Research Square

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Community Health Screenings Impacting Intention to Change Lifestyle: A Descriptive Study

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Abstract

BACKGROUND Health fairs and associated screenings are a widely-utilized method to get the community involved in health awareness and health risk, in hopes of motivating the improvement of healthy behaviors and referral to healthcare to prevent/treat chronic diseases. However, there is little research on their effectiveness and influence on behavioral intention, behavior, and health outcomes of participants. The purpose of this study was to provide preliminary investigation of the effectiveness of self-selected health screenings on intention to improve risk in rural, adult populations in Texas.

METHODS: Data were collected as a part of a statewide project, *Community Conversations on Health*, in partnership with the Texas Department of State Health Services. Family health expos were hosted in 21 rural communities across 20 counties offering lifestyle-related health screenings: blood pressure/heart rate, handgrip strength, waist circumference, physical activity frequency, and fruit/vegetable intake. Expo attendees were allowed to self-select screenings, to maintain autonomy support—a theoretical foundation of the project. After each screening, participants were asked an intention question on a 5-point Likert-type scale.

RESULTS: 170 adults (59.93 ± 16.15 years of age; 73% women) participated in at least one screening: blood pressure (95%), handgrip strength (83%), heart rate (79%), fruit/vegetable intake (72%), physical activity level (68%), WC (35%). Overall mean intention to improve ranged from 3.92 ± 0.84 (handgrip strength) to 4.21 ± 0.59 (WC), with no statistically significant differences between means (*Wilks' Lambda* = 0.82, $F(4, 16) = 0.88$, $p = 0.50$). The only statistically significant mean difference in intention between risk classification groups ($t = -4.67$, $p < 0.001$) was in WC, with those classified as *very low/low risk* (3.79 ± 0.43, $n = 14$) being statistically significantly lower than those classified as *high/very high risk* (4.60 ± 0.51, $n = 15$).

CONCLUSIONS: These findings provide preliminary support that self-selected, community health screenings can positively impact intention to improve the risk/results of screenings. Future research should confirm findings with a larger sample and pre-post assessment of intention as well as potential impact on health behavior change.

BACKGROUND

Chronic diseases, such as heart disease, cancer, stroke and diabetes, comprise nearly 90% of the leading causes of death in America (1–2). A healthy lifestyle that includes a healthy diet, not smoking, and adequate physical activity has been proposed to decrease the risk of an individual developing a chronic disease, preventing close to 80% of all chronic diseases (3–5). Since a majority of US adults do not meet common recommendations (6–7), many are encouraged through public health and healthcare messaging to initiate a healthy lifestyle and other preventive behaviors. In response, health screenings are prominently promoted to provide awareness and motivation to initiate and maintain healthy lifestyle adoption, and in hopes, subsequently yield long-term public health benefits.

However, there is scant evidence for these assumptions. For example, the United States Preventive Services Task Force concludes that screening for hypertension, perhaps one of the most commonly employed health screenings, has limited evidence on benefits of screenings on health outcomes (8). In addition, there is support that the individual response to overall health screenings is not benign, and induces an array of emotional, motivational, and behavioral responses in adults—including the promotion of indifferent or unhealthful responses (9–13). Unhealthy responses include, but are not limited to, the use of unprescribed supplements, obsessive exercise, and cosmetic surgery (11). There is little research on the positive effectiveness of intention, behavior change, and outcomes that are observed across health screenings for chronic disease prevention.

Health fairs are a common way for communities to receive health screenings, often free of charge or low-cost, and especially important in rural communities that often have limited to no access to healthcare facilities and/or practitioners. The effectiveness of health fairs can be evaluated through changes in a participant's target behavior related to seeking ways to improve health factors (14). However, the measurement of the effectiveness of health fairs is complicated. First, there are barriers to participation, such as lack of awareness and convenience of screening offerings, perceptions of affordability, lack of time, beliefs that one is currently healthy, and perceived concerns that screening procedures are too complicated to implement (15–16). Research suggests that the effectiveness of health fairs is limited due to some screenings being more desirable to complete than others, as well as individuals attending with no prior intent or motive to improve their health (17). There is also concern about the limits to the generalizability of the screening outcomes, resulting in poor effectiveness of health fairs overall (18). However, some research has elucidated supportive factors, such as accessibility to various populations of focus, including vulnerable populations and if participants have prior intent to participate in specific screenings (19–20). In addition, limited research has found that additional education provided from health fairs increases individual's empowerment to make healthy choices to prevent illnesses (21).

