

A Sustainable Model Reflecting Role Of Health Protective Behavior In Reducing Premenstrual Syndrome And Suicide Burden Among Girls With Visual Impairment

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Abstract

The number of people with visual impairment has been significantly increased despite of the significant advancement in the treatment of many vision loss conditions. The costs of productivity losses due uncorrected myopia and presbyopia alone estimated to be US\$ 244 billion and US\$ 25.4 billion respectively. The situation in the developing countries is far worst. On the other hand, visual impairment associated with poor mental health may multiply this loss of productivity to many folds and poses substantial financial burden on society. Therefore, recent studies have recommended to develop effective interventions. The current study proposed a sustainable model that may be applied in educational and counselling programs for the blind girls to improve their mental health by reducing premenstrual syndrome and suicide burden in relation to health protective behavior. In short, the suggested cost effective model shall lead towards a sustainable society by improving their mental health.

Keywords: Visual Impairment; Sustainable Model; Cost Effective Intervention; Suicide; Premenstrual Syndrome; Health Protective Behavior

Introduction

It is well known that visually impaired people face significant difficulties in performing their daily routine tasks that are necessary for their survival like independent mobility, proper functioning at academic and professional places as well as co-ordination with others. (Panday, et al., 2015; Nadagaddi et al., 2020). Generally, visual impairment is categorized in to two main types called as partially blind and legally blind. Visual impairment refers to loss of vision which impact the daily life activities of the individual to such an extent that even with correction he/she cannot perform them independently.

The prevalence of visual impairment is on rise around the world. Over the last decade the number of visually impaired people has been increased more than 20% in United States only and this number is estimated to be doubled by 2050. This number has been increased despite of the huge advancement in the treatment of many vision loss conditions and the situation in the developing countries around the globe may be worst (WHO, 2021). According to WHO (2021) at least 2.2 billion people are suffering from vision impairment around the globe. The costs of productivity losses due to the two types named as uncorrected myopia and presbyopia alone estimated to be US\$ 244 billion and US\$ 25.4 billion. However, vision impairment associated with poor mental health may multiply this loss of productivity to many folds and poses substantial financial burden on the society. Recent studies reported anxiety, depression, stress, suicidal behavior, poor social-emotional adjustment, distress and grief among the individuals with visual impairment (Demmin and Silverstein, 2020; Akram and Batool, 2020 : Khurana et al., 2021; Dillion et al., 2020; Choi et al., 2020)

Nearly 8 million people commit suicide and end their lives each year. In other words, one life being lost every 40 seconds around the globe (WHO, 2019). There are various potential but complex factors that drive people to end their own lives however the premenstrual syndrome has been found one of the strong contributor in the suicidal behavior of the women. A few studies showed positive association of suicidal behavior with the specific phases of menstrual cycle (Jang and Elfenbein, 2019; Osborn, 2021; Owens and Eisenlohr-Moul, 2018; Pilver, et.al., 2013). Relph (2021) on BBC news reported the experiences shared by thousands of women during the different phases of their menstrual cycle through BBC news. Majority of the women expressed that they are suffering from the various symptoms of PMS.

Usually mild changes such as moodiness, irritability, food craving and fatigue are experienced by women during the few days before having menses. Some other women also reported tender breasts, depression, anxiety, headaches, bloating, crying spells, hopelessness, disturbed sleep, reduced confidence and joint/muscles pains. These symptoms are collectively known as premenstrual syndrome (PMS) or premenstrual tension (Green et al., 2017). The routine life of majority of the women may be interfered due to the experience of PMS. Saunders and Hawton found a significant association between premenstrual syndrome and suicidal behavior among women after reviewing 44 studies focusing on suicide and menstrual cycles. Eisenlohr-Moul (2019) found that 30% of the women suffering from premenstrual symptoms tried to take their own lives thus they concluded that women with pre-

menstrual symptoms are likely to be at a higher risk of suicide as compared to the females without PMS. Further, findings of a systematic review showed a strong and positive association between PMS and suicidality independent to psychiatric comorbidities (Pilver, et. al., 2013; Osborn, 2021; Owens and Eisenlohr-Moul, 2018).

