A social network analysis of interactions about physical activity and nutrition among APPLE schools staff

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A B S T R A C T

Comprehensive school health (CSH) is a holistic approach to school-based health promotion that involves active participation and buy-in of school community members, including school staff (e.g., support staff, teachers, school health champions, principals). Implementation and sustainability of CSH builds on complex relationships within the school that support school-level health promoting changes and understanding the social relationships that exist in a school setting is critical. Thus, the purpose of this study was to conduct a social network analysis to examine adviceseeking networks of staff within three schools involved with a CSH program called APPLE Schools (A Project Promoting healthy Living for Everyone in Schools) project approach. The degree to which school staff were central in the network (i.e., gave or sought physical activity or nutrition advice, were connected or disconnected to others; indegree/outdegree centrality and betweenness centrality) and the overall structure of the networks were assessed (i.e., optimal levels of density and centralization). School health champions and several other individuals in the network were shown to be key sources of physical activity or nutrition advice and were identified as central players in the network. Whole networks across schools had low density and betweenness centralization, with optimal levels of out-centralization, and low to optimal levels of incentralization. This research allowed us to gain an understanding of network structures and relationship patterns in CSH schools, with specific attention to the coordinating role of school health champions, and other central players within the network. These findings increase our understanding of advice relationships that exist in a school setting and how these relationships may support CSH implementation and sustainability.

1. Introduction

Schools have been increasingly identified as an important setting to promote health (Storey et al., 2016). Comprehensive school health (CSH) is an approach for implementing health promotion in schools that moves beyond individual- and classroom-based health education to an integrated and holistic model involving the whole school community (Pan-Canadian Joint Consortium for School Health, 2020). CSH aims to build the capacity of the school community to incorporate well-being alongside student achievement through individual, interpersonal, community, and organizational factors. This strategy has been shown to positively influence student academic outcomes as well as health behaviours such as healthy eating, physical activity, and mental well-being, (Storey et al., 2016; Fung et al., 2012; Marshall et al., 2000; Murray, Low, Hollis, Cross, & Davis, 2007; Rissel & Rowling, 2000;

Stewart-Brown, 2006). CSHis recognized by the World Health Organization as an effective 'settings' approach for the development of healthy school communities (World Health Organization, 2018). Recent research by our group identified essential conditions necessary for CSH to be successfully implemented (Storey et al., 2016). Two of the essential conditions identified in our study included a *dedicated champion to engage the school community* and *demonstrated administrative leadership* (i. e., school principal). Specifically, school health champions and the school principal are critical leaders to initiate and going integration of CSH in schools, as evidenced by our work (Roberts et al., 2015, 2016; Storey et al., 2016) and the work of others (Card & Doyle, 2008; Stolp, Wilkins, & Raine, 2015). However, buy-in from all school staff is crucial for sustainability and long-term program success (Larsen & Samdal, 2008). Distributed leadership (Hargreaves, 2009; Ryan, 2006) where school staff serve as active participants and joint-ownership and joint-responsibility of a program are emphasized (Spillane, 2006), is

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List of abbreviations

APPLE Schools	A Project Promoting healthy Living for Everyone in Schools
CSH	Comprehensive school health
EA	Educational assistant
SHF	School health facilitators

particularly effective. Buy-in and distributed leadership require effective interactions and relationships between individuals in the school setting (e.g., support staff, teachers, school health champion, principals). As such, these connections are necessary for the implementation and sustainability of a CSH approach. Previous work has supported this concept and indicated that social structures and relationships within a system are key ingredients for intervention effectiveness, and can support organizational change (Marks, Barnett, Foulkes, Hawe, & Allender, 2013).

Understanding the social relationships that exist in a school setting is important for the implementation and sustainability of CSH; however, it is uncommon to measure these relationships empirically (Hawe & Ghali, 2008). Considering the essential role of the school health champion and school principal, and need for distributed leadership among school staff; it is necessary to understand how staff within CSH schools are connected as a whole, and the degree to which staff members give or seek advice related to health promotion content areas (e.g., physical activity, nutrition). This will help determine the success of the network as a whole in communicating important health information (Valente, Palinkas, Czaja, Chu, & Brown, 2015), and identify additional staff members who serve as informal community leaders the network. Both formal (i.e., school health champions) and informal community leaders who act as conduits of health information may support implementation and sustainability long term (Eng, 1993; Eng, Hatch, & Callan, 1985; Israel, 1985; Valente & Pumpuang, 2007). Social network theory (SNT) is an ideal approach to study relationships related to CSH implementation, as it recognizes the important role of dyadic relationships and social networks in understanding behaviours (Valente, 2015). According to SNT, people both influence and are influenced by the networks to which they belong, individual positions in a network influence behaviour, and the structure of the network dictates the performance of the whole network. Social network analysis (SNA) provides a set of methodological tools for studying dyadic relationships, network position, and network structure.

