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Review Article

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Applying multi-theory model of health behaviour change to address implicit biases in public health

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ABSTRACT

A person receiving public health services should not receive a lesser standard of service because of his/her race, gender, age, colour, national origin, disability status, occupation or any other extraneous characteristics. However, sometimes our perception based on these hidden linkages (unconscious, irrepressible, or irrational connotations) may influence our judgements resulting in unfairness which are referred as implicit biases. Such biases can result in poorer quality of care. In public health, where the ultimate motive is to ensure social justice, these implicit biases are thus quite deleterious. The purpose of this article was to examine the implicit biases in public health practice and develop recommendations for education, training and research in this discipline using the application of a novel behavioural theory, multi-theory model (MTM) of health behaviour change. A review of literature in the MEDLINE, CINAHL, Google Scholar, and ERIC databases was performed to prepare this article. The constructs of participatory dialogue in which advantages outweigh disadvantages, behavioural confidence, and changes in physical environment were discussed to initiate behaviour change devoid of implicit biases. The constructs of emotional transformation, practice for change and changes in social environment were discussed to sustain behaviour change devoid of implicit biases. Educational interventions based on MTM need to be adopted by Schools of Public Health in education of public health students and training of public health professionals. Such efforts will reduce implicit biases in the discipline of public health and improve quality of care.

Keywords: Implicit bias, Theory, Educational intervention, Change

INTRODUCTION

A dictionary definition of bias equates it as a prejudice. This bias can either favour or be against an object, person, or group compared with another and can lead to an unfair behaviour. In public health, such bias can manifest directly (e.g. one may like Whites more than Blacks so he/she will provide better care for them or vice versa) or sometimes subtly (e.g. one may not listen more carefully to what a Black person is saying than a White

individual or vice versa). The first situation is called explicit bias and entails a person being aware of his/her assessment of a particular object, person or group with a conviction to be correct in some respect and indulges in manifestation of an overt behaviour. The latter situation is called implicit bias. Implicit bias is defined as unconscious, irrepressible, or irrational connotation that may influence one's judgements resulting in unfairness toward an individual, group or community.²

In the United States, research shows that explicit bias has generally reduced over time as there are laws and policies in that regard but implicit bias is widely prevalent.³⁻⁵ This scenario is also true in public health. Implicit biases in public health often result in disconnection between what a public health professional explicitly considers and wants to display (e.g. being fair to everyone) and the concealed impact of negative implicit overtones on his or her thoughts and behaviours (e.g. viewing a Latina client as less capable and thereby not spending enough time explaining her about the importance of screening for breast cancer). Besides race, common areas where biases are often found pertain to gender (preferring males over females or vice versa), age (preferring young versus old or vice versa), national origin (preferring one nationality people over another), sexual orientation (preferring heterosexuals over other orientations or vice versa), weight status (preference for athletic builds over overweight individuals), economic status (preference for rich over poor), disability status (preferring able bodied people over persons with disabilities), occupation and so on. In general, implicit biases tend to favour one's own group; though research has shown that one can also have implicit biases against their own group. For example, it has been found that poor people and overweight people tend to devalue their own groups and prefer the dominant groups.6

A recent systematic review conducted with health care professionals found that they exhibited the same levels of implicit biases as the general population. Further, it was found that a negative correlation existed between implicit biases and quality of care provided by health care professionals to certain groups. The review included 42 studies and found that race/ethnicity and gender were most commonly studied biases in United States and led to poorer care for minorities, women and other vulnerable groups. The findings from this systematic review are particularly disconcerting because public health and health care are fields that aim at bringing about social justice and equity. Public health professionals, in particular, are responsible for working with minority ethnic groups, poor and disadvantaged, immigrants, low health-literacy people, women, children, people of different sexual orientations, elderly, mentally ill, overweight/obese, disabled, and other such vulnerable groups which are often at the receiving end of implicit biases.⁸ Public health professionals should be particularly cautious of any kind of adverse assessment that they make which is linked to affiliation with a group or to a particular trait in their dealings. Implicit biases in public health and health care are responsible for growing disparities and poor quality of care and thus need to be pre-emptively mitigated through interventions geared toward public health professionals' education and training. Boscardin advocates for curricular interventions in training of health care professionals that build selfawareness, create an inclusive learning environment,

enhance opportunities for positive interactions among different groups and develop empathy skills.¹⁰