It is true that adolescents have to deal with substantial psychological, physical, and social changes. Menses is one of these changes that may affect the mental state and social emotional adjustment of the girls' adolescents. Some girls may suffer with headaches, mood swings, and sleep and appetite disturbances before or during their menses. These symptoms resolve after a few days of the menstruation without any medication (Jang and Elfenbein, 2019; Osborn, et al., 2021, Green et al., 2017). Adolescents with visual impairment face different types of crucial challenges at this stage of development as compared to them without visually impaired counterparts. Researchers argued that visually impaired girls suffer from some particular stressors like limited physical mobility and increased dependency needs in accomplishing various activities thus feel difficulty in performing self-care behavior (Barman, et al., 2020; Lawal, et al., 2020; Mahalakshmi, et al., 2017). Akram and Batool (2020) reported a significant higher rate of suicidal ideation and attempts among the adolescents with visual impairment as compared to their hearing impaired and regular counterparts. Similarly, the association of severity of disability with mental health issues has been also found. Disability itself is a traumatic experience of the individuals themselves and for their significant others. Further the perceived stigma of disability adds the fuel to injury for the individual as well as to the family (Smith, et al., 2021; Choi, et. al., 2020; Akram and Batool, 2020; Panday,et.al., 2015; Khurana, et al. 2021) compared suicidal behavior in people with and without sensory impairment. They concluded that participants with visual or hearing impairment reported three times higher ratio of suicidal ideation and suicidal attempts as compared to the people without sensory impairment

The literature also indicates that the severity of symptoms of PMS can be reduced by changing the life styles and by adopting the health protecting behaviors. Pender, et., al (2014) reported health protecting behavior (HPB) as an essential part of healthy lifestyle. They further elaborated that health protecting behavior is an expression of the human actualizing tendency and this behavior directs toward sustaining or enhancing the individual's level of personal fulfillment, well-being and self-actualization. As a result, the health protective behavior reduces or eliminate the chances of encountering illness. According to Harris et al., (1979) health protective behavior (HPB) refers to any action taken by an individual, irrespective of his actual or perceived health status, in order to protect, improve or sustain his health, although this behavior may or may not be objectively effective for health. Pender, et al., (2014) explained that health promotion actions and behaviors may inhibit most of the serious and chronic diseases like heart disease, diabetes, stroke, risk of early death and also advance physical health. Health behaviors has strong impact on individuals' physical health (Nielsen et al., 2018). Sanitization and health protective behavior during the phase of menses is important for good physical and psychosocial functioning of the

girls. (Alberda, 2018). On the other hand, Dundar et al., (2020) studied menstrual sanitary management in females with visual impairment and concluded that visually handicapped females have to face problems during periods. Such females require substantial support from others.

Nadagaddi, et al (2020) reported that mean score of practice and knowledge of personal sanitation and hygiene of children with visual impairment was improved after receiving the intervention. Similarly, Nolett et al., (2019) explored the risk factors that contribute in developing depressive symptoms among the individual with visual impairment. Results indicated some significant risk factors for depressive symptoms for visually impaired population such as eye condition, ethnicity (non-white), younger age, visual function and poor self-rated health. The reason of their poor self-rated health may be their less engagement in health promoting practices or behaviors.

Need and Significance of the Research

Recent study reported the prevalence of mental health issues among the individuals with visual impairment. These studies also recommended to explore the mechanism that link visual impairment and poor mental health so that effective rehabilitation intervention may be developed to reduce loss of productivity at the part of the individuals with vision loss and financial burden in society. Premenstrual syndrome and suicidal ideation are common mental health issues prevailing in women independent to psychological morbidities. Moreover, poor hygienic menstrual management has been reported in Pakistani adolescent girls primarily due to lack of knowledge and adequate facilities (Lihemo and Hafeez-Ur-Rehman, 2017). In this scenario the troubles of adolescent girls with visual impairment while maintaining the hygienic menstruation can be estimated in Pakistan. There is a dearth of published literature on premenstrual symptoms and suicide among the girls with visual impairment thus the significance of the current study is evident.

