Identifying multi-level culturally appropriate smoking cessation strategies for Aboriginal health staff: a concept mapping approach

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Abstract

Aboriginal Australians, including Aboriginal Health Workers (AHWs), smoke at rates double the non-Aboriginal population. This study utilized concept mapping methodology to identify and prioritize culturally relevant strategies to promote smoking cessation in AHWs. Stakeholder participants included AHWs, other health service employees and tobacco control personnel. Smoking cessation strategies \( n = 74 \) were brainstormed using 34 interviews, 3 focus groups and a stakeholder workshop. Stakeholders sorted strategies into meaningful groups and rated them on perceived importance and feasibility. A concept map was developed using multi-dimensional scaling and hierarchical cluster analyses. Ten unique clusters of smoking cessation strategies were depicted that targeted individuals, family and peers, community, workplace and public policy. Smoking cessation resources and services were represented in addition to broader strategies addressing social and environmental stressors that perpetuate smoking and make quitting difficult. The perceived importance and feasibility of clusters were rated differently by participants working in health services that were government-coordinated compared with community-controlled. For health service workers within vulnerable populations, these findings clearly implicate a need for contextualized strategies that mitigate social and environmental stressors in addition to conventional strategies for tobacco control. The concept map is being applied in knowledge translation to guide development of smoking cessation programs for AHWs.

Introduction

Indigenous peoples worldwide have disproportionately elevated rates of tobacco use. Aboriginal and Torres Strait Islander Australians (hereafter referred to as Aboriginal peoples) have a prevalence of smoking more than double that of non-Aboriginal Australians (45% vs 20%) [1]. High rates of smoking amongst Aboriginal Australians is thought to reflect cultural and historic factors, including provision of tobacco in exchange for labour during colonization, and the high burden of socioeconomic disadvantage experienced by Aboriginal communities [2]. Major disparity exists between the health of Aboriginal relative to non-Aboriginal Australians, and tobacco is the leading modifiable risk factor contributing to this health gap [3]. Reduction in smoking has strong potential to improve the health and well-being of Aboriginal peoples. The Australian government has prioritized smoking reduction as a primary mechanism to achieve its goal of closing within one generation...
the life expectancy gap between Aboriginal and non-Aboriginal Australians [4].

Aboriginal Health Workers (AHWs) work within a variety of health and community settings as primary care practitioners responsible for providing comprehensive health care to Aboriginal clients—including smoking cessation services [5]. High numbers of AHWs are themselves smokers (e.g., 49% [6] and 54% [L. Maksimovic et al., manuscript under review]), however, and this negatively impacts the nature of services provided to the community. A recent systematic review implicates smoking amongst AHWs as a barrier to the delivery of tobacco interventions to Aboriginal peoples [7]. AHWs report that smoking inhibits their provision of smoking cessation advice to Aboriginal clients for fear of appearing hypocritical [8]. Effective smoking reduction amongst AHWs has the potential to yield improved delivery of smoking cessation services to Aboriginal clients and thus reduced rates of smoking in the broader Aboriginal population.

The South Australian government has prioritized smoking cessation in Aboriginal health staff as a key component of its Aboriginal Health Care Plan (2010–16). Little is known, however, about how best to enable Aboriginal health staff to quit smoking. Trials of smoking cessation programs targeted specifically to reduce smoking in AHWs are lacking [9] and few studies of smoking cessation programs have been undertaken with Aboriginal populations in general [2]. Some commentators maintain that Aboriginal peoples should respond to the same tobacco control strategies as the general population, and that in designing new programs the ‘emphasis should be on established tobacco control activities’ (p. 6) [10]. Others posit that contextual differences between Aboriginal and non-Aboriginal populations (e.g. history, cultural background or beliefs) may reduce the likelihood that interventions with proven efficacy in the general population will similarly succeed in Aboriginal communities [2, 11]. Stakeholder consultations with Aboriginal community members and health staff illustrate that largely orthodox, evidence-based tobacco control strategies are not always viewed as relevant or applicable to local Aboriginal communities [12]. Hence, it is unclear if smoking cessation programs for AHWs should draw on proven tobacco control activities, or unique approaches tailored to cultural needs.

The aim of this study was to identify and prioritize stakeholder-relevant strategies to promote smoking cessation in AHWs and create a visual framework depicting stakeholder conceptions of culturally relevant smoking cessation programs for AHWs. A structured process was needed to elucidate the contextual factors that make quitting difficult for AHWs, and identify culturally relevant targeted strategies that could enable AHWs to quit smoking. We selected concept mapping, a structured group conceptualization process that integrates input from multiple stakeholders to generate a visually depicted framework that can be used to guide action planning and program development [13]. Concept mapping was a suitable method by which to identify and prioritize smoking cessation strategies for AHWs because it involves inclusive participatory processes that derive tangible stakeholder-relevant outputs for immediate application in program planning.

