

Original Article

Vitamin D deficiency awareness among African migrant women residing in high-rise public housing in Melbourne, Australia: a qualitative study

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The aims of this study were: 1) to explore the individual perceptions, experience and understandings of vitamin D deficiency (VDD) amongst African migrant women residing in high-rise public housing, 2) to identify the most useful sources of information about VDD among this population, and 3) to document the barriers and enablers to addressing VDD. The Health Belief Model was used to guide the study. Convenience sampling was used with women living in particular high-rise public housing. Five focus group discussions were conducted (n=30). Thematic analysis was used to code and categorise the data to develop a deeper, conceptual understanding of the issue. We found that participants were aware of VDD and could identify the impacts that VDD had on their health. Barriers to addressing VDD included the women's: 1) living conditions in Australia, 2) risk of skin cancer, and 3) cultural roles in the family. The most positive strategy for preventing and addressing VDD was peer information sharing. This study has highlighted the significant need for health promotion strategies to combat VDD in this population. Future health promoting public health strategies for this population should encompass community-based peer education programs. This study demonstrates the critical role of qualitative inquiry in gaining a deeper understanding of VDD in a particular migrant community. It is clear that this issue requires a coordinated solution that must involve the community themselves. Health care professionals must take into consideration the multiple barriers that exist to address VDD which is a significant public health issue.

Key Words: vitamin D deficiency, migrant, women's health, public housing, health promotion

INTRODUCTION

Approximately three per cent of Africa's population have migrated internationally either voluntarily or as refugees.¹ The migration pattern follows close economic, political and cultural ties with former colonial rulers, meaning that the majority of the preferred destination of most African migrants is Europe.¹ Their migration to Australia began in the late 1990s to escape chronic poverty and hunger, wars and human rights abuses as well as natural disasters, and the number has increased significantly over the last 10 years (currently representing 1% of the Australian population).² Upon arrival in Australia, vitamin D deficiency (VDD) is among the many health and settlement issues experienced by dark skinned migrants, including those from Africa.³ If left unaddressed, VDD can lead to deleterious health effects including rickets and osteomalacia (both forms of a metabolic bone disease characterised by softening and weakening of bones due to defective or inadequate bone mineralization)^{4,5} as well as increased

risk for type 2 diabetes, hyperlipidemia and other metabolic syndromes.⁶

Internationally, over the past four decades, rickets has been documented among migrant children of Mediterranean origin,⁷ and VDD has been reported among veiled or dark skinned pregnant women.⁸ In Australia, the prevalence of VDI/VDD (25(OH)D <50 nmol/L)⁹ among African migrant populations has been estimated to be 87% among children¹⁰ and 92% among adults.³ Available data

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suggest that the prevalence of rickets among migrant children of Mediterranean origin was 70% in the 1960-70's.⁷ In 2007, McGillivray and colleagues¹⁰ found that among 232 East African (Somalia, Sudan, Ethiopia, Kenya, Egypt, Eritrea or Djibouti) migrant children and adolescents (0-17 years) living in Melbourne, that VDD (serum 25-OHD level <25 nmol/L) prevalence was 44%, and overall 87% had VDD or vitamin D insufficiency (serum 25-OHD level <50 nmol/L). They found that VDD was associated with being younger in age, being female, length of residence in Australia, decreased daylight exposure, and whether vitamin D levels were tested in winter or spring.

Four years earlier, Skull and colleagues³ found that VDD prevalence among African migrants from the Horn of Africa (Somalia, Sudan, Ethiopia, Eritrea or Kenya) was 53% (male 20% female: 72%), and overall 92% (male: 20%; female: 72%) had VDD or vitamin D insufficiency. They found that VDD was associated with 1) being mostly covered when outdoors, 2) Muslim religion, and 3) longer duration of residence in Australia.

