,6}. Compared with other measurements, self-reported sun exposure questionnaires remain the most cost-effective assessment of sunlight exposure among population. Therefore this study aimed to develop and validate a sunlight exposure for quantification of sun light exposure among population.

MATERIALS AND METHODS:

DESIGN:

Methodological design was followed to develop the validity and

reliability of the self-reported sun exposure questionnaire in this study.

Participants

Subjects in this study were general population visiting Medical OPD at Chettinad Hospital and Research Institute in Kelambakkam, Tamilnadu, India. The study Protocol were approved by Institutional ethical Review board prior to the instigation of the study.

Development of Self-reported sunlight exposure questionnaires

Before starting the preparation of questionnaire author completed extensive literature review to retrieved already published tool. Based on review constructed self - reported sun exposure questionnaire consist of following four domains

Part I-Knowledge related to Vitamin D & Sun light

Part II- Skin Phenotype Questionnaire

Part III- Sun Exposure questionnaire

Part IV- Sun Protection Behaviour

Following that demographic questions on age and Gender were included.

DATA COLLECTION PROCEDURE

The questionnaire was self-administered among the 50 general population under the direct supervision of the author. Subjects took 10 minutes to complete the questionnaire. After the thorough explanation about the study and got the informed consent the data were collected in two different occasions that is two weeks apart from the subjects.

Item analysis

It involves statistical analysis of the each item in four domains to identify the items which can be retained and need to discard.

Validation of the questionnaire

To validate the tool Content validity method was followed and to assess the reliability two methods were used 3. Internal consistency validity 4. Test retest reliability.

CONTENT VALIDITY:

Content validity refers to "the sampling adequacy of items for the construct that is being measured"⁶. The content validity Index scale was prepared by author and tool was evaluated by using the 4 point CVI rating scale. The self - reported sun exposure questionnaire was evaluated by 5 experts with discipline in nursing and two experts from dermatologist. Among them three experts were given the report about the CVI scale.

INTERNAL CONSISTENCY VALIDITY:

Repeated measurements of same phenomenon is referred as reliability⁷. Cronbach's alpha method was used to analyse the internal consistency validity. Cronbach's alpha ranges from r=0 to 1. If r=0.7 or greater is considered as the tool is reliable⁸.

TEST RETEST RELIABILITY:

It means administering the same tool to the same group of test takers under the same conditions in two different occasions⁹. Pearson's correlation between the scores on the first and the second testing¹⁰. The value for a Pearson's coefficient correlation can fall between 0.00 (no correlation) and 1.00 (perfect correlation)¹¹.

RESULTS:

In total 50 subjects were completed their questionnaire twice. Majority of the subjects (36%) aged 50 and above and 30% belongs to 20 to 29 years. 52% of the subjects were female. The content validity Index score was analysed. The overall content validity index score from the three experts showed that 0.98 and they suggested for minor correction in the question which was incorporated later.

Karl Pearson's coefficient correlation was followed to assess the reliability of the each domains in the questionnaire. Table 1 shows the reliability of the each domains. The internal consistency reliability was assessed by using the overall Cronbach's alpha. The analysed value was 0.820 it's showing the acceptable internal consistency of the questionnaire.

TABLE 1- KARL PEARSON'S CORRELATION OF THE QUESTIONNAIRE DOMAINS

S.NO	QUESTIONNAIRE DOMAINS	RELIABILITY SCORE
1.	Knowledge Related To Vitamin D & Sunlight	0.858
2.	Skin Phenotype Questionnaire	0.725
3.	Sun Exposure Questionnaire	0.900
4.	Sun Protection Behaviour	0.794

DISCUSSION:

The recent scientific and media interest in vitamin D, health effects, and sun exposure, many people know about vitamin D. 80% of vitamin D is synthesized in the skin through ultraviolet B (UVB) radiation, and solar UVB radiation. The duration of Sun exposure, skin phenotype and sun-protection behaviours are concerns about the vitamin D synthesis which is necessary to prevent disease and optimize health¹¹. 90% of the population are affected with vitamin D deficiency. It is essential to enumerate the status of vitamin D in the population and to find its relation to disease outcomes. Assessment of sunlight exposure is an important factor should be consider while computing the vitamin D. Present day no standard, validated sunlight exposure questionnaires are available to quantify exposure. Through extensive review of literature, this is one of the first studies which developed a valid questionnaire to measure the sun light exposure, sun protection behaviour and also assessed the skin phenotype the one of the significant factor influencing the synthesis of vitamin D through sunlight. This study revealed that the questionnaire has good internal consistency and reproducibility.

CONCLUSION:

The developed sun exposure recall questionnaire has adequate validity and reliability to assess the sun exposure prior to estimate the vitamin D status. The questionnaire can provide cost effective important tool to measure the sun exposure among population.

CONFLICT OF INTEREST

The author had no conflicts of interest in relation to this manuscript.

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