Materials and methods

Study context and population

This study was conducted in South Australia where AHWs are employed in both community-controlled health services (governed by a board of local Aboriginal community members) as well as government-coordinated health services (directed by the state health department). These health services are distributed across the state in metropolitan, regional and remote locations. Smoking amongst health service staff is commonplace in these health services, with over half (54%) of AHWs surveyed in South Australia in 2009 reporting to be current smokers [L. Maksimovic et al., manuscript under review].

A partnership approach was utilized in this study where the research team comprised university-based researchers and key personnel from the Aboriginal Health Council of South Australia (AHCSA). Peak state-wide bodies responsible for AHW workforce needs (Aboriginal Primary Health Care Worker’s
Forum) and decision-making in relation to Aboriginal tobacco control (Puyu Wiya ‘No Smoking’ Advisory Group) were engaged to provide ongoing support to the project and assist interpreting findings. The Tackling Tobacco Coordinator for South Australia was engaged to provide cultural mentoring to university researchers.

The project honoured six Iga Warta principles for Aboriginal health research including pro-active prevention, cross-sectoral coordination of activities, sustainability, consideration of social health determinants, and respect for Aboriginal notions of time and space, and Aboriginal community and family [14]. Social ecological theory, which provides a set of principles for understanding the ‘interrelations among diverse personal and environmental factors in human health and illness’ [15: 283], informed the research process. Specifically, this theoretical underpinning influenced the way smoking cessation strategies were brainstormed. Stakeholders were encouraged to consider multi-level (i.e. individual, interpersonal, organizational, and so on) behavioural influences on smoking and subsequently identify multi-level smoking cessation strategies for AHWs. A social ecological perspective was appropriate in this context as it aligns with Aboriginal notions of health and wellbeing [16, 17]. Ethical approval was granted by two institutional human research ethics committees and the South Australian Aboriginal Health Research and Ethics Committee, and all participants provided informed consent.

Study design: concept mapping

The research partners (comprising key Aboriginal personnel from AHCSA and university-based researchers) considered it important that smoking cessation programs designed for AHWs should be developed by AHWs and other Aboriginal stakeholders. Such an approach is essential to ensure the cultural appropriateness and relevance of any implemented cessation programs and to generate engagement and ownership from stakeholders across the state. To this end, the concept mapping approach was selected for this study because it promotes participation by a large number of stakeholders in program design. Concept mapping is a mixed method process that combines qualitative and quantitative analysis methods with participatory group processes in a way that clarifies overall stakeholder thought in relation to a specific issue. We applied the techniques of concept mapping according to methods described in detail by Kane and Trochim [18], including a comprehensive ‘Generation of Ideas’ stage designed to meet the needs of the Aboriginal stakeholder population. The six component stages were developed during a 2-year period from August 2009 to August 2011. This project duration was necessary to enable the development of mutual trust between researchers and participants, this being fundamental to the participatory approach [19, 20], and essential for working with Aboriginal stakeholders. The application of findings is ongoing.

1. Preparation

At study initiation, the focus of the concept mapping process was clarified and the sampling framework constructed. Logistics for recruitment and data collection were determined by project partners. The sampling frame included AHWs, other health service staff and tobacco control personnel drawn from community-controlled and government-coordinated health services in South Australia to represent diverse perspectives on smoking cessation strategies for AHWs. Participation was voluntary and based on interest expressed consequent to health service site visits and networking by project partners.

2. Generation of ideas

We generated ideas through a two part process which was comprehensive and designed to create a culturally safe space for participants to share their ideas. First, we travelled across the state to meet one-on-one with stakeholders (via interviews) and with groups of stakeholders (via focus groups and informal discussions during staff meetings). Face-to-face interaction is a respectful way for researchers to engage with and build trust with participants. This approach allows for conversational-style data
gathering similar to the Aboriginal process of ‘yarning’, which is an ‘Indigenous cultural form of conversation’ [21: 37]. Whilst we did not strictly adhere to yarning as a means of data gathering (as our discussion schedules were guided by open-ended questions as opposed to the non-directed yarning style), the face-to-face conversational approach is considered a culturally acceptable style of communication and as such facilitated a sense of cultural safety among participants. The in-depth, exploratory process lasted for 12 months and included 15 field visits to health services across metropolitan, rural and remote regions of South Australia. A total of 50 stakeholders contributed to the initial identification of strategies to enable AHWs to quit smoking. Thirty-four interviews were undertaken with AHWs and other stakeholders \( (n = 23 \text{ AHWs}, n = 9 \text{ other health service staff and } n = 2 \text{ tobacco control coordinators}) \) and 17 health service staff contributed to three focus group discussions (including one individual who also participated in an interview) that were used to clarify themes emerging from interview data. They included smokers, non-smokers and ex-smokers, and were employees of both government-coordinated and community-controlled health services. We invested in this lengthy process and invited a large number of stakeholders to gain a comprehensive ground-up understanding of the complexities around smoking behaviours and consequently generate an extensive range of strategies to promote smoking cessation in AHWs.