The current study has been designed to find a practical, sustainable and cost effective rehabilitation intervention in relations to premenstrual syndrome (PMS), suicide and health protective behavior (HPB) for the girls with visual impairment

Theoretical Framework

The literature shows that a large number of women may have premenstrual symptoms during one week prior to their regular menses and PMS has been found to be linked with suicidal thoughts and attempts. On the other hand, it has been also found that PMS may reduce by adapting the health protective behavior which may improve the mental health of women thus decrease the risk of suicide. Based on this theoretical model emerged from the literature the hypothesis of the present research is given below:

Hypothesis

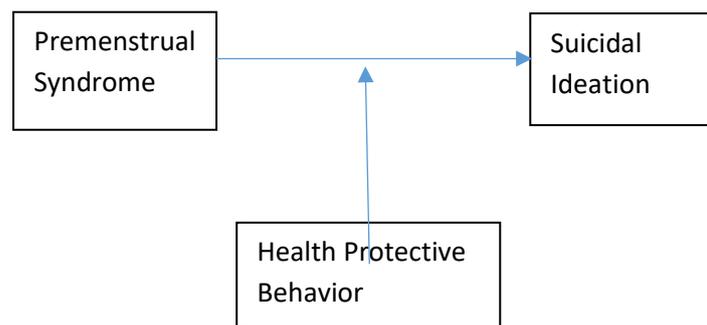
- 1 Premenstrual syndrome is prevailing among visually impaired adolescent's girls and is linked with SI independent to psychiatric comorbidity.
- 2 Premenstrual syndrome is positively associated with suicide ideation.

It is assumed that PMS is also prevailing in the girls with visual impairment just like the individuals who are not suffering from vision loss. Literature also shows that PMS is positively associated with suicidal ideation regardless of presence of another psychological disorder (Elfenbein, 2019; Papadopoulou, 2019) therefore in this study the girls with depression, stress and anxiety were excluded because it is well known that stress, depression and anxiety can strongly lead towards suicidal behavior (Smith, 2021).

The girls may experience one or more premenstrual symptoms like anger, anxiety, hopelessness, mood, tearfulness, decreased functioning, changed pattern of sleep and appetite as well as decreased interest in work, home and social activities. These unaddressed and prolonged symptoms may lead towards suicidal ideation.

Health Protective Behavior effects PMS as well as SI negatively thus may play moderating role in the relationship of PMS and Suicidal ideation among the girls with visual impairment. The interaction effect of three variables results in a sustainable model which will prevent and reduce PMS as well as Suicidal Ideation.

On the basis of literature review (Nielsen et al, 2018; Alberda 2018; Dundar et al 2020). it is also hypothesized that premenstrual syndrome has inverse relationship with health care behavior whereas positively associated with suicidal ideation. It means that the blind girls who take healthy diet (more fruits and vegetables than junk food), do exercise, monitor weight, avoid smoking and take other self-care measures regularly they have very rare chances to experience premenstrual syndrome which further reduce the risk of suicidal behavior. Whereas unaddressed PMS will lead towards suicidal risks and increase the death and financial burden. Therefore, it is assumed that health protective behavior improves the mental and physical health thus increase the likelihood of better social emotional adjustment at homes, schools. Work and other social places. Healthy individuals are more productive and bring prosperity to themselves, their families and nations. Therefore, they will create a sustainable environment for themselves and others. Literature shows that health protective behavior can be learnt (Nadagaddi et al., 2020) and may be used as an early intervention and treatment cost effective technique to reduce mental health issues like PMS and suicidal ideation. As a result, the individuals with visual impairment shall contribute positively in creating sustainable society.



Methods

After approval from institutional research review committee this correlational cross sectional analytical study with quantitative research design was conducted to explore the moderating role of health protective behaviors in premenstrual symptoms and suicidal behavior among girls with visual impairment by controlling the mental health in terms of depression, anxiety and stress of the participants. In order to collect data permission was obtained from the principals of the schools as well as from the parents of the girls with visual impairment. Further informed consents were taken from the participants. Moreover, the tools/questionnaires were used after obtaining permissions from the authors.