Despite the increased rates of VDD among African migrants in Australia, studies that explore awareness of VDD and its risk factors among this at-risk population are lacking. However, in order to better understand African migrants' awareness of VDD it is important to consider this within a relevant theoretical framework. This is particularly important when examining awareness of diseases among populations from traditional cultures and with low health literacy, where awareness of health is socially constructed, leading to the clash between expert and lay knowledge.¹¹ One theory applicable in this context is the Health Belief Model (HBM). The HBM is a theoretical model that highlights the function of an individual's beliefs in decision making.¹² The HBM is useful in highlighting the range of complexities that might be involved in predicting behaviours or identifying elements that are important in influencing people to change. The three main categories of the HBM are 'individual perceptions' 'modifying factors' and 'likelihood to action.' This model is suitable for this study as it reflects the aims of the project. These broad classifications are also relevant to VDD among African migrants. Understanding how African migrants acknowledge VDD, conceptualise preventive strategies is paramount and a first step towards informing public health programs. Therefore, the purpose of this qualitative study was threefold: 1) to explore the experience and understandings of VDD amongst a group of dark skinned and veiled African migrant women residing in high-rise public housing in the western region of Melbourne, 2) to identify their most useful sources of information about preventing and addressing VDD, and 3) to report the strategies and potential barriers to addressing VDD in future community-based interventions.

METHODS

Aims

The aims of this study were: 1) to explore the individual perceptions, experience and understandings of vitamin D deficiency (VDD) amongst African migrant women residing in high-rise public housing, 2) to identify the most useful sources of information about VDD among this

population, and 3) to document the barriers and enablers to addressing VDD.

Study design

A qualitative approach was adopted for this project as it was deemed most appropriate to explore and gain a deeper understanding of issues relating to VDD in this sub-population. Using the HBM guided the researchers to explore participant's cultural perceptions of VDD and potentially promising solutions for addressing the health issue.

Culture accounts for numerous perceptions of health which may change over time, especially when families migrate to a new country and their culture is no longer the dominant one.¹³ From a constructivist perspective,¹⁴ culture is deemed to be constructed and deconstructed over time and it is the participants' understanding of this reality which is paramount in establishing their experiences of VDD. With this in mind, it has been suggested that sensitive cultural and religious issues are best explored in small groups with familiar and/or similar type of individuals.¹⁵ In addition, in discussion with community workers, it was felt that this method would be appropriate and feasible for the participants. Therefore focus group (FG) discussions were selected as the most appropriate method.

Selection of study participants

This project used convenience sampling to identify 30 women to partake in the study. The women were self-identified as being dark skinned, wore a veil and resided in high-rise public housing in the inner west region of Melbourne. Access to the participants was facilitated by the Vitamin D Project Worker from the neighbouring Community Health Service who had a long-standing relationship with the women. All participants arrived in Australia as Humanitarian Refugees and originated from the Horn of Africa countries (Somalia, Eritrea, Oromo) in the last ten years. They are practicing Muslims and wore variations of the hijab. Ethical approval was obtained from Deakin University Human Research Ethics Committee (DUHREC) and participants confirmed their participation by reading the Plain Language Statement and signing consent forms. An interpreter was available at five FGs to assist those who could not read English. All participants were able to verbally communicate in English but an interpreter was used on one occasion (Somali). Five focus groups were conducted in total. It is important to report here that this project was undertaken as part of an Honours research degree, with AP the student researcher.

Question guide

The development of the questionnaire was guided by the structure of the HBM. Questions were structured under the headings: individual perspectives, modifying factors, and likelihood to action, which correspond respectively to each of the three project aims. This provided a directive framework for identifying key areas which needed to be explored.¹⁶ Within each of the categories (individual perceptions, modifying factors and likelihood to action) broad questions were developed by the researcher (AP) along with the inputs of three other research team members (TC and two staff at the neighbouring Community

Health Service). Questions participants were asked included: 'What does VDD mean to you?', 'Where do you think you could get help or information about VDD from?' and 'Do you believe you are VDD?' Questions that were used as prompts were also developed to facilitate the discussion. Some prompts included 'Can you tell me more about that?' 'How did that affect you and your family?' Each focus group took approximately 40 minutes. To aid in clarification AP repeated the answers back to participants to ensure responses were understood correctly.

Data collection and analysis

All focus group discussions, bar one, were audio taped and transcribed verbatim by the student researcher (AP). In the FG with no voice recording detailed hand-written notes were taken by AP and a scribe and these were combined to make one transcript. The interview transcripts were analysed thematically. The approach involved identifying, analysing and reporting patterns (themes) within data.¹⁷ Voice recordings were listened to twice and the transcripts were read and re-read by AP who manually coded the text in the transcripts. AP then 'grouped' the similar codes into categories which facilitated the development of the themes. Given the use of the HBM in designing the research and interview questions, broad a priori themes had been identified and the coding and categorising allowed for additional themes to emerge. These themes were then refined between the student and supervisor (AP and TC).