There is a paucity of behaviourally robust interventions that can bring about definitive behavioural modification among public health and health care professionals to reduce implicit biases. Usually, there is a lot of lip service accorded to the construct of implicit bias and only token interventions are implemented that do not result in much needed behaviour change and at the most merely bring about awareness and knowledge about the situation. While awareness building and knowledge are essential but these are not sufficient in bringing about desired behavioural changes. In health behaviour research, knowledge-based interventions are often considered as the first generation programs. 11 The second generation programs are the skill-developing programs. An example of such a program in the area of implicit bias is the labbased 12-week intervention implemented by Devine and colleagues with introductory psychology non-Black college students in which they built self-regulation skill strategies to combat implicit racial bias. 12 The third generation programs are theory-based interventions that are also called as evidence-based interventions. Interventions in this category that explicitly utilize constructs from behavioural theories have not been developed in the context of implicit bias either in laboratory settings, classroom settings, or real world settings. However, such interventions have been used in health behaviour research quite extensively. 11 Newer advances have been made in the field of health behaviour and a set of fourth generation interventions which are called precision interventions have evolved. These interventions utilize multiple theories and culturally robust constructs and are delivered with precision often requiring brief delivery. Utilization of such approaches in developing interventions can improve the efficacy and effectiveness of interventions designed to mitigate implicit biases among public health professionals. Such interventions can guide and improve training and education of public health workforce in preventing implicit biases and set an implicit bias free research agenda in public health.

In this backdrop, the purpose of this article was to address implicit biases in public health through interventions based on a fourth generation multiple theory approach that has been described as the multitheory model (MTM) of health behaviour change. 11,13 It is envisaged that this theory can serve as an important means to design effectual interventions to modify behaviours related to implicit bias in public health.

METHODS

A literature search using the key words: "implicit bias," public health," "health," "multi-theory model" was conducted in MEDLINE, CINAHL, Google Scholar, and ERIC databases. Full text articles were obtained and this review article was prepared after reviewing them.

RESULTS

Application of multi-theory model (MTM) of health behavior change in public health

Multi-theory model (MTM) of health behaviour change is a new theory. It utilizes efficacious and empirically tested constructs from previous theories, is parsimonious and thus testable, addresses behaviour change as opposed to a mere acquisition of a behaviour, avoids commonality among constructs thus there is no shared variance between putative constructs making it once again testable, addresses both instant and long range change, is culturally viable and suitable for resource scarce settings. This theory separates behaviour change into two parts: initiation of the behaviour change and sustenance or continuation of the behaviour change. In the context of implicit bias, being aware of the implicit biases and making an effort toward change constitutes the initiation of behaviour change and continuation of behaviour devoid of implicit biases in every day interactions becomes the goal. This distinction of two

components is essential because the constructs influencing starting of the behaviour change are somewhat different than the constructs responsible for maintenance of the behaviour change. The theory is new and in its initial applications to physical activity behaviour, portion size behaviour, water consumption behaviour and sleep behaviour has shown very good predictability. 14-17

The first construct responsible for initiating behaviour change is the construct of participatory dialogue derived from Freirean model of adult education. 18 Murray-Garcia and colleagues also advocate the importance of dialogue in the context of removing implicit biases. ¹⁹ This construct is constituted by a two-way dialogue between the facilitator and the person wanting behaviour change that underscores the advantages of behaviour change over the disadvantages of behaviour change. A two-way exchange is very important to involve the person making the change and then convincing him or her that the advantages of behaviour change outweigh the disadvantages. In the context of public health professionals, some of the advantages and disadvantages of starting behaviour devoid of implicit biases have been summarized in Table 1.