The purpose of this study was to examine advice-seeking networks of staff within three schools implementing a CSH approach. All schools are located in Alberta, Canada and were part of the school-focused health promotion initiative APPLE Schools (A Project Promoting healthy Living for Everyone in Schools) (APPLE Schools, n.d.). Specifically, we sought to assess the degree to which members of the school communities gave or sought advice about physical activity or nutrition (the prioritized health promotion content areas at the time for APPLE Schools) and to determine the overall structure of the networks. The research objectives included: (1) to determine whether the school health champion was central in the network (i.e., gave and sought physical activity or nutrition advice from others, was connected or disconnected to others; indegree/outdegree centrality, betweenness centrality), (2) to identify the presence of other central players in the network with whom many people were discussing physical activity or nutrition (i.e., evidence of informal community leadership), and (3) to examine the frequency of physical activity- or nutrition-related information sharing within the whole network (i.e., optimal levels of density and centralization). Each of these components are important to promote an ongoing 'conversation' related to CSH between school staff, including information sharing and whole school community engagement, and may promote more effective implementation and sustainability of CSH over time. Together, this information provided contextual material to elucidate if optimal

network characteristics (e.g., density of overall network, centrality of school health champion) were observed or not observed. Thus, using SNA allowed us to gain a rich understanding of the advice seeking relationships of teachers, administrators, and other staff within schools taking a CSH approach. This included whether there was frequent advice-giving occurring within the network (i.e., network structure), the coordinating role of school health champions in building relationships to strengthen capacity for ongoing CSH, and whether there were other central players within the network to whom others were going to for advice.

2. Methods

2.1. Setting

APPLE Schools is a school-focused health promotion initiative aimed at supporting the creation of healthy school communities. Established in 2008, APPLE Schools currently works in 75 Canadian schools across British Columbia, northern Alberta, the Northwest Territories, and Manitoba and takes a CSH approach that "inspires and empowers school communities to lead, choose, and be healthy"(APPLE Schools, n.d.). A key feature of APPLE Schools is the provision of a school health champion, called a School Health Facilitator (SHF) in each school hired at various full-time equivalents (FTE). The SHF works with the school community to facilitate the development and implementation of a school-specific wellness plan. Three APPLE Schools were conveniently sampled to take part in the SNA. Schools selected were chosen based on self-identified interest, research burden (i.e., schools with competing research demands were not selected), diversity in location (i.e., rural and urban), and proximity to the research team to avoid unnecessary travel costs.

All three schools are located in central Alberta and joined the APPLE Schools program in 2011. School A and School B are located in urban areas while School C is rural. At the time of data collection, School A had a SHF (seconded teacher) who was employed in a 0.5FTE SHF position/0.5FTE teaching position, and a total student population of 300. School B had a SHF (externally hired) in a 1.0FTE position with a student population of 116. School C had a SHF (seconded teacher) who was employed in a 0.8FTE SHF position/0.2FTE teaching position with a student population of 400.

2.2. Participants and procedures

In May 2013, a network questionnaire was used to collect data on advice seeking on physical activity and nutrition among school staff in the three APPLE school communities. All teachers, administrators, and other staff in the schools were invited to participate (School A $n = 32$; School B $n = 22$; School C $n = 48$) in a self-administered questionnaire during a staff-meeting, or by email if they were unable to attend. Members of the research team were present during survey completion to answer questions. Participation rates were 53%, 45%, and 63% for School A ($n = 17$), School B ($n = 10$), and School C ($n = 30$), respectively. However, everyone from the network was included in the roster regardless of whether they participated or not, and thus, non-participants could receive incoming nominations. At the dyad level, data is available for 56% (School A), 50% (School B), and 64% (School C) of each network.