Stakeholders were invited to participate during on-site field visits and provided informed consent. A fundamental qualitative descriptive design was utilized because we sought a comprehensive, low-inference description of stakeholder views to inform program development. Strategies to support AHWs to quit smoking were identified through analysis (in Nvivo 8 software, QSR International Pty Ltd, 2008) of transcribed text and notes taken during interviews using a qualitative content analysis approach based on the method of Graneheim and Lundman [22]. Categories that emerged from the content analysis became the statements that were consequently reviewed and refined in the second component of idea generation (a Working Group workshop).

A full-day Working Group workshop (September, 2010) was undertaken to review and refine the identified support strategies and brainstorm further ideas. The Working Group, representing broad perspectives of the smoking cessation needs of AHWs, comprised 12 Aboriginal stakeholders including AHWs \( (n = 4) \), health service chief executive officers \( (n = 2) \), a board member from a regional community-controlled health service, a workforce development officer from the AHCSA, tobacco control personnel \( (n = 2) \), a research and ethics officer and a social marketing project officer. Six members of the Working Group had previously participated in interviews or focus groups, hence a total \( n = 56 \) stakeholders contributed to the generation of ideas stage. The workshop was held at the AHCSA, and expenses for participant travel from metropolitan and regional areas were covered by the project.

The focus statement for brainstorming strategies was: ‘A program to support AHWs to quit smoking should include…’. Factors that perpetuate smoking and strategies to address these factors that were identified during stakeholder interviews and focus groups [23] were presented to the Working Group. Participants reviewed and refined the proposed strategies and identified omissions. Next, barriers to quitting for AHWs [24] were outlined alongside strategies proposed to mitigate the barriers. Participants reviewed the strategies and identified additional measures to address barriers to cessation. An inclusive approach was used in that no ideas put forward by Working Group members were eliminated at any stage.

There were 59 strategies identified during the analysis of interviews and focus groups that were initially presented to the assembled Working Group. During the one-day workshop, the Working Group generated 95 smoking cessation strategies including the initial 59 strategies refined and/or approved and novel strategies brainstormed by the group. The strategies were reviewed by university-based researchers to remove duplicates and collapse those with similar intent. A sub-sample
of the Working Group \((n = 4)\) reviewed the amended list and made minor changes. Careful attention was paid to use of culturally appropriate language. A refined list of 74 strategies was then disseminated to all Working Group participants to assess a need for any further refinement. No changes were requested.

3. Structuring the strategies

(1) **Sorting:** Next, the 74 strategies were sorted by 16 stakeholders including 12 AHWs and 4 Working Group members employed in tobacco control and/or research. The Working Group members and some AHWs had participated in prior stages (i.e. interviews and the Working Group workshop in the idea generation stage). AHWs were invited to participate during a quarterly meeting of the Aboriginal Primary Health Care Workers Forum and Working Group members were invited via e-mail. All participants who were invited provided voluntary informed consent and completed the exercise. The history and purpose of the project, and the process of sorting was carefully explained to participants. The purpose of the sorting exercise was explained and participants were asked to familiarize themselves with strategies (which were depicted on pieces of cardboard) before grouping them according to their perceived similarity. There were two occasions when the exercise was performed in a group setting. In these cases, participants were asked to complete the exercise individually without discussing sorting preferences with others. Guidelines for sorting were outlined as follows: there were no right or wrong answers; however, no groups should include unrelated strategies (i.e. a ‘miscellaneous’ pile); strategies could be placed in only one pile (i.e. strategies could not be placed in more than one pile or be left out of the sorting exercise); there could be no group that included all strategies; and around 10–20 piles was recommended. Participants were asked to assign a label to each of the groups they created, to describe the way in which the strategies were related in meaning.

(2) **Rating:** Strategies were rated on relative importance and feasibility by 45 stakeholders, including the 16 participants who sorted the data and an additional 29 participants recruited during field visits to regional and metropolitan health services (two in community-controlled and two in government-coordinated sectors). The 45 stakeholders were 62% female, mostly AHWs \((n = 31)\) but included other health service staff and tobacco control personnel. Stakeholders had varied smoking histories (current smoker, 43%; ex-smoker, 18% and never smoked, 39%) and had worked in the Aboriginal health field for mean \(\pm SD\) 8.6 \(\pm\) 7.9 years. Importance was rated on a 5-point scale (1, relatively unimportant; 2, somewhat important; 3, moderately important; 4, very important; 5, extremely important). Feasibility was similarly rated on a 5-point scale, in terms of perception of feasibility of implementation specifically **within the next 6 months** (1, not at all feasible; 2, somewhat feasible; 3, moderately feasible; 4, very feasible; 5, extremely feasible (or already doing). Participants were reminded that the ratings were relative so even if they perceived all strategies to be important and/or feasible, they needed to discriminate strategies using the full range of the scoring system. Participants were advised to first read all statements in order to gain a sense of the spectrum of strategies proposed prior to assigning the ratings.