Table 1: Some advantages and disadvantages of starting behaviour devoid of implicit biases for public health professionals.

Advantages	Disadvantages
Being fair in one's dealings	 Having to change set patterns which may be difficult
Being ethical in one's transactions	 Becoming more conscious of one's transactions
Developing satisfying relationships	May be feeling deprived
Having peace of mind	Having to compromise views
Being contented in life	May be not having fun
Serving clients professionally	 Not being supportive of one's own group
 Not having any complaints from clients 	

The second construct associated with initiating implicit bias devoid behaviour change for public health professionals is that of behavioural confidence. 11,13 This construct has been derived from Bandura's construct of self-efficacy and Ajzen's construct of perceived behavioural control.^{20,21} However, it is slightly different from these two conceptualizations. Behavioural confidence refers to futuristic behaviour change as opposed to "here and now" conceptualization in selfefficacy. Furthermore, the sources of behavioural confidence can come from external sources instead of mere self. For example, one may believe in power of God, a deity or any other powerful person in helping build one's behavioural confidence. In the context of implicit biases in public health professionals, this implies that the professional is able to identify and become conscious of inner implicit biases in working with clients or patients and deriving inner confidence in overcoming those biases. This can be done by identifying these biases in small steps and attributing sources for confidence in overcoming these biases to self and other influential sources.

The third construct accompanying initiation of behaviour devoid of implicit biases in public health professionals is that of the actual changes in physical environment that assist the behaviour change. For this to happen it is imperative that supportive environments that foster equality in decision making and policies that promote fairness irrespective of variation in attributes that account for implicit biases such as race, ethnicity, gender, national origin, disability status, economic status, occupational status etc. are planned and implemented. Educational programs should provide and reinforce information on such policies and environmental supports in place in our society. Where there are no such supports efforts must be mandated to put such supports and policies in place. The three constructs of the initiation model are presented in Figure 1.

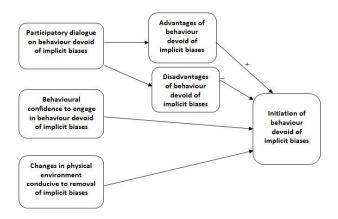


Figure 1: Constructs in initiation of behaviour devoid of implicit biases in applying multi-theory model of health behaviour change for public health professionals.

For sustenance of behaviour devoid of implicit biases among public health professionals the first construct that is central is that of emotional transformation derived from the work related to emotional intelligence theories. 11,22,23 In the context of public health professionals this implies that the practitioner must direct his or her emotions toward the goal of removing implicit biases in daily interactions, self-motivating himself or herself toward leading implicit bias free behaviours, and overcoming self-doubt in accomplishing these goals.

The second construct for sustenance of behaviour devoid of implicit biases among public health professionals is called practice for change derived from Freire's adult education model's praxis that refers to active reflection while thinking and reflective action while working. ¹⁸ This method would help constant identification and mitigation of implicit biases. This entails keeping a diary, journal or notes of encountering situations in which one was challenged by implicit biases, applying oneself in overcoming barriers, and agility of being able to change one's plans when faced with difficulties.

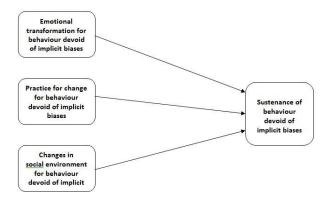


Figure 2: Constructs in sustenance of behaviour devoid of implicit biases in applying multi-theory model of health behaviour change for public health professionals.