RESULTS

A total of 30 women were invited to participate in the research and all agreed. All women lived in public high rise housing in the western region of metropolitan Melbourne. All women were from the Horn of Africa, most from Somalia and a small proportion from other African countries including Eritrea and Oromo. All had arrived in Australia as humanitarian refugees within the last five years; however a few women had been in Australia for approximately ten years. All women identified as Muslim and all wore a hijab.

Three broad themes emerged from the data: 1) Knowledge and awareness of VDD, 2) Barriers to preventing and addressing VDD, and 3) Community solutions for preventing and addressing VDD. These will now be presented along with their subthemes.

Knowledge and Awareness of VDD

Familiarity with VDD

The results indicate that participants in this study were familiar with what VDD was and its impact on their health. They were aware of the factors contributing to VDD such as lack of exposure to sunshine, having darker skin, lack of Vitamin D rich foods, and presence of veils, and some could recall the health related consequences caused by the condition. When asked what some of the effects of untreated VDD were, a participant responded with the following quote which was a common view held by most of the participants:

'you become forgetful. Tired and sore but very forgetful you lose things in your mind.'

Participants were also familiar with supplementation and dietary practices to support increasing their vitamin D (VD) levels. Although many reported that they knew about how to prevent VDD, they remained deficient. Participants also reported that many of their friends in the community were either VDD or had been deficient before.

Skin colour

Participants were aware that their skin pigmentation was a contributing factor to their higher susceptibility of VDD. They understood that people with darker skin complexion needed to stay in the sun longer so their bodies could absorb the vitamin D as compared to someone with lighter skin pigmentation. The following quote illustrates this:

'And the other thing I think is because we used to live in African country we have dark skin and we have melanin so its kind of protection of sun so we need more sun, more sun to be outside.'

Gender

Many participants believed that women and children in their community were at greater risk of being VDD. Gender-related issues participants identified in relation to their increased risk were: their cultural and religious practices (wearing a veil), their role as a mother and caregiver of the family, and physiological characteristics of being a female such as pregnancy, menstruation and lactation. Many women received their VDD diagnosis when they were pregnant and were tested in the hospital.

Barriers to addressing VDD

Living conditions

Participants had a good understanding of the different environments and living conditions between Africa and Australia and how they believed this had negative effects on their health. They reported that VDD was not a problem in Africa and many had never heard of VDD until they came to Australia. Participants felt that the colder climate in Melbourne, with less sunny days meant there was reduced opportunity for direct sun light exposure.

The participants reported that their imposed lifestyle in Australia such as living in high-rise buildings, with no backyard or private balcony made it extremely difficult for them to gain adequate sun exposure in a culturally appropriate manner (cloistered from male view). Participants reported that living in high-rise housing made it extremely difficult for them to get regular time outdoors. One woman spoke about the type of behaviour/lifestyle that was adopted with living in high-rise housing:

'and now the lifestyle is different because we are the 20th floor and you only go out when you have to. You don't go out here for relaxation. You just go out there to grab something or go get something, you are in a rush'

Further to this, many stated that in Africa, it was common practice for women to walk daily in the sun to the markets to purchase their fresh food. It was evident that this no longer occurred for these participants, which had a dramatic effect on their lifestyle, food choice and impacted on their sense of community.

Skin cancer

Several women in the study expressed concerns about the risk of developing skin cancer in the Australian sun. Many believed that in their countries in Africa, although the climate was a lot warmer, sun exposure did not contribute to skin cancer and they enjoyed time in the sun. One participant summed this up:

'But when we were in our countries, we were exposed to the sun a lot. Our sun is very healthy. We don't have cancer, we don't have cancer in the skin.'