Sample and Sampling Procedures

The population is the total number of elements from which subjects are selected (Faiz et al., 2021; Lakhan et al., 2020; Ali et al., 2021; Siddique et al., 2021). Moreover, the sample were the number of subjects chosen from the population (Ali et al., 2021; Siddique et al., 2021; Mah Jabeen et al., 2021; Munir et al., 2021; Saeed et al., 2021; Siddique et al., 2020). In order to collect data from the target population total 13 schools for the individuals with visual impairment were accessed out of which 10 schools allowed to collect data. These schools were located in Sialkot, Gujranwala, Gujrat, Lahore and Rawalpindi.

The sample was recruited by multistage non-probability, purposive sampling technique. At the first stage only girls with visual impairment age ranged from 14 to 19 years were offered to participate in the study. At the second stage DASS was administered on N (1240) participants to screen out the girls with depression, anxiety and stress. The participants who showed higher scores (comorbidity) on any of these three disorders have been excluded. As a result, N (1050) girls left with the study on whom PMS scale was administered. Out of 1050 total 653 girls met the criteria of PMS and 27 girls appeared to be suffering from Premenstrual dysphoric disorder (PDD) a severe form of Premenstrual syndrome (PMS). Out of 27 girls 19 were seeking treatment for their PDD symptoms whereas 8 were referred to health care professionals. However, at the end only 573 girls with PMS (Mean age =16.47; SD= 2.38) could complete the information/questionnaires (Table 1).

Table 1 Frequency and percentage of Sample size selected from different cities

Sr#	Cities	Frequency	Percentage
1	Sialkot	090	16
2	Gujranwala	115	20
3	Lahore	167	29
4	Rawalpindi	125	22
5	Gujrat	066	13
	Total	573	100

Measures/Tools

In this study following tools were administered to measure the study variables:

1. Premenstrual symptoms screening tool revised for adolescent (PSST-A) consisted of 19 items, was developed by Steiner et al., in 2011. The participants have to response on 4-point Likert scale ranging from not at all to severe. In current research, Cronbach alpha reliability of PSST-A in this study is 0.91. It measures the symptoms like anger, anxiety, depressed/hopelessness, mood disturbances, tearfulness, decreased interest in work, home and social activities, appetite and sleep disturbances and others. It also consists of four items that measure the functional disturbances and productivity
2. Depression, Anxiety and Stress Scale (DASS) consisted of three subscales and 42 items, measures the levels of depression, anxiety and stress. It was developed by Lovibond and Lovibond in 1995. Each statement was rated on four-point Likert scale i.e. 0= Never, 1= Sometimes, 2= Often and 3= Almost Always High scores on the subscales showed poor mental health. The researchers administered DASS-21 (Aslam & Kamal, 2017) Urdu version to measure the depression, anxiety and stress of the girls with visual impairment and excluded those participants who obtained higher scores than the normal range on any of three subscales. In the present study internal consistency of DASS scale is $\alpha=0.89$.
3. Health Protective Behavior Scale (HPBS) measures health promoting and protective behaviors (Ping et al., 2018). It consists of 32 items. In current study, internal consistency of HPBS in this study is $\alpha= 0.90$.
4. Suicidal ideation was assessed by the Suicidal Ideation Attribution Scale (SIDAS). This 10-point scale with 5 items has been developed by Van-Spijker et al., in 2014. The higher scores on this scale ranging from 0 to 50 depicted higher level of suicidal ideation. SIDAS demonstrated high internal consistency and good convergent validity. It also showed high Cronbach alpha reliability in the current study (0.93).

Results

Descriptive and inferential statistical techniques were used to test the hypothesis of the study. Frequency program was run to estimate the percentage of Premenstrual Syndrome (PMS) among the participants. Total 653 (62%) girls met the criteria of PMS thus our first hypothesis supported that it is prevailing in the girls with visual

impairment independent to other psychological comorbidity in terms of stress, depression and anxiety.