The final construct for sustenance of behaviour devoid of implicit biases among public health professionals is the changes in social environment. This would entail becoming cognizant of implicit biases in oneself and then befriending people from the group against which these biases are held to help in identifying and overcoming these biases with their help. Additionally efforts can be made to recruit the help of family, friends, co-workers, and other professionals in sticking to the goal of sustained behaviour change with regard to overcoming implicit biases in interactions with clients and patients. The constructs responsible for aiding in sustenance of behaviour devoid of implicit biases are depicted in Figure 2

DISCUSSION

The purpose of this article was to apply multi-theory model of health behaviour change to combat implicit biases in public health students and professionals. Despite being a new theory, MTM has been used in several studies. It has been used to predict physical activity behaviour in college students where 26% of the variance in initiation of physical activity behaviour in sedentary students was explained by advantages outweighing disadvantages, behavioural confidence, work status, and changes in physical environment and approximately 30% of the variance in sustenance of physical activity behaviour was explained by emotional transformation, practice for change, and changes in social environment.¹⁴ MTM has also been used to predict consumption of small portion size behaviour in those eating large portion sizes where approximately 37% of the variance in the initiation was explained by participatory dialogue, behavioural confidence, age, and gender (males more likely) and about 21% of the variance in sustenance was explained emotional transformation, changes in social environment, and race (Whites more likely). 15 MTM has also been applied to promote water consumption behaviour instead of sugar sweetened beverages where about 62% of the variance in the initiation was explained by behavioural confidence and changes in the physical environment and about 58% of the variance in the sustenance was explained by emotional transformation and practice for change.¹⁶ Another application of MTM has been with predicting adequate sleep behaviour where for initiation the construct of behavioural confidence was found to be significant and accounted for about 24% of the variance while for sustenance changes in social environment, emotional transformation and practice for change were significant and accounted for about 34% of the variance. 17 Clearly MTM is a promising theory that has the potential to be applied for promoting behaviours devoid of implicit biases in public health professionals.

Implications for training and education in public health

Training and education in public health and medicine often emphasize population level information such as population risk attributes, community level distribution and determinants of diseases and so on that have the potential to expose learners to minorities and certain groups in unfavourable ways thereby reinforcing stereotypes which are the root causes of implicit biases. These biases get formed early on in education of public health and health care professionals. Blair et al explored whether explicit and implicit ethnic/racial biases among clinical professionals were related to their care of Black and Latino patients and found that while explicit biases were generally low; implicit biases especially with Black patients were present and seemed to influence their clinical relationships and had deleterious effects on overall care.³ These findings have important ramifications in shaping the training and education of health care and public health professionals. Right from being students,

public health and health care professionals should be exposed to education that helps them become cognizant of implicit biases and counter conditions their minds toward behaviours devoid of implicit biases. Multi-theory model (MTM) of health behaviour change can be very useful in this regard. Appendix 1 presents an instrument for measuring change in overcoming implicit biases in behaviour among public health students based on MTM. The instrument has a Flesch Reading Ease of around 60 and a Flesch-Kincaid grade level less than seventh grade thus making it suitable for different target audiences. This instrument can be used for use in educational settings such as Schools of Public Health preparing public health students as well as training of public health workforce to gauge the preparedness of these individuals.

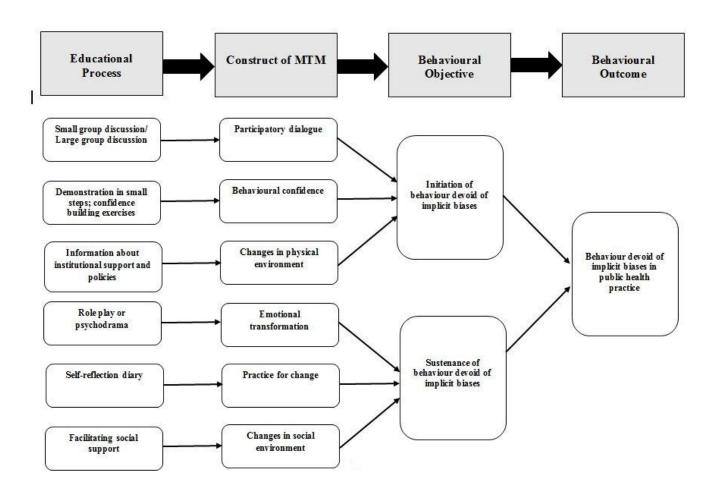


Figure 3: Diagrammatic depiction of how multi-theory model for health behaviour change can be used for educational interventions for behaviour change devoid of implicit biases in public health students and professionals.