A few women stated that when they weighed up the two options, risking skin cancer or becoming VDD, they indicated that it is probably safer to have VDD than having cancer, hence preferring to remain indoors and out of the sun. The following quote illustrates this point:

'There are some rays in the sun. Skin cancer, so sometimes we compare, we say is it better to have lack of vitamin D or to have skin cancer? You compare the both, which one is safer. We think vitamin D (deficiency) is safer'

Cultural roles

A strong barrier to prevention of VDD identified by the women was their cultural role in the family, being a mother and caregiver. This affected their ability to achieve sufficient VD levels as well as affecting their overall health. They reported how the needs of their family came first and until everyone else was fed and looked after, they would only then look after themselves. This had a flow-on effect for supplementation in terms of not providing themselves with adequate nutritious food. Most women were aware that supplementation was an effective way in treating VDD, and many had Ostelin supplements at home, yet were still VDD as they consistently forgot to take their supplements. The women explained that their cultural role in the family meant that they were so busy looking after everyone else (several children, husband and often elderly parents) made their health second place after the needs of the family.

Community solutions for preventing and addressing VDD

The role of a general practitioner (GP)

There was mixed perspectives regarding how effective the local GP was in providing information about VDD and aiding women to address their deficiency. Some of the women felt the local GPs didn't show them enough time or respect and they had to prompt the doctor to check their VD status. The following quote from one participant reflects the frustrations that many women had.

'They only worried about time; they don't care about your health and your kids. But you need to take action and say, excuse me!'

Although not all women were satisfied with the support provided by their doctor, it was evident the doctor's advice was extremely influential and women were willing to listen. One participant who was happy with her local GP and describes how the health system had changed over the last four years:

'That's good the doctors now aware, they mention when you visit them your levels and you need to check. Whereas four years (ago), like even I know it was an

issue like you have to demand them to ask if they are quite aware so doctors do know. They are aware now because they were finding out a lot of Somalis were ending up low in vitamin D, so now it's on their radar.'

The two main hospitals in the area, The Royal Women's Hospital and The Royal Children's Hospital were also perceived as extremely helpful in providing information and also testing for VDD. When asked *where did you hear information about VDD?* One participant stated, with others also agreeing that they went to the:

'Royal Children's Hospital, Women's Hospital. Now children have blood test at Royal Women's Hospital.'

All participants reported that support from the community via peer information sharing would be a positive strategy for addressing this issue. They felt that it was important for everyone in the community to be educated about the issue and that the profile was raised in terms of how important it was to start addressing it. They reported that it would be much more appropriate to have their peers disseminating information, that this approach would have much more influence than a health professional coming into the community and providing advice. The women reported this option was ideal because it was through their community networks that they had heard of VDD and had been urged by the women to be tested for their VDD status. The following quote from one woman, speaking on behalf on many, illustrate this transfer of information:

'Yeah when my sister was pregnant that's when she said maybe you should go get tested and I was low at 18. The doctor said 50-150 is good but I was 18!'

Although it was identified that several local primary health services were providing information and even prompting testing for VDD, there remained significant barriers for the women to address their deficiency.

DISCUSSION

This is the first study to explore the knowledge and awareness of VDD among dark skinned and veiled African migrant women residing in high-rise public housing, in the western region of Melbourne; their sources of information about preventing and addressing VDD, and strategies and potential barriers to addressing VDD in future community-based interventions. Previous studies on VDD have indicated three main issues 1) VDD is a serious health problem,¹⁸ 2) dark skinned and veiled women who live in western countries have an increased risk of VDD,^{10,19} and 3) The Australian climate and change in lifestyles can be unaccommodating to low SES migrants from African countries.²⁰ This research contributes new findings including: 1) women living in high-rise public housing in the western region of Melbourne have a good awareness of what vitamin D deficiency is and are aware of several causal risk factors. However, they are not aware of the long-term serious effects of prolonged deficiency like cancer, CVD and type two diabetes,²¹ 2) significant complex barriers exist for women to successfully change their behaviours due to living in high-rise housing without provision of adequate outdoor space and their cultural and gender roles which hinders their ability to prioritise the importance of their own health; 3) health

promotion interventions to address VDD should encompass peer information strategies as the women identified this as the most effective way in disseminating information and encouraging long term behaviour change.