2.3. Measures

A social network survey was used to assess advice seeking related to physical activity and nutrition. The focus was on physical activity and nutrition because these were the prioritized health promotion content areas at the time for APPLE schools. The survey included a roster of all staff members working in the school, provided by administrators, and participants answered the survey question for all coworkers. In addition,

participants were instructed, *"If there are individuals you are involved with that are not included on the list below, please add the individual(s) and answer the questions as appropriate."* The survey was developed by the researchers, based on existing work in this field (Hawe & Ghali, 2008; Hawe, Webster, & Shiell, 2004; Marks et al., 2013; Provan, Nakama, Veazie, Teufel-Shone, & Huddleston, 2003; Provan, Veazie, Teufel-Shone, & Huddleston, 2004). Participants were asked "Please indicate which individuals you go to (i.e., meet with, e-mail, phone) for information regarding nutrition or physical activity and, if so, how frequently." Response options included "no," "yes, less than 3 times per year," "yes, 4–8 times per year," "yes, 9–12 times per year," And "yes, more than once a month." The names of each person from the network were listed and this question was answered for each person. We dichotomized the variable with advice seeking 9–12 times per year or more representing a connection, and fewer interactions representing no connection. In consultation with the APPLE Schools management team we deemed 9–12 times per year as a meaningful level of advice seeking exchange between two members of the network from a practice perspective based on the average instructional school year duration of 10 months. The role of each participant within the school (e.g., teacher, administrator, other staff) was provided by school administration during roster development.

All school boards and schools approved the study, and participants provided written consent. Ethical approval for this study was obtained from the Health Research Ethics Board at the University of Alberta (Pro00035108).

2.4. Data analysis

Data analysis was completed in UCINET 6.64 and network maps were created using NETDRAW 2.161. As we had incoming advice connections for non-participants, all network members were included in the analyses. Centrality of the network members was measured using the following indicators. Normalized values are also presented to allow for comparisons across networks of varying sizes. To identify the central players in the networks, those with the top five scores for each centrality measure were identified and presented. As the SHF is expected to be central because communication around physical activity and nutrition is an expectation of their role, network members with scores at least half the value of the SHF for each centrality measure were deemed "informal leaders."

1. Outdegree centrality is the number of other network members each participant reported seeking physical activity or nutrition advice from at least 9 times per year or outgoing connections each network member had.
2. Indegree centrality is the number of network members who reported seeking physical activity or nutrition advice from each participant at least 9 times per year or incoming connections each network member had.
3. Betweenness centrality is the extent a person lies on the geodesic (shortest path) connecting members in the network (Freeman, Roeder, & Mulholland, 1979). Those with high betweenness centrality scores were considered gatekeepers in the network

Whole network characteristics examined were as follows. Based on the "Goldilocks Principle" scores under 0.30 (or 30%) were deemed low, scores between 0.30 and 0.50 (or 30–50%) were deemed optimal, and scores above 0.50 (or 50%) deemed high (Valente et al., 2015).

1. Network density is the number of connections in the network divided by the total number of possible connections (Wasserman & Faust, 1994). Data were symmetrized for this analysis.
2. Out-centralization is the extent to which the outdegree connections are dominated by one or a few network members. A high score indicates that a small number of participants are seeking advice from many other network members.
3. In-centralization is the extent to which the indegree connections are dominated by one or a few network members. A high score indicates that several network members are going to a small number of participants for advice.
4. Betweenness centralization represents the degree to which a few network members have control over other connections in the network. Higher scores indicate a smaller number of gatekeepers dominated the network.

3. Results

Network maps of the frequent advice networks (at least 9 times per year) are presented in Figs. 1–3, with unique member roles identified using shapes.

3.1. Network centrality of the SHF

For our first research objective we examined whether the SHF was highly central in the network as this would indicate they were accepted by the school as a trusted person from whom to seek physical activity or nutrition advice. Across schools, 5 to 20 others in the networks reported seeking advice from the SHF at least 9 times per year (i.e., indegree centrality; Table 1), representing 16%–43% of possible connections. The SHF had the highest indegree centrality scores in two schools (School B and School C), and the second highest score in one school (School A). Given that the SHF was at a 0.5FTE in School A (School B = 1.0FTE, School C = 0.8FTE), it would make sense that the indegree connections were not as dominated by the SHF in this community. Therefore, the SHF are key sources of physical activity or nutrition advice in the network.

Across schools, the SHFs reported going to between 5 and 7 others for physical activity or nutrition advice (i.e., outdegree centrality) representing 11%–33% of possible connections. SHFs from two schools (School A and School B) had the second highest outdegree scores compared to others in the network, yet in School C the SHF was not on the list of top five scores. Thus, the SHF in two schools frequently drew upon the knowledge of others in the network when required.