Based on MTM, precise and brief interventions can be designed to develop behaviours devoid of implicit biases in dealing with clients in public health and patients in health care. Such interventions can be delivered both face-to-face and through online channels. For initiation of behaviour devoid of implicit biases the construct of participatory dialogue in which advantages outweigh disadvantages can be influenced through educational

processes of small and/or large group participatory discussions in which both the facilitator and participants actively participate to explore these and swing the choice toward advantages. The construct of behavioural confidence can be influenced by teaching the technique of identifying implicit biases in small steps and building confidence in overcoming these biases through emphasizing the role of self-power and other significant

influences on one's life. Educational methods such as role plays, psychodramas, simulations, demonstrations and so on can be used in this regard. The construct of changes in physical environment can be modified in educational programs by providing information on policies and legislations and helping learners imbibe the essence of these measures.

For sustenance of behaviour devoid of implicit biases the construct of emotional transformation can be built by showing the importance of emotions in shaping behaviours through affective methods such as role plays, simulations, and psychodramas. In such methods the negative influences of having implicit biases can be portrayed thereby generating feelings in the participants or audiences to influence behaviour change. In order to influence the construct of practice for change participants should be encouraged to keep a self-diary or a journal in which one becomes cognizant of implicit biases and records these on a regular basis. These days technology has advanced where apps are available for many behaviours and technology gurus should explore the possibility of developing some apps in this regard. Finally, for influencing the construct of changes in social environment opportunities should be explored in educational programs to build both natural (such as family, friends, co-workers) and artificial social supports (such as instructors, health care professionals etc.) to facilitate behaviour change. Figure 3 depicts and summarizes how multi-theory model (MTM) for health behaviour change can be used in an educational intervention for behaviour change devoid of implicit bias in public health students and professionals.

Implications for research and practice in public health

The instrument presented in Appendix 1 that measures change in overcoming implicit biases in behaviour among public health students based on MTM can be applied for both research and practice. For research with public health students and public health professionals, studies on instrument refinement and predictive studies can be undertaken utilizing this instrument. For instrument refinement construct validation of the instrument can be done using confirmatory factory analysis or structure equation modelling in data collected from cross sectional surveys.²⁵ Internal consistency reliability of the subscales pertaining to different constructs can be determined by Cronbach's alphas.²⁵ The same data set can be utilized to build a predictive model using stepwise multiple regression where the constructs of MTM can serve as independent variables and the dependent variables can be the intents for initiation and sustenance of behaviour devoid of implicit biases. These studies can be undertaken in a variety of sub groups such as male public health students, female public health students, students of different racial backgrounds, public health practitioners of different demographic make-ups and so on. In calculation of sample sizes for such studies G*Power can be used where an alpha of 0.05, power of 0.80, an estimated effect size of 0.10 (medium) and number of predictors in regression being three would come to be 114 participants which can be inflated by 10% for missing values to arrive at 125. 26

In research and practice there is also a need to design and test educational interventions based on MTM that can modify behaviour with implicit biases to a behaviour devoid of implicit biases in public health students and professionals of different demographic make-ups based on the variations of the generic model presented in Figure 3 and explained in previous section. Such studies can simple pre-test post-test designs, experimental designs or the gold standards, randomized controlled designs (RCTs) depending upon the resources and other factors. For conducting a RCT two groups from selected population would need to be randomly allocated to experimental group with MTM based intervention and control group which can have a standard knowledge/awareness based intervention on implicit biases. In calculating the sample size of such a RCT using G*Power an alpha of 0.05, power of 0.80, effect size of 0.30, two groups and three measurements the total sample size using G*Power comes to 62 or 31 in each group. 26 The method of data analysis to be utilized would be repeated measures analysis of variance (ANOVA).