4. Concept mapping analysis, and 5. Map interpretation

Data were entered into Concept System Core (version 4.0) software. A second researcher reviewed a random selection of 10% of participant data and found 100% data accuracy. Within the
software, individual sort data were used to generate a co-occurrence matrix which expressed whether statements were grouped together. These matrices were then summed to generate a similarity matrix that indicates the number of participants who grouped each pair of statements together. A multi-dimensional scaling analysis was performed to represent the (dis)similarity data in terms of distance in Euclidean space. Each statement has an assigned $x$ and $y$ value, used to create a bivariate plot depicting the relative similarity of statements via their proximity in space. In this two-dimensional visual display, strategies more frequently grouped by stakeholders are proximally located, whereas those strategies less frequently grouped are located distally in space.

Next, a hierarchical cluster analysis using Wald’s algorithm partitioned the statements into non-overlapping clusters (the Concept Map). One of the 16 participants who sorted the data created only three groups. Concept maps that included their data were very difficult to interpret. Following careful consideration of the impact of this participant’s data on the results, they were excluded from the cluster analysis. The stress index during multi-dimensional scaling was slightly reduced following their exclusion (from 0.354 to 0.351). The stress index provides a diagnostic statistic in multi-dimensional scaling, which indicates the discrepancy between the input similarity matrix and the two-dimensional representation of the data. It is anticipated that 95% of concept mapping projects yield stress values between 0.205 and 0.365. The stress index in this project is at the upper range of expected values, and may reflect data complexity that is challenging to represent in two dimensions and/or a high degree of variability in the way stakeholders grouped the strategies [18].

The mean number of groups created by stakeholders during the sorting exercise was 8.9 (range 6–25, median 8). Hence, during the map interpretation stage, a range of concept maps comprising 6–12 clusters were considered. A member of the research team facilitated an exercise where three members of the Working Group iteratively reviewed concept maps with 6–12 clusters to decide which they believed most accurately depicted domains of strategies necessary to address smoking cessation in AHWs. The software mathematically assigned labels for each cluster as proposed by participants (including best-fitting and other possible labels). These were reviewed and the most appropriate labels determined. The Concept Map recommended by Working Group members was next reviewed by members of the State-wide Puyu Wiya ‘No Smoking’ Advisory Group and staff of a regional community-controlled health service, and deemed to be acceptable.

Following development of the Concept Map, a bivariate plot was generated to depict the mean importance and feasibility ratings for all statements (the ‘Go-Zone’ plot). Finally, a number of bivariate comparisons of mean cluster-level importance and feasibility data were performed (the Pattern Match plot) to examine group differences (e.g. smokers vs. non-smokers, AHWs vs. non-AHWs, employees of government-coordinated vs. community-controlled health services).

6. Utilization
Findings are intended to be used to inform policy and program development for implementing novel strategies for smoking cessation amongst the target population of AHWs in South Australia. The Concept Map provides a framework for how smoking cessation programs for AHWs are conceptualized by key stakeholders. The Pattern Match and Go-Zone plots provide additional information regarding which strategies are considered most important and feasible, and by whom.

Results

The concept map
The Concept Map depicting the two-dimensional representation of strategies created using data from the 15 included participants is presented in Fig. 1. The most relevant and meaningful cluster solution was 10 clusters, with 5 strategies manually redistributed to adjacent clusters (whilst preserving non-overlapping arrangements), to optimize
grouping of strategies most similar in content and target audience. The Concept Map highlights that stakeholders perceive the promotion of smoking cessation in AHWS as requiring initiatives targeted at individual AHWs (n = 3 clusters) as well as strategies targeted at their family and peer network (n = 1 cluster), the community (n = 1 cluster), the workplace (n = 3 clusters) and public policy (n = 2 clusters). Strategies targeting individual AHWs are grouped in the superior aspect of the map, with community and family/peer strategies immediately adjacent. More distal to the individual are public policy and workplace strategies, located at the inferior region of the map.