Table 2 Moderation Analysis of Health Protective Behavior in PMS and Suicidal Behavior among visually impaired girls

Moderation Analysis of Health Protective Behavior in PMS and Suicidal Behavior among visually impaired girls (N=573)

Hypothesis Testing	B	Premenstrual Symptoms	
		95%CI	
		LL	UL
(Constant)	62.15**	46.99	124.07
H2 PMS	0.63*	0.35	0.82
H3 HPB	-0.72**	-2.47	0.87
H3 PMS × HPB	-0.12**	-1.43	1.17
R ²		0.68	
F		17.89***	
ΔR ²		0.21**	
ΔF		4.87	

Note: CI= Confidence Interval, LL=Lower Limit, UL=Upper Limit

The moderating role of Health Protective behavior was analyzed by the Hayes Process version 2.0 on SPSS IBM 21. As a result, Table 2 shows a significant model appeared with $R^2 = 0.68$, $F 17.89$ $P < 0.001$. The value of R indicated 68% variance is explained by the pre-menstrual symptoms in the suicidal ideation of the girls. The model appeared to be 21% more fit as indicated by $\Delta R^2 (0.21^{**})$ in the result of the interaction of health protective behavior and premenstrual symptoms which means that interaction effect of both variables bring 21% additional variance in the suicidal behavior of the participants. Further premenstrual symptoms appeared as positive predictor of suicidal behavior (0.63, $p < .05$) whereas health protective behavior emerged negative predictor (-0.72, $p < .001$) of suicidal behavior. These findings supported second and third hypothesis respectively. The results in Table 2 mentioned that health protective behavior significantly and negatively moderated the relationship between premenstrual symptoms and suicidal behavior among visually impaired adolescent girl which is evident from interaction effect B (-0.013, $p < 0.05$). Thus, the third hypothesis has been supported. Figure 1 also explains the results shown in table 2.

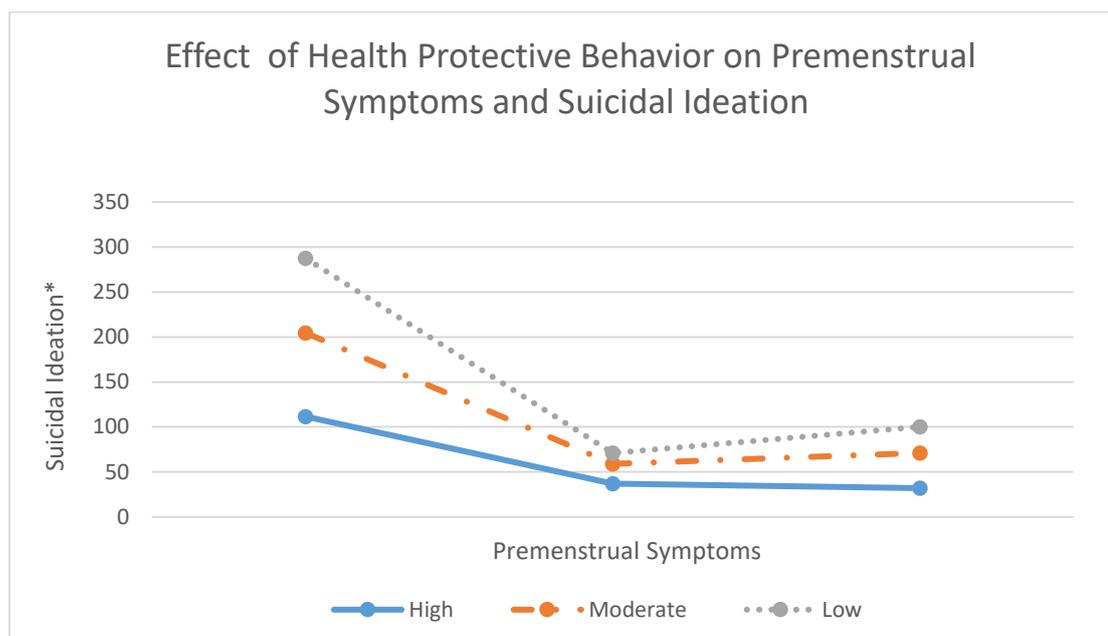


Figure 1 Graphical Representation of Interaction effect of Premenstrual Symptoms and Health Protective Behavior on Suicidal Ideation.

Further Path Analysis was run on AMOS to confirm the results yield by moderation analysis as well as to extract the sustainable model of preventing and reducing Suicidal Ideation and PMS among girls with visual impairment.