CONCLUSION

Just like all walks of life, implicit biases are also present in public health students and practitioners. Unfortunately, these can have deleterious effects on quality of care in public health and are detrimental to the goals of public health practice. A new theory, multi-theory model (MTM) of health behaviour change provides a useful framework to both identify preparedness of public health students and professionals to engage in change efforts and design educational interventions that promote behaviours devoid of implicit biases in public health practice. The applications of this theory need to be empirically tested and verified in subsequent years.

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APPENDIX 1

Measuring change in overcoming implicit biases in behaviour by public health students

Directions: This survey is voluntary, which means you may choose not to complete it or not to answer individual questions. There is no direct benefit of this survey to you but your responses will help in developing effective implicit bias education programs. All data from this survey will be kept confidential. Please put an X mark by the response or fill the response that correctly describes your position. Thank you for your help!

Implicit bias is defined as unconscious, irrepressible, or irrational connotation that may influence one's judgements resulting in an unfair behaviour toward an individual, group or community. We all have some implicit biases based on race, gender, age, colour, national origin, or any other extraneous characteristics which influence our behaviour. The following questions relate to changing our behaviour toward behaviour devoid of implicit biases.

[Demographic questions can be changed as per the relevance to the region, state, country] 1. What is your gender? \square Male ☐ Female ☐ Other, ____

2.	How old are you today?	yea	ırs	•••••					
3.	What is your race/ethnicity?		 Caucasian Aı	nerican					
		☐ Black or A		rican					
		☐ Asian Ame							
		☐ Hispanic A							
		☐ Other							
4.	What is your class?	□МРН		• • • • • • • • • • • • • • • • • • • •					
		□ DrPH							
		☐ Other							
5. V	What is your current overall GPA?	☐ Less than 2	.49	• • • • • • • • • • • • • • • • • • • •					
	(on a 4.00 scale)	□ 2.50–2.99							
		□ 3.00–3.49							
		□ 3.50 – 4.00							
6.	Where do you live?	☐ On campus		• • • • • • • • • • • • • • • • • • • •					
	•	☐ Off-campu	S						
7.	Do you work?	□ No							
	•	☐ Yes,	_ average l	nours per week	(put a sing	gle number n	ot		
		range)							
••••		Never	Almost Never	Sometimes	Fairly Often	Very Often			
If yo	ticipatory dialogue: Advantages ou change your behaviour toward one devoid nplicit biases you might								
7.	be fair in your dealings.								
8.	be ethical in your transactions.								
9.	develop satisfying relationships.								
10.	have peace of mind.	□							

11.	be contented with your life.						
		Neve	r Almos Never	t Sometime		irly Very ten Often	
If you	ipatory Dialogue: Disadvantages change your behaviour toward one devoid blicit biases you might						
12.	have to change which you may not like.						
13.	become more conscious of your interactions.						
14.	feel deprived.						
15.	have to compromise your views.						
16.	not be supportive of own group.						
		Not At All Sure	Slightly Sure	Moderately Sure	Very Sure	Completely Sure	
Behav	rioural confidence						
	sure are you that you can change behaviour devoid of implicit biases						
17.	this week?						
18.	this week with your classmates?						
	this week with your clients?						
20.	this work without Botting it ustratout.						
21.	this week while being happy?						
		Not At All Sure	Slightly Sure	Moderately Sure	Very Sure	Completely Sure	
Chang	ges in physical environment						
How	sure are you that you will						
22.	have opportunities to exercise behaviour devoid of implicit biases?						
23.	be able to apply behaviour devoid of implicit biases at school?						
24.	be able to apply behaviour devoid of implicit biases at social events?						