**Pattern matching**

The Pattern Match plots depict aggregate ratings data for the 10 clusters. In Fig. 2a, similarly ranked clusters for perceived importance (left) and feasibility (right) are depicted with horizontal lines. The only cluster with discordant rankings (depicted by an oblique line) was *Funding and advocacy* which was ranked third on importance but seventh on feasibility of implementation. *Motivating smokers to quit* and *Community health promotion* were highest ranked on both importance and feasibility, and the correlation between mean importance and feasibility ratings was 0.87.

A meaningful difference was found in the importance ratings of 16 stakeholders working in government-coordinated as compared with 28 stakeholders working in community-controlled health services (Fig. 2b). The predominance of oblique lines in the plot illustrates the dissimilarity in rankings. Stakeholders from the community-controlled

Fig. 1. Concept Map of the 74 strategies grouped into 10 unique clusters by hierarchical cluster analysis, superimposed upon the two-dimensional spatial distribution of strategies arranged by multi-dimensional scaling. Five map regions depicting the targets of the strategies are also illustrated (individual AHWs, community, family and peers, workplace and public policy).
Fig. 2. (a) Pattern Match Graph illustrating relative cluster-level ratings of mean importance and feasibility for all stakeholders. (b) Pattern Match Graph depicting cluster-level ratings of mean importance for stakeholders employed in government-coordinated (left) and community-controlled (right) health services.
sector considered Community health promotion and Family and peer support for quitting to be more important than their counterparts in government organizations. In contrast, stakeholders from government-coordinated health services viewed Workplace strategies that value health workers and Workplace harmony and stress management as more important domains than workers in the community-controlled sector. There were no other meaningful differences found based on group comparisons (e.g. smoking history and gender).

The individual strategies contributing to the ranking of the 10 clusters in the Pattern Match are outlined in Table I. The two highest ranking strategies for importance and feasibility are given for each cluster, with clusters listed in descending order of mean cluster-level importance ratings. Strategy identification numbers (‘ID’ in the first column) correspond to the numbers depicted in the Concept Map and Go-Zone Plot. As demonstrated in the table, tobacco-specific strategies were ranked high in importance and feasibility (e.g. ID 42: subsidized nicotine replacement therapy) in conjunction with strategies that address broader social and environmental stressors (e.g. ID 44: development of participatory and interactive cultural awareness training that is mandatory for non-Indigenous staff at all levels).

**Go-zones**

The relative importance and feasibility ratings from 45 participants were used to generate a ‘Go-Zone’ bivariate plot (Fig. 3). Each strategy is represented according to a mean perceived feasibility score (x axis) and mean perceived importance score (y axis). The mean ratings for individual strategies in this study ranged from 2.91–4.70 for importance and 2.83–4.26 for feasibility. Mean importance and feasibility ratings for all strategies combined are represented as vertical and horizontal lines, respectively, to generate four quadrants. The upper right quadrant on the graph represents those strategies with greater-than-average importance and feasibility—i.e. primary targets for program planning.

**Utilization**

Concept mapping products have direct application in program planning activities. The Concept Map (Fig. 1) depicts stakeholder conceptualizations of smoking cessation strategies for AHWs, and highlights the importance of an ecological approach including multiple levels of intervention. The map demonstrates that multi-level approaches tailored to the local organizational and community setting are needed to empower AHWs to undertake quit attempts. That is, ecological programs that address AHWs’ needs in addition to their family and peer network, the workplace, community and public policy are necessary. The Concept Map is currently being used to inform a program logic model to guide the planning and evaluation of a state-wide health service strategy to support AHWs to quit smoking. The Pattern Match plots highlight that motivating smokers to quit and changing community beliefs around smoking through community health promotion campaigns are strategy domains perceived to have greatest importance and feasibility (Fig. 2a). Differences in ratings found between employees of government-coordinated and community-controlled health services (Fig. 2b) indicate a need for tailoring programs to local needs and priorities. The Go-Zone Plot (Fig. 3) provides strategy-specific data to inform program development.

Findings are currently being used to inform the development of multi-dimensional workplace-based smoking cessation programs for AHWs, to be pilot tested in selected health services in South Australia prior to broader implementation. For example, multi-dimensional programs to reduce smoking in AHWs might include the provision of tobacco-specific strategies such as subsidized nicotine replacement therapy (ID 42); provision of a Smokerlyzer in the health service to demonstrate the harmful effects of smoking (ID 13); development and provision of an Aboriginal quit smoking booklet (ID 58); a community health promotion campaign to promote smoke free houses (ID 66), smoke-free cars (ID 6), and educate the community about passive smoking (ID 62); and a designated smoking cessation training workshop for AHWs.
## Table I. Strategies to support AHWs to quit smoking: top two strategies in each cluster in regards to mean importance and feasibility, organized in descending order of mean importance