The number of times in which participants were located on the shortest path connecting pairs of other network members (i.e., betweenness centrality) ranged between 47 and 323 across schools. In each of the three schools the SHF received the highest betweenness centrality score. This data demonstrates that the SHFs served as gatekeepers in the networks.

3.2. Network centrality of other members

For our second research objective we examined whether there were people other than the SHF for whom people were going to frequently for physical activity or nutrition advice, as this is important for long-term sustainability. There were several individuals in the networks who were sought out by others for physical activity or nutrition advice at least 9 times per year (i.e., in-degree centrality) and were considered "informal leaders". These included teachers, an educational assistant, secretaries, staff, and a librarian (Table 1). Individuals who most frequently sought out advice from others at least 9 times per year (i.e., out-degree centrality) included principals, teachers, educational assistants, and an accounts clerk. Those who were located on the shortest path connecting other network members (i.e., betweenness centrality) included principals, teachers, and an educational assistant. The principal had the second highest betweenness centrality score for two schools and was in the top five for the third school. Therefore, multiple individuals in these schools were identified as central players in the networks.
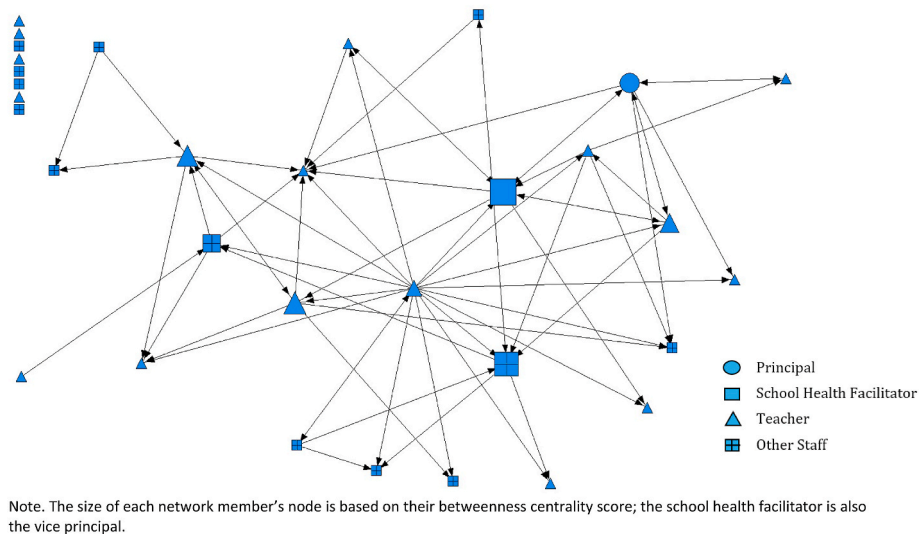
Note. The size of each network member's node is based on their betweenness centrality score; the school health facilitator is also the vice principal.
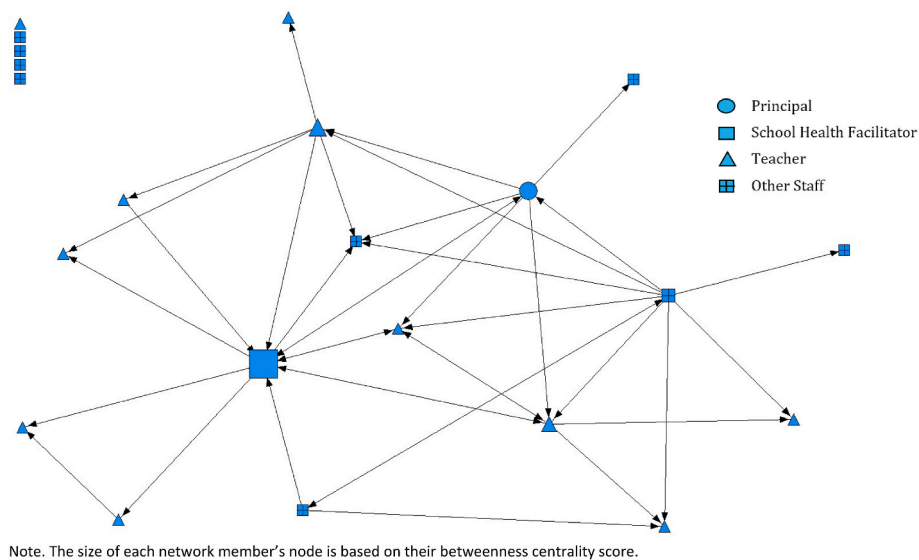
Fig. 1. Advice network for School A
Note. The size of each network member's node is based on their betweenness centrality score; the school health facilitator is also the vice principal.