Although the study participants were knowledgeable about VDD and understood its consequences, they did not know the negative effects of prolonged VDD and its relationship with chronic diseases such as cancer cardiovascular disease and diabetes.²² While the study participants highlighted the need for extra vitamin D to compensate for the needs associated with physiological changes including to pregnancy, lactation, menstruation and menopause, their views are not supported by the literature as these physiological characteristics require no extra amount of vitamin D.²³ This misconception could be addressed through the provision of correct information disseminated through peer networks.

Our results suggest that dark skinned women included in our study were aware of VDD, but they are not taking long-term action to prevent the deficiency. This finding is consistent with the literature.²⁴ This behaviour can be explained by the HBM in terms of 'individual perceptions' which suggests that to address behaviour change an individual must weigh up their *perceived susceptibility*, which is their belief that they are likely to encounter the condition (in this case VDD) versus their *perceived seriousness*.²⁵ It was evident that the participants knew about VDD and were able to recall some of the impacts on health but were not aware or did not mention the longer term risks such as diabetes, CVD and cancer.²² Thus their *perceived seriousness* did not outweigh their *perceived threat*. In addition to this Talbot and Verrinder²⁵ suggest when weighing up *perceived seriousness*, the effects on family, work and social life need to be considered before behaviour change can occur. The data clearly shows that women were putting their own needs and their health last, as constrained by their gender roles, and therefore failing to sufficiently treat their VDD. *Perceived seriousness* may not have appeared manageable and could affect the family therefore no further action was taken.

Much of the literature on behaviour change has stated that enabling and reinforcing factors are crucial in determining one's ability to sustain behaviour change. Simply knowing about the issue may not be enough, and there are wider determinants and enablers that influence behaviour that need to be considered. Health promotion interventions need to consider a more holistic approach, including promoting gender equity and stressing the importance of women's health. The HBM considers these factors as *modifying factors*.¹² Internal factors including personality combined with external factors such as socioeconomic status and cultural factors are weighed up with individual perceptions in order to assess ones likelihood of behaviour change.²⁵ The external factors in this study, socioeconomic status, housing arrangements and cultural roles constitute significant barriers for these women to contemplate long-term behaviour change. However being of a low SES is not something an individual or group of people can instantly change or have much control over. Therefore health promotion messages and interventions need to be designed to accommodate these barriers and assist people in overcoming them. For example, providing

a private place where women who are living in high-rise housing can go to spend appropriate time in the sun.

Our findings suggest that lifestyle changes increased the risk of VDD in our study population. However, there have been very few studies investigating the risk of VDD in individuals who live in high-rise public housing, especially for women. Our findings are similar to those reported by Benson²⁰ who suggest that the increased risk of VDD among dark skinned migrants in western countries such as Australia could be due to indoor lifestyle and/or an increased latitude.

Our findings suggest that study participants were not entirely satisfied with the role of GPs in helping them address VDD. The literature has shown that ethnic and minority groups, in western countries^{26,27} experience a poorer quality of health services. The inadequate relationship between doctors and their clients may reflect a lack of familiarity with the patient's culture and how to provide information, advice and support in cross-cultural situations. This may be further compounded by other barriers such as gender and ethnicity. Palotta-Chiarolli²⁸ highlights that health promotion professionals including doctors, need to be trained and aware of ethnic differences and how to deal with people in a humane and trusted way. She highlights that doctors may not be acknowledging the individual diversity of women through religion, culture and their lifestyle.

In determining *likelihood to action* participants stated that peer information sharing in the community was probably the most effective strategy in addressing health issues and prompting behaviour change. This was described as having the greatest impact on the community as it was regarded as a more reliable and trusted source of information. These findings are vitally important, and provide significant actions to be considered for health promotion professionals for addressing VDD in culturally diverse communities. The literature has shown that peer education and support is a successful strategy for improving the health and well-being of individuals.^{29,30} Health promotion strategies need to embrace the multiple strategies required for outcomes such as education for VDD as well as programs within in the community that encourages one another to continue to take action.

There are a few Australian studies looking at vitamin D deficiency in dark skinned and veiled women and the associated implications for health.³¹ Longitudinal studies are required to determine the long-term effects of vitamin D deficiency in this group of women and high-rise public housing and to monitor and evaluate successful prevention strategies.