		Not At All Sure	Slightly Sure	Moderately Sure	Very Sure	Completely Sure	
Emoti	ional transformation						
How 9 25.	sure are you that you can direct your emotions/feelings to the goal of applying behaviour devoid of implicit biases every day?						
		Not At All Sure	Slightly Sure	Moderately Sure	Very Sure	Completely Sure	
	ional transformation sure are you that you can						
26.	motivate yourself to applying behaviour devoid of implicit biases every day?						
27.	overcome self-doubt in accomplishing the goal of applying behaviour devoid of implicit biases every day?						
	ice for change sure are you that you can						
28.	keep a self-diary to monitor applying behaviour devoid of implicit biases every day?						
29.	be able to apply behaviour devoid of implicit biases every day if you encounter barriers?						
30.	change your plan for applying behaviour devoid of implicit biases every day if you face difficulties?						
	ges in social environment sure are you that you can get the help of a family member to support you with applying behaviour devoid of implicit biases every day?						
32.	friend to support you with applying behaviour devoid of implicit biases every day?						
33.	professor to support you with applying behaviour devoid of implicit biases every day?						

		Not At All Likely	Moderately Likely	Very Likely	Completely Likely	
	viour change: Initiation likely is it that you will					
34.	apply behaviour devoid of implicit biases every day in the upcoming week?					
		Not At All Likely	Moderately Likely	Very Likely	Completely Likely	
	viour change: Sustenance likely is it that you will					
35.	apply behaviour devoid of implicit biases every day from now on?					

Scoring

Construct of advantages: Scale: Never (0), Almost never (1), Sometimes (2), Fairly often (3), Very often (4). Summative score of Items 7-11. Possible range: 0-20. High score associated with likelihood of initiation of behaviour change.

Construct of disadvantages: Scale: Never (0), Almost never (1), Sometimes (2), Fairly often (3), Very often (4). Summative score of Items 12-16. Possible range: 0- 20. Low score associated with likelihood of initiation of behaviour change.

Subtract disadvantages score from advantages score to calculate participatory dialogue construct score. Positive score will be indicative of behaviour change.

Construct of behavioural confidence: Scale: Not at all sure (0), slightly sure (1), moderately sure (2), very sure (3), completely sure (4). Summative score of Items 17-21. Possible range 0-20. High score associated with likelihood of initiation of behaviour change.

Construct of changes in physical environment: Scale: Not at all sure (0), slightly sure (1), moderately sure (2), very sure (3), completely sure (4). Summative score of Items 22-24. Possible range 0-12. High score associated with likelihood of initiation of behaviour change.

Construct of emotional transformation: Scale: Not at all sure (0), slightly sure (1), moderately sure (2), very sure (3), completely sure (4). Summative score of Items 25-27. Possible range 0-12. High score associated with likelihood of sustenance of behaviour change.

Construct of practice for change: Scale: Not at all sure (0), slightly sure (1), moderately sure (2), very sure (3), completely sure (4). Summative score of Items 28-30. Possible range 0-12. High score associated with likelihood of sustenance of behaviour change.

Construct of changes in social environment: Scale: Not at all sure (0), slightly sure (1), moderately sure (2), very sure (3), completely sure (4). Summative score of Items 31-33. Possible range 0-12. High score associated with likelihood of sustenance of behaviour change.

For modelling initiation dependent variable can be Item 34: not at all likely (0), somewhat likely (1), moderately likely (2), very likely (3), and completely likely (4) and multiple regression can be used. For modelling sustenance dependent variable can be Item 35: not at all likely (0), somewhat likely (1), moderately likely (2), very likely (3), and completely likely (4) and multiple regression can be used.

Flesch reading ease: 60.2 Flesch-Kincaid grade level: 6.5