Note. The size of each network member's node is based on their betweenness centrality score.

Fig. 2. Advice network for School B
Note. The size of each network member's node is based on their betweenness centrality score.

3.3. Whole network structure

For our third research objective we examined the structure of the advice networks to determine whether there was frequent advice seeking occurring across the entire networks (Table 2). Centralization and density scores between 0.30 and 0.50 were regarded as "optimal" (Valente et al., 2015). Across the three schools the density was quite low (between 0.05 and 0.12) indicating low levels of frequent advice seeking connections. Out-centralization scores however ranged between 0.29 and 0.50 which could be considered "optimal." In-centralization scores were considered "low" for school A (i.e., 0.20) and B (i.e., 0.21) and "optimal for school C (i.e., 0.38). Finally, betweenness centralization scores were between 4.31 and 13.94, which represented a low number of gatekeepers in the network. However, it should be noted that UCINET treats missing data on these statistics as zeros. Because there was missing outgoing advice connections for non-participants, the scores were likely lower than reality.

4. Discussion

This study examined physical activity and nutrition advice seeking networks of staff from three schools implementing a CSH approach. The SHFs and several other network members were shown to be key sources of physical activity or nutrition advice in the networks. The whole networks had low density and betweenness centralization, optimal levels of out-centralization, and low to optimal levels of in-centralization. Through SNA, this research allows us to gain an understanding of network structures and relationship patterns in CSH, with specific attention to the coordinating role of school health champions, and other central players within the network.

In our previous research on CSH implementation, we identified the essential role of the school health champion and school principal to facilitate CSH implementation and promote distributed leadership. Specifically, success was supported by the SHF so long as their role evolved from that of 'doing' (i.e., leading/coordinating CSH initiatives) to that of 'facilitating' (i.e., supporting CSH initiatives). This ensured
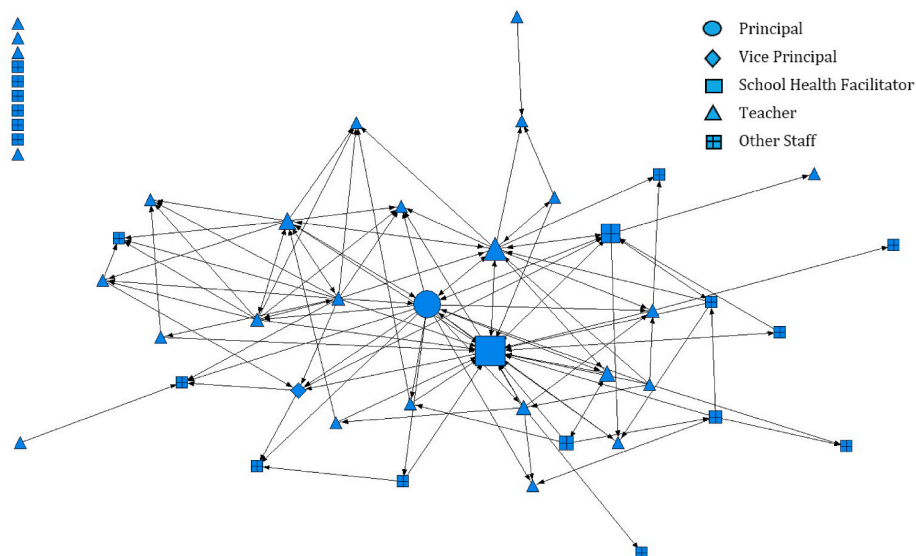
Note. The size of each network member's node is based on their betweenness centrality score.

Fig. 3. Advice network for School C
Note. The size of each network member's node is based on their betweenness centrality score.

Table 1
Central player characteristics for frequent advice network (at least 9 times per year).