Table 3 Hypothesis testing using Path analysis

Hypothesis Testing	B	CHI SQUARE	NFI	GFI	CFI	TLI	RMSEA
H2	0.62***						
H3	-0.26***						
H3	-0.13**						
PMS*HPB		0.847	0.95	0.91	0.92	0.94	0.04

The results mentioned in Table 3 and Figure 2 supported the findings of moderating analysis and suggested a sustainable model imply that Health protecting behavior impose a significant inverse influence on Premenstrual symptoms (B-0.52***) and Suicidal Ideation (-0.26***). Further the interaction effect is also significant and negative (-0.13***) which means that when health protective behavior is exhibited by the girls with visual impairment it effects and changes the direction of relationship between PMS and suicidal ideation which was positive. In other words, health protective behavior plays significant role in reducing PMS as well as suicidal burden among the girls with visual impairment.

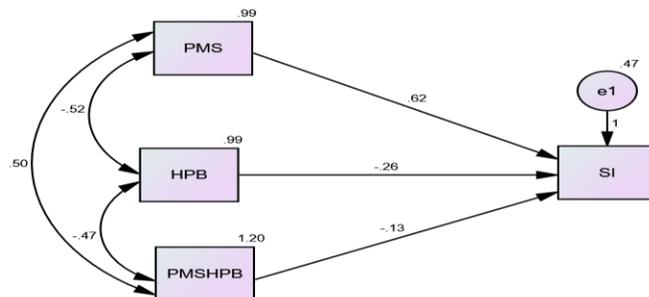


Figure 2. Emerged Sustainable Model from Path Analysis

Discussion

The findings of the study are in consistent with the previous researches that PMS is associated with suicidal behavior independent to psychological comorbidity (Kustriyanti et al., 2020). The most common allied psychological problems are stress, depression and anxiety (Akram & Batool, 2020). Therefore, in the current study the participants suffering from stress, depression or anxiety were screened out to find the independent relationship of PMS and suicidal ideation. The results showed significant and positive relationship of premenstrual syndrome with suicidal ideation in line with the findings of previous researches (Pilver, et al., 2013; Osborn, 2021; Owens, 2018; Khurana, et al., 2021). It means that girls who have symptoms of anger, irritability, changes in mood, appetite and sleep, hopelessness, headache, tender breasts, joint pains and crying spells a few days before to their menstrual cycles are at the high risk of suicidal thoughts and attempts. Literature indicates that suicidal behavior as well as mental and physical health problems (Choi et al., 2020; Dudar and Ozsoy, 2020) are prevailing among the individuals with visual impairment. Akram and Batool reported the higher level of suicidal ideation and attempt among adolescents with vision loss as compared to other two groups with and without hearing impairment.

On the other hand, Health Protective Behavior shows strong negative effect on PMS and Suicidal Ideation thus it plays a significant moderating role in relation to PMS and Suicidal Ideation. It means that health protective behavior like including more vegetables and fruits, regular exercise, proper self-care during menses, weight control, smoking avoidance, use purified water, use protection measures at living places, sugar control, seeking in-time medical and psychological care will reduce the severity and chance of premenstrual symptoms. These health protective behaviors not only reduce

the PMS as well as make the girls relax during their menses thus may significantly decrease or eliminate the risk of suicide. The above mentioned health protective behaviors are easy to learn for the individuals without disability. However, these behaviors must be taught to the girls with visual impairment because they cannot receive information from their sense of eyes in full manner (Akram and Batool, 2020). Vision loss increases the dependency needs of the individuals in performing daily routine activities and limits their mobility severely. As a result, the significant others and friends may start avoiding them therefore they cannot learn many behaviors and skills that are essential to lead the healthy lives. Literature throws light on research (Merle et al., 2018) that assess unhealthy behaviors of visually impaired people. Results showed low physical activity and poor diet in visually impaired students. One main factor of lower physical activity are dependency needs of the individuals with visual impairment on others to move from one place to another (Akram and Batool, 2020). Numerous studies have demonstrated physical activity is a strong factor in overall health and well-being, and a growing body of literature, reviewed herein, suggests that several eye conditions, including glaucoma, age-related macular degeneration, and diabetic retinopathy, are associated with lower activity levels (Elsman et al, 2019; Merle et al., 2018; Akram and Batool, 2020).. Likewise, physical activity levels are lower in persons with worse vision (Elsman et al., 2019). The individuals with visual impairment are usually ignored by their families and society therefore they may have poor self-image and feelings of self- worthlessness. The findings of recent researches reported poor perceived self- rated health. The reason may be their less involvement in health care behavior (Akram and Batool, 2020).