<table>
<thead>
<tr>
<th>ID</th>
<th>Strategy</th>
<th>Mean importance</th>
<th>Mean feasibility</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Individual level: motivating smokers to quit</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Objective measures of lung function (e.g. Smokerlyzer) that demonstrate the harmful effects of smoking that lead to premature sickness and death</td>
<td>4.44</td>
<td>4.17</td>
</tr>
<tr>
<td>66</td>
<td>A community health promotion campaign to promote smoke free houses</td>
<td>4.40</td>
<td>3.95</td>
</tr>
<tr>
<td>64</td>
<td>Real-life examples of successful quitters in the community and other good news stories</td>
<td>4.37</td>
<td>3.99</td>
</tr>
<tr>
<td></td>
<td>Mean cluster ratings</td>
<td>4.22</td>
<td>3.97</td>
</tr>
<tr>
<td></td>
<td><strong>Community level: community health promotion</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>62</td>
<td>A community health promotion campaign to educate the community about passive smoking</td>
<td>4.43</td>
<td>4.14</td>
</tr>
<tr>
<td>19</td>
<td>Information that depicts smoking as the erosion of Aboriginal communities through premature sickness and death</td>
<td>4.28</td>
<td>3.88</td>
</tr>
<tr>
<td>6</td>
<td>A community health promotion campaign to promote smoke free cars</td>
<td>4.05</td>
<td>4.12</td>
</tr>
<tr>
<td></td>
<td>Mean cluster ratings</td>
<td>4.21</td>
<td>3.95</td>
</tr>
<tr>
<td></td>
<td><strong>Policy level: funding and advocacy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Advocacy by the national Aboriginal and Torres Strait Islander Health Worker Association to ensure that AHWs are recognized as health professionals</td>
<td>4.53</td>
<td>3.85</td>
</tr>
<tr>
<td>15</td>
<td>Long-term funding for strategies that tackle smoking</td>
<td>4.52</td>
<td>3.61</td>
</tr>
<tr>
<td>60</td>
<td>A campaign to recognize the diversity of Aboriginal cultures within the context of multi-cultural Australia (to address racist stereotypes in the community and health care system)</td>
<td>4.06</td>
<td>3.65</td>
</tr>
<tr>
<td></td>
<td>Mean cluster ratings</td>
<td>4.17</td>
<td>3.57</td>
</tr>
<tr>
<td></td>
<td><strong>Family level: family and peer support for quitting</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>57</td>
<td>Information on the harms of passive smoking to demonstrate the effect of smoking on others</td>
<td>4.21</td>
<td>4.13</td>
</tr>
<tr>
<td>67</td>
<td>A ‘quit buddy’ system so that health workers have the support of another AHW on the same journey towards quitting</td>
<td>4.19</td>
<td>3.67</td>
</tr>
<tr>
<td>8</td>
<td>Education and resources for families of health workers on how to support health workers to quit smoking</td>
<td>4.00</td>
<td>3.90</td>
</tr>
<tr>
<td></td>
<td>Mean cluster ratings</td>
<td>4.11</td>
<td>3.78</td>
</tr>
<tr>
<td></td>
<td><strong>Individual level: quit supports and resources</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>58</td>
<td>An Aboriginal quit smoking booklet as a key resources to support health workers during quit attempts</td>
<td>4.38</td>
<td>3.86</td>
</tr>
<tr>
<td>59</td>
<td>A designated training workshop to enable health workers to take time away from work and learn about quitting smoking</td>
<td>4.31</td>
<td>3.64</td>
</tr>
<tr>
<td>10</td>
<td>Information around the stages of quitting</td>
<td>4.28</td>
<td>4.17</td>
</tr>
<tr>
<td>29</td>
<td>A smoking diary to help AHWs identify the causes of their stress and their smoking triggers</td>
<td>3.81</td>
<td>3.88</td>
</tr>
<tr>
<td></td>
<td>Mean cluster ratings</td>
<td>4.11</td>
<td>3.74</td>
</tr>
<tr>
<td></td>
<td><strong>Organization level: workplace strategies that value health workers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>73</td>
<td>Access to regular health checks at work</td>
<td>4.30</td>
<td>4.02</td>
</tr>
<tr>
<td>54</td>
<td>Strategies to ensure health workers are supported by at least one other health professional in the clinic at all times (i.e. avoid working alone in the clinic)</td>
<td>4.17</td>
<td>3.69</td>
</tr>
<tr>
<td>49</td>
<td>Implementation of smoke-free policy at every organization that includes a change management strategy to support staff during the transition to Smokefree</td>
<td>4.12</td>
<td>3.81</td>
</tr>
<tr>
<td></td>
<td>Mean cluster ratings</td>
<td>4.02</td>
<td>3.67</td>
</tr>
<tr>
<td></td>
<td><strong>Individual level: strategies to manage triggers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>Subsidized nicotine replacement therapy (e.g. patches, gum)</td>
<td>4.70</td>
<td>4.26</td>
</tr>
<tr>
<td>9</td>
<td>Subsidized quit support medications (e.g. Champix)</td>
<td>4.49</td>
<td>4.22</td>
</tr>
<tr>
<td></td>
<td>Mean cluster ratings</td>
<td>3.97</td>
<td>3.60</td>
</tr>
</tbody>
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(continued)
(ID 59). It could also include strategies to reduce social and environmental stressors that perpetuate smoking and create barriers to quitting, such as the development of cultural awareness training for non-Indigenous health staff (ID 44); and strategies to ensure that AHWS are supported by another health professional in the clinic at all times (ID 54). Strategies that demonstrate AHWS are valued in the health service are also important and could include access to regular health checks at work (ID 73) and opportunities to exercise during work time (ID 74). Our findings clearly demonstrate that program composition must be determined in consultation with local health staff; hence, a comprehensive needs assessment must pre-empt participatory program development and consequent implementation of strategies.