	People with the highest in-degree centrality scores		People with the highest out-degree centrality scores		People with the highest betweenness centrality scores	
	Role	Unnormalized score (normalized score)	Role	Unnormalized score (normalized score)	Role	Unnormalized score (normalized score)
School A	Teacher	8 (0.26)*	Accounts clerk	17 (0.55)*	SHF[+">+]	46.50 (5.00)*
	SHF[+">+]	5 (0.16)*	SHF[+">+]	6 (0.19)*	EA	39.00 (4.19)*
	EA	5 (0.16)*	Principal	6 (0.19)*	Teacher	34.00 (3.66)*
	Teacher	4 (0.13)*	Teacher	5 (0.16)*	Teacher	30.00 (3.23)*
	Teacher	4 (0.13)*	EA	4 (0.13)*	Principal	26.50 (2.85)*
	Secretary	4 (0.13)*	Teacher	4 (0.13)*		
	Staff	4 (0.13)*	Teacher	4 (0.13)*		
			Teacher	4 (0.13)*		
School B	SHF	6 (0.29)*	EA	9 (0.43)*	SHF	48.00 (11.43)*
	Teacher	4 (0.19)*	SHF	7 (0.33)*	Principal	18.60 (4.43)
	Teacher	4 (0.19)*	Principal	6 (0.29)*	Teacher	15.10 (3.60)
	Secretary	4 (0.19)*	Teacher	5 (0.24)*	Teacher	10.60 (2.54)
	Teacher	3 (0.14)*	Teacher	4 (0.19)*	EA	7.50 (1.79)
School C	SHF	20 (0.43)*	Principal	16 (0.34)*	SHF	322.67 (14.92)*
	Teacher	8 (0.17)	Teacher	13 (0.28)*	Principal	275.00 (12.72)*
	Librarian	6 (0.13)	Teacher	11 (0.23)*	Teacher	200.33 (9.27)*
	Teacher	6 (0.13)	Teacher	10 (0.21)*	Librarian	119.67 (5.53)
	Teacher	5 (0.11)	Teacher	8 (0.17)*	Teacher	92.50 (4.28)

Note. * indicates central players or those with unnormalized scores at least half the value of the SHF; EA = educational assistant; SHF = school health facilitator; [+]the SHF is also the vice principal.

Table 2
Whole network characteristics for the frequent advice network (at least 9 times per year).

	Network density	Out-centralization	In-centralization	Betweenness centralization - %
School A	0.12	0.50	0.20	4.31
School B	0.17	0.36	0.21	10.83
School C	0.05	0.29	0.38	13.94

Note. Scores under 0.30 (or 30%) were deemed low, scores between 0.30 and 0.50 (or 30–50%) were deemed optimal, and scores above 0.50 (or 50%) were deemed high.

APPLE Schools were led through distributed leadership to promote sustainability and did not rely solely on the SHF (Roberts et al., 2015, Storey et al., 2016). Although a formal statistical test could not be performed, there were more central players in school A (based on all three centrality measures; i.e., 0.5 FTE) compared to school B (1.0 FTE) and C (0.8 FTE), suggesting the SHF in school A was engaging in more 'facilitating' and less 'doing'. Thus, it is possible that having a SHF working part-time may serve to encourage informal leadership among other school community members.

We also identified several informal community leaders in the networks. For Schools A (0.5FTE) and C (0.8FTE), there were a few to several people in the network who had betweenness centrality scores close to that of the SHF. This is consistent with the literature on social network formation and translation. Valente et al. (Valente, 2015) (p. 7) suggests that rather than relying on a charismatic and highly motivated

leader for network maintenance, "to successfully transition to later stages of implementation, the program will require a deeper commitment by other community members, leaders, and stakeholders." In the current study, we found that while SHFs were highly central in the physical activity and nutrition advice networks across all schools, there were several other individuals in the network who were also central based on each type of centrality. These included individuals in multiple diverse roles within the school, such as an accounts clerk, educational assistant, principal, and teacher. These findings highlight the importance of all school staff in CSH implementation, including staff members whose duties may not include school health, but who interact frequently, and broadly, with members of the school community. While SHFs held a vital role as key sources of physical activity or nutrition advice in the networks, many others in these schools were important advice actors and served to connect others within the networks, who were otherwise disconnected. This is encouraging in light of what is known about the role of a central health champion in successful CSH implementation. Our previous research identified that a while a *dedicated champion* is imperative from a leadership perspective to promote the ongoing integration of CSH in schools, school health champions need the engaged support and buy-in of school staff for sustainable change to occur (Storey et al., 2016). Our results also reinforced the importance of school principals in CSH implementation, including advice sharing. As school leaders, it is recognized that principals must be actively engaged, rather than merely supporters of school health champions and offering passive buy-in Roberts et al., 2015; Storey et al., 2016). Principals had some of the highest number of outgoing advice connections and were also key 'connectors' in all three schools. Future research could investigate whether providing more professional development and resources to central players could improve sustainability and capacity of networks initially and long term.