Limitations

The participants in this project were mostly recent arrivals from Horn of Africa countries and their participation meant that they expressed themselves in a language that was not their first or preferred language and/or through an interpreter. Limitations that may result from conducting focus group discussions within this population group may be that they were reluctant to give negative information, they may comply or agree with one another and/or they may not understand the questions completely and blame it on their own inadequacies. Student researcher AP was not

of the same ethnicity of participants. It could be suggested that participants may have been inclined to open up more to a researcher of the same ethnicity who had a greater understanding of their cultural and religious values. Although every effort was made to work with the VDD project worker who was of African background to ensure that the research was appropriate and culturally sensitive at every stage of the research process.

Conclusion

This study has demonstrated the significant need for health promotion strategies in Melbourne Australia to combat VDD in dark skinned and veiled women. It is well established that simply providing knowledge and information about a particular health issue is not enough to result in sustained behaviour and lifestyle change. As reported in this study, there are wider determinants and enablers that influence behaviour and health promotion and public health practitioners must consider these critical factors that encompass cultural and gender-based influences. Interventions focused on reducing VDD should focus on creating more supportive environments for migrant communities, which will enable and support behaviours that are mindful and responsive to cultural difference. Continued promotion to promote long-term change, women susceptible to VDD need to be able to understand the perceived severity, combined with their perceived susceptibility. We recommend further research to determine whether basic structural changes to high-rise public housing environments would allow veiled women to benefit from adequate sun exposure in a culturally acceptable way. Finally public health and health promotion campaigns should encompass peer education as an effective approach in addressing VDD.

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AUTHOR DISCLOSURES

The author(s) declare that they have no competing interests. There was no funding for this research as it was a student project.

REFERENCES

- Ratha D, Mohapatra S, Özden C, Plaza S, Shaw W, Shimeles A. Leveraging migration for Africa: Remittances, Skills, and Investments. Washington: The World Bank, 2011.
- Australian Bureau of Statistics. 2006 Census of Population and Housing (cat. No. 2914.0.55.002). Canberra: ABS; 2007.
- Skull S, Ngeow J, Biggs B, Street A, Ebeling P. Vitamin D deficiency is common and unrecognized among recently arrived adult immigrants from The Horn of Africa. *Intern Med J*. 2003;33:47-51.
- Khaw K, Sneyd M, Compston J. Bone density, parathyroid hormone and 25-hydroxyvitamin D concentrations in middle aged women. *Br Med J*. 1992;305:273-7.
- Robinson P, Högler W, Craig M, Verge C, Walker J, Piper A, Woodhead H, Cowell C, Ambler G. The re-emerging burden of rickets: a decade of experience from Sydney. *Arch Dis Child*. 2006;91:564-8.
- Renzaho A, Halliday J, Nowson C. Vitamin D, obesity, and obesity-related chronic disease among ethnic minorities: A systematic review. *Nutrition*. 2011;27:868-79.
- Mayne V, McCredie D. Rickets in Melbourne. *Med J Aust*. 1972;2:873-5.
- Grover S, Morley R. Vitamin D deficiency in veiled or dark-skinned pregnant women. *Med J Aust*. 2001;175:251-2.
- Whiting SJ, Calvo MS. Dietary recommendations for vitamin D: a critical need for functional end points to establish an estimated average requirement. *J Nutr*. 2005; 135:304-9.
- McGillivray G, Skull SA, Davie G, Kofoed SE, Frydenberg A, Rice J, Cooke R, Carapetis JR. High prevalence of asymptomatic vitamin D and iron deficiency in East African immigrant children and adolescents living in a temperate climate. *Arch Dis Child*. 2007;92:1088-93.
- Aikins Ad-G, Boynton P, Atanga LL. Developing effective chronic disease interventions in Africa: insights from Ghana and Cameroon. *Global Health*. 2010;6:1-15.
- Naidoo J, Wills J. Health Promotion. Foundations for Practice. 2nd ed. New York: Bailliere Tindall; 2003.
- Morse J, Richards L. Selecting a method. Read me first for a users guide to qualitative methods. Thousand Oaks, CA: Sage; 2002. pp. 43-64.
- Bryman A. Social Research Methods. 2nd ed. Oxford: Oxford University Press; 2004.
- Ruppenthal L, Tuck J, Gagnon AJ. Enhancing research with migrant women through focus groups. *West J Nurs Res*. 2005;27:735-54.
- Grbich C. Qualitative Research in Health. An introduction. St Leonards: Allen & Unwin; 1999.
- Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol* 2006;3:77-101.
- Working Group of the Australian and New Zealand Bone and Mineral Society, Endocrine Society of Australia, Osteoporosis Australia. Vitamin D and adult bone health in Australia and New Zealand: a position statement. *Med J Aust*. 2005;182:281-5.
- Dawodu A, Wagner CL. Mother-child vitamin D deficiency: an international perspective. *Arch Dis Child*. 2007;92:737-40.
- Benson J, Skull S. Hiding from the sun - Vitamin D deficiency in refugees. *Aust Fam Physician*. 2007;36:355-7.
- Holick MF. The vitamin D epidemic and its health consequences. *J Nutr*. 2005;135:2739-48.
- Holick M. Vitamin D deficiency. *New Engl J Med*. 2007; 357:266-81.
- Wardlaw GM, Hampl JS, DiSilvestro RA. Perspectives in Nutrition. 6th ed. New York: McGraw-Hill Companies; 2004.
- Brand CA, Abi HY, Couch DE, Vindigni A, Wark JD. Vitamin D deficiency: a study of community beliefs among dark skinned and veiled people. *Int J Rheum Dis*. 2008;11: 15-23.
- Talbot L, Verrinder G. Promoting health: the primary health care approach. 3rd ed: Churchill Livingstone; 2005.
- Johnstone M-J, Kanitsaki O. Health care provider and consumer understandings of cultural safety and cultural competency in health care: An Australian study. *J Cult Divers*. 2007;14:96-105.