Findings are also being used to inform broader policy and practice in an ongoing manner. First, the results have been disseminated to project partners to inform development of a recently implemented Smoking Cessation Training Program for AHWs (ID 59) and to tobacco control personnel to build their capacity to deliver programs that meet the unique needs of AHWs. This has led to the development and implementation of ‘Ambassador Projects’ led by tobacco control personnel that promote real-life examples of successful quitters in the community (ID 64). Second, the proposed organizational strategies have and will continue to be disseminated to health services across the state via field visits, presentations and reports to promote organizational policies and practices that stakeholders believe will enable smoking cessation. Third, researchers have initiated an advocacy role in sharing the findings with relevant professional associations and policy makers to promote both the overall well-being of the AHW workforce as well as the development of policies that address broader social and environmental factors influencing smoking in AHWs.
Discussion

This concept mapping study identified a need for multi-dimensional programs, planned and implemented through a coordinated and collective effort, to enable AHWs to quit smoking. Key findings, elaborated upon below, demonstrate that culture and context matter in the delivery of cessation programs. Consistent with social-ecological principles, programs must be tailored to the local environment and local needs of Aboriginal health staff, and also address the broader context of a normalization of smoking in the Aboriginal population.

Culture did not emerge as a discrete cluster in the concept map. The need for cultural specificity and consideration is reflected in multiple strategies within and across clusters, and is also represented in the arrangement of clusters in the overall map. Notably, the proximity of clusters in the superior aspect of the map is consistent with Aboriginal notions of wellbeing where family, peers and community are viewed as intimately connected to the health of the individual [16, 17]. As such, approaches to enable cessation among AHWs need to consider family and community factors, workplace practices and public policy in addition to strengthening their individual capacity. AHWs have a unique role within primary health care and community, and report an often burdensome array of competing obligations and responsibilities [5]. Not surprisingly, then, many of the 74 strategies identified were non-specific to tobacco, and instead addressed social and environmental stressors that perpetuate smoking and create barriers to quitting.

Conventional tobacco-specific strategies such as subsidized nicotine replacement therapy and pharmacological support were considered highly important and feasible by stakeholders. In addition, the provision of resources, social marketing and
training workshops that are Aboriginal-specific was likewise valued, and broader strategies to combat social and environmental factors that perpetuate smoking (e.g. racism, under-valuing of AHWs, excessive work demands [23]) were also rated highly. As such, this study demonstrates that stakeholders envisage smoking cessation program for AHWs should include established tobacco control activities in conjunction with Aboriginal-specific tobacco control measures as well as broader strategies that address social and environmental stressors. These collective measures will motivate AHWs to quit, create conditions that are conducive to quitting, and provide AHWs with the necessary resources to undertake a quit attempt while respecting their cultural responsibilities and obligations.

We identified different smoking cessation priorities for AHWs working in community-controlled versus government health services. Institutionalized racism and micromanagement are stressors more commonly identified by AHWs working in government-controlled compared with community-controlled health services [23]. The predominance of these stressors in government health services—where the Aboriginal health team sits within a larger non-Aboriginal workforce—may be precipitated by the tarnished history of colonization that perpetuates a lack of trust between Aboriginal and non-Aboriginal Australians. This contextual background may explain why Workplace harmony and stress management strategies were considered more important by AHWs working in the government sector compared with their counterparts in community-controlled settings. Our findings indicate local needs assessment must precede program development activities to ensure the smoking cessation priorities of Aboriginal health staff are met.

A normalization of smoking in Aboriginal communities is a primary barrier to quitting smoking for AHWs [24]. The normalization of smoking is thought to be due to a long history of tobacco use in Aboriginal society, including selective use of bush tobacco in pre-colonial times [25], and widespread distribution of manufactured tobacco following colonization [26]. The continuing high prevalence of smoking in AHWs suggests that mainstream mass media campaigns have done little to challenge the acceptability of smoking in Aboriginal peoples. Our findings highlight that culturally relevant social marketing strategies that undermine the normalization of smoking (e.g. community health promotion campaigns to promote smoke-free homes and cars) are considered key to achieving smoking reduction in AHWs.