Density scores across all three schools indicated that frequent advice seeking relationships were low. This may suggest that individuals are sharing advice more "broadly" across the network rather than in re-occurring pairs. In addition, the out-centralization scores observed were within the optimal range, whereas the in-centralization scores were in the low to optimal range, as described by Valente et al. (Valente, 2015). No scores exceeded 0.50. Valente et al. (Valente, 2015), suggest that scores above 0.50 can impede diffusion, performance, or collective action among networks. Thus, we can surmise that across the networks, network members were seeking advice and being sought for advice from several others. As collective action is a primary goal of the CSH approach, and supports the concept of distributive leadership, this finding is promising for CSH implementation in the participating schools. This finding links to importance of community support, though the establishment of strong internal (and external) relationships, to foster successful CSH implementation and promote sustainability (Storey et al., 2016). As described by Hawe et al. (Hawe & Ghali, 2008) (p. 63), "interpersonal exchanges among people in a particular place create a web of relationships that are integral to understanding system-level phenomena, such as how quickly information gets around or how easy it is to rally resources." This concept is highly relevant to the implementation of CSH and the role of the social environment to support and accelerate change (Pan-Canadian Joint Consortium for School Health, 2020). This is tacit in the presence and quality of the relationships among and between staff in the school, including advice seeking relationships. While detailed tracking of the type of physical activity and nutrition information being shared was not within the scope of this study, future research examining the nature of the information being shared would be of benefit. This would help to better understand how this information more specifically supports implementation, and among whom. The network question used in this study included both nutrition and physical activity advice seeking as one construct. Future research would benefit from the examination of nutrition and physical activity separately. Furthermore, given the increased focus on mental health and wellbeing in schools, as well as more widespread adoption of the CSH approach, future research should include mental health, sleep and overall wellbeing as a content area of interest as well as more general CSH-related information. Future research could also examine the conditions required (e.g., min level of FTE, internal/external hire) for maintaining network structure long term. Similarly, future research could tie student outcomes (e.g., PA and nutrition outcomes) with network characteristics to determine ultimate network conditions for facilitating student health. Low scores for betweenness centralization and density may indicate an opportunity for improvement in these networks. Providing professional development and resources to informal leaders within schools such as principals and teachers could increase overall performance of the networks. Future research however is needed to test this hypothesis.

4.1. Strengths and limitations

A key strength of this research was the use of a SNA approach to understand advice seeking relationships of individuals within three schools taking a CSH approach. The variation across schools in regards to school size, location (urban, rural), and SHF characteristics (i.e., level of employment [0.5 vs. 0.8 FTE vs. 1.0 FTE], type of hire [external hire vs. seconded]) strengthened our analysis. Despite these strengths, there are some limitations that should be acknowledged. As the data was cross-sectional, we were not able to look at the change in advice ties from the start of the program. Longitudinal data would have provided information on whether relationship patterns changed over time due to the implementation of the CSH approach, a potential avenue for future research. It should also be noted that we had a high volume of missing data, which may have been a result of only having a paper-based survey available (versus the choice of paper-based and electronic). This missing data may have particularly affected the reliability of the betweenness centrality measure. While not feasible for this study, including comparator schools in the design would have strengthened our approach, providing information on what advice networks look like in schools not implementing CSH.

5. Conclusions

This research provides important insight into advice sharing among staff in school communities implementing a CSH approach, including overall network structure, the central role of the SHF, and the presence of distributed leadership among school stakeholders in diverse roles. This is the first study to our knowledge that used social network analysis to empirically measure the social relationships in schools taking a CSH approach. This study was able to demonstrate how staff within CSH schools are connected as a whole, and the degree to which staff members give or seek advice related to health promotion content areas (e.g., physical activity, nutrition). As well, it allowed us to identify other staff members within the network who serve as informal community leaders. These findings allow us to gain understanding of the advice relationships that exist in a school setting and how these may support CSH implementation and sustainability. Future research should examine the ideal network structures and leadership distribution for long term success including the health outcomes of students.

Ethical statement

This research received ethical approval from the University of Alberta Human Research Ethics Board (No. Pro00035108). Written consent was gathered from all participants in the study.

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