27. Markovic M. Responding to cultural diversity in women's health. A resource for health professionals. Melbourne: Key Centre for Women's Health in Society; 2001.
28. Pallotta-Chiarolli M. 'From Difference to Diversity': Exploring the social determinants of youth health. In: Keleher H, Murphy B, editors. Understanding Health, A Determinants Approach. South Melbourne: Oxford University Press; 2004.
29. Dijk F, Reubsaet A, de Nooijer J, de Vries H. Smoking status and peer support as the main predictors of smoking cessation in adolescents from six European countries. *Nicotine Tobacco Res.* 2007;9:495-504.
30. Ross MW, Harzke AJ, Scott DP, McCann K, Kelly M. Outcomes of project wall talk: An HIV/AIDS peer education program implemented within the Texas state prison system. *AIDS Educ Prev.* 2006;18:504-17.
31. Abi H. Community and women's health service organisational health promotion report. Melbourne: Dousta Galla Community Health, 2007.

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居住於澳洲墨爾本國宅之非裔移民婦女對維生素 D 缺乏之認知：質性研究

本篇研究之目的：1)探討居住於國宅之非裔移民婦女，個人對於維生素 D 缺乏的認知、經歷和理解之情形；2)確立族群中關於維生素 D 缺乏之資訊的最有效來源；3)確認防治維生素 D 缺乏之障礙與可行辦法。本研究以健康信念模式(HBM)為準則，並以任意抽樣方式擇出居於國宅之婦女為研究對象，分成五個焦點討論小組進行(共 30 位)。為了利於對問題有更深入及概念之理解，利用主題分析法將資料編碼及分類。我們發現，參與者對於維生素 D 缺乏都有認知，並且可指出維生素 D 缺乏對於健康的影響。阻礙防治這些婦女維生素 D 缺乏之因素有：1)她們在澳洲的居住情形；2)擔心患皮膚癌之風險；3)婦女在家庭文化的角色。防治維生素 D 缺乏最有效的策略，就是同輩間的訊息分享。本研究已突顯此族群中防治維生素 D 缺乏最需要之健康促進策略，未來針對此族群的健康促進公衛策略應包含以社區為主的同輩教育計畫。本研究也呈現了質性訪問的重要角色，可增加對特殊移民社區之維生素 D 缺乏現況的深入了解。很明顯的，此問題之解決需整合各界，包含社區本身。醫療照護專業者必須將防治維生素 D 缺乏之多重障礙納入考量，而這是一個重要的公共衛生議題。

關鍵字：維生素 D 缺乏、移民、婦女健康、國民住宅、健康促進