A culturally relevant evidence base was needed to inform the development of supportive smoking cessation strategies for AHWs in South Australia. Smoking cessation interventions that promote consultation, community ownership and involvement are considered most likely to succeed in Aboriginal populations [2]. The strategies identified here are the culmination of a comprehensive brainstorming process where stakeholders were extensively and iteratively consulted to determine the supports they believed AHWs need to quit smoking. This bottom-up (as opposed to top-down) participatory approach signalled to stakeholders that their contributions were essential to effective action planning and program development. This was considered particularly important given the socio-historical context where Aboriginal peoples in Australia have experienced repeated dispossession, discrimination and disadvantage and have consistently been the recipients of interventions designed without their input.

The participatory approach and study findings are likely to be of relevance for those planning tobacco control initiatives for Indigenous and marginalized sub-populations worldwide. We received positive anecdotal feedback from Aboriginal participants regarding the participatory nature of the project. Too often, external stakeholders determine the cultural appropriateness and relevance of programs designed to benefit Aboriginal people. Although such strategies have been effective in reducing the smoking prevalence of non-Indigenous Australians, they have not proven effective for Indigenous Australians where smoking remains normalized. AHWs and other stakeholders appreciated the degree to which their perspectives and input were considered essential to the strategy identification process.
It did appear that some individuals found the academic nature of the sorting exercise challenging, whereas the ‘yarning’ (informal discussions) during interviews, focus groups and the Working Group workshop was aligned with traditional and preferred means of communication. Researchers utilizing this approach in future projects may wish to take this into consideration when working with Indigenous stakeholders.

There are limitations to concept mapping methodology. First, concept mapping utilizes a relatively small and purposively selected participant sample which can pose limitations to stability of estimates and representativeness of the sample, respectively. In light of this, we went to extensive efforts to recruit a considerable number and broad range of stakeholders (e.g. AHWs, health service managers, tobacco control personnel). Despite this, the higher stress index in this project may reflect a considerable degree of variability in stakeholder responses. This may indicate that larger numbers of stakeholders may be needed in future projects that address similarly complex health challenges. Second, the Concept Map is a ‘best-fit’ representation of groups of strategies, and as such is not always an ideal fit. In this study, there were strategies which ideally should have been grouped in a different cluster; however, manual re-allocation of strategies was not possible (note: in concept mapping, it is only possible to re-allocate strategies to immediately adjacent clusters where the non-overlapping cluster array is preserved). Finally, the findings represent stakeholder preferences and do not include current evidence in relation to intervention efficacy. Therefore, the data generated through this participatory approach will be considered alongside relevant empirical evidence [9, 11, 27] to ensure that future programs are informed by evidence, where available and relevant.

**Conclusion**

In summary, concept mapping was used to facilitate stakeholder participation in the identification, organization and prioritization of strategies to enable AHWs to quit smoking. The concept map created represents the aggregated perceptions of multiple stakeholders. Strategies targeted to individual AHWs were identified in addition to those that targeted family members and peers, the workplace, the community and public policy. Stakeholder perceptions indicate that smoking cessation programs for AHWs must be culturally sensitive and ecological so they can address unique social and environmental influences that perpetuate smoking and create barriers to smoking cessation in additional to providing tobacco-specific resources and services. Group comparisons revealed differences in perceived importance of strategy domains between participants working in community-controlled compared to government-coordinated health services, highlighting that programs targeted to local needs are paramount. These findings are being dovetailed with empirical evidence to inform the development of stakeholder-relevant and evidence-based programs to enable AHWs to quit smoking in South Australia.

**Acknowledgements**

This project would not have been possible without the partnership of the AHCSA. We appreciate their continuing support. We thank the Aboriginal Health Workers and other health service personnel who volunteered time to participate in the research, and we thank the management of health services across South Australia who accepted our invitation to be involved in the study. We thank Stella Artuso for her contributions to the study design and data collection. Ethical approval was granted from the Human Research Ethics Committee, SA Health, Government of South Australia (256/09/2011), the Human Research Ethics Committee, University of South Australia (P240/08) and the Aboriginal Health Research and Ethics Committee, Aboriginal Health Council of South Australia (04-08-257). The views expressed in this manuscript are those of the authors and not the South Australian Minister for Health or the South Australian Department of Health. Margaret Cargo was supported by an Australian Research Council Future Fellowship (FT100100312).
Funding

South Australian Department of Health through the Strategic Health Research Program [SN-11621].

Conflict of interest statement

None declared.

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