It has been found that health promoting behaviors like increased physical activity, participation in social activities and in-time medical and psychological care also improve the vision ability as well as enhance mental and physical health of the individuals with visual impairment. Elsman et al., (2019) reviewed 441 research papers and concluded that oral hygiene, sports camps are effective rehabilitation interventions to improve the social participation and quality of life of individuals with vision loss. Moreover, they also suggested that intervention must be effective as many countries particularly the developing countries face financial burden of running the intervention programs.

The emerged model by the findings of the current study seems to be highly beneficial, easy and cost effective. Its application as an early intervention is easy because it may incorporated in the curriculum of the visual impairment individuals at the stage of their schools so that they may obtain the knowledge about the health protective behaviors and may learn to perform them in their childhood. The teachers and parents may help the visually impaired children in adopting healthy behaviors like increasing physical activity, maintaining weight, sugar and sodium control, taking more vegetables and fruits, regular exercise, regular hand washing, hygienic behavior during menses, sharing their problems with others, trying to be calm and relaxed, oral care, taking in-time advise of medical professionals and other individuals. The model is cost effective also because it does not need expensive material, machine or equipment to

apply. However visual impairment may bring a lot of difficulties to the individuals besides independent mobility. Limited vision adversely effects the self-care activities of the individuals and they have to put extra effort in learning the health protective behavior from their significant others as compared to the people without vision loss. On the other hand, the trainers/instructors have to put more effort and to achieve desired results. They may have to offer awareness programs about the health protective behaviors and premenstrual symptoms to the parents, significant others and girls with visual impairment simultaneously in the countries with low literacy rate like Pakistan. The majority of adolescent girls reported to be unaware and unprepared for onset of their menses. They also found to have poor knowledge about the hygiene practices during their menstruation. Majority of them feel embarrassment to share their experiences and feelings of menstruation due to cultural norms of not discussing openly the matters related to reproductive system. Further lack of proper facilities to manage their menstruation, poor hygienic conditions in schools and untrained teachers to guide the girls during this time period have been also reported (Lihemo and Hafeez-Ur-Rehman, 2017). They further suggested that poor hygienic practices during menstruation negatively affect their psychological wellbeing, development as well as their academic performance because they miss their schools during these days. These findings are related to the adolescent girls without any disability and one can feel the significance of the proper menstrual management among the girls with vision loss in Pakistan. Therefore, this is the need of hour to introduce interventions consists of health protective behavior at prevention and intervention levels to improve the quality of life of people and mental health of girls with visual impairment (Elsman et al., 2019; Pender et al., 2014; Nadagaddi et al., 2020).

In short, the implication of emerged sustainable model will promote the healthy behavior among individuals with visual impairment. The model clearly indicates that the health protective behavior may significantly reduce PMS disease as well as suicide burden. Consequently, the application of this model will increase the chances of healthy participation of girls with visual impairment at various social places and make them productive. The healthy and productive people will contribute in creating a sustainable society.

Conclusions

Recent researches recommended a better understanding of the mechanisms linking visual impairment and poor mental health so that the sustainability of the blind individuals may be enhanced. Moreover, previous studies also strongly suggested to develop effective interventions to improve the mental health and psycho-social wellbeing of the blind individuals (Demmin and Silverstein, 2020; Elsman et al., 2019). This study has explored one mechanism that is contributing in improving mental health and productivity of the girls with visual impairment by understanding the role of health protective behavior in relation to premenstrual syndrome and suicide among them. The findings of this study showed that health protective behavior negatively effects the premenstrual symptoms and suicidal ideation among the girls with visual impairment.

In other worlds Health Protective behavior as a cost effective preventive and treatment technique will increase the productivity and sustainability in the society by improving mental as well as physical health of the girls with visual impairment.

Limitations

The present study used quantitative research design and selected sample only five districts of Pakistan. Future in-depth studies with mixed method designs are needed to explore the underlying factors of PMS and suicidal behavior of girls with visual impairment at national level.

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