In conclusion, despite a dearth of supportive research, health fairs might generate positive and negative outcomes in those who participate in the health fair and its screenings. It is then hypothesized that, despite their wide use, the prior research expresses the vital role of individual factors, amidst a limited understanding of the effectiveness of health fair screenings for chronic disease prevention, changing behavioral intention, behavior, and health outcomes in participants (15). Such knowledge would be important to inform best practices for community-focused health screenings, as well as future research questions surrounding their effectiveness. Thus, the primary purpose of this evaluation was to further the understanding of common health screenings in adults at a free, community health expo across 12 different rural areas in Texas. More specifically, this evaluation explored: (1) which screenings do participants self-select when provided the opportunity, (2) what are screening results and risk ratings, and (3) what is the impact on intention to improve screening results, respectively. It is important to note that all the screenings selected to be in the evaluation were included because they are linked to chronic diseases. Therefore, improving the health in any screening area could reduce the chance of developing such diseases (11,18,22–24).

METHODS

Secondary data analysis was conducted with individual data collected from 20 health expos in rural communities. Expo events were hosted by local communities as a part of a larger project with Texas A&M AgriLife Extension to provide rural communities with awareness of and access to health-related resources for chronic disease prevention. The project included various measures of individual responses to the health screenings to guide internal evaluation of the expos (see below). The present research received Institutional Review Board (IRB) approval for secondary data analysis and dissemination of de-identified data (the original data did not contain personal identifiable information) was received prior to this manuscript.

Health Expos

The health expos were designed to encourage adults (≥ 18 years of age) toward self-selection and self-administration of any or all health screenings related to the lifestyle prevention of chronic disease, including: blood pressure, handgrip strength, waist circumference (WC), physical activity, and fruit and vegetable intake.

Health screening participation was overseen by trained volunteers from the project staff or community. The trained volunteers did not conduct the screenings but rather assisted with instructions, recording results, and answering questions, as needed. Screening instructions were provided in both English and Spanish, alongside the screening tools for participants to follow during chosen screening(s). Participants received the 'Healthy Lifestyle Screenings' in either English or Spanish to record their screening results, as well as respond to the risk classification and intention questions (see Supplementary Information File). It is important to note that all data was collected and interpreted in the imperial measurement system. As seen in the Supplementary Information File, the risk classification data was given and interpreted by the participants in imperial metrics. Data was then translated from the imperial system to the metric system for a more inclusive understanding of the data. The screening forms were carbon copy format, so that participants could retain their results and responses as a reference for future self-screenings and/or to share with their healthcare provider. Each carbon copy was retained by the project team for data collection. Additionally, participants received a booklet with health education and resources that coincided with the screenings.

Health Screenings

Blood Pressure/Heart Rate Monitor

Blood pressure and heart rate were assessed using a Yuwell electronic monitor (model: YE660E) via an arm cuff, with the user's manual instructions provided to guide participants. In summary, participants were asked to place the arm cuff around the bicep and start the machine per the instruction manual to receive the participant's blood pressure result.

The American Heart Association's classification table was used for blood pressure and heart rate results (25). Blood pressure categories were presented, and ranged from 'Normal' with Systolic mmHg < 120 and/or Diastolic mmHg < 80 to 'Hypertensive Crisis' with Systolic mmHg > 180 and/or Diastolic mmHg > 120. Participants that were classified as 'High Blood Pressure (Hypertension Stage 1)' had Systolic between 130–139 mmHg and Diastolic 80–89 mmHg. Two categories were provided for heart rate: 'Normal' with 60–100 beats per minute, and 'Abnormal' with

Handgrip Strength

Handgrip strength, though not commonly utilized in community settings, can assess several health risks, such as muscle weakness, nutritional deficiencies, cognitive function, fall risks, WC, and other chronic morbidities (22). The Handexer Digital Dynamometer was used to assess handgrip strength (in pounds (lbs)), following the user manual. In summary, participants held their arm at a 90° angle with the elbow by the side of the body and the thumb at the top of the grip to ensure the wrist was properly rotated. Participants were asked to squeeze the dynamometer grip for five seconds without moving other parts of the body. One practice trial was allowed before the best result from three attempts was recorded.

The classification table provided by the Handexer Digital Hand Dynamometer user manual was provided for screening result interpretation, relative to age category (18–99 years) and sex. Three categories of result classification were then provided based on screening results (i.e., grip strength in lbs)—'Weak', 'Normal', or 'Strong'. For example, men and women in the age range of 55–59 years were classified 'Strong' with results of > 106.9 lbs and > 69.4 lbs, respectively.

Waist Circumference

Waist circumference was self-assessed using a Gulick measuring tape following the instructions provided by the American College of Sports Medicine (26), which recommends a circumference measurement at the level of the navel. Self-assessment of WC has been found to be a valid method when compared to a practitioner measured method (27–28). Participants were provided a seven-foot standing, privacy screen to conduct the WC self-assessment and allowed to measure on top of thin clothing, if needed.

The classification table for men and women, respectively, was provided by the ACSM, and included the following four risk categories: (1) 'Very low', (2) 'Low', (3) 'High', (4) 'Very high' (25). For example, men between 39.5–47.0 inches and women 35.5–43.0 inches are considered a 'High risk' category for obesity-related diseases.

Physical Activity and Fruit/Vegetable Intake

Physical activity was assessed with a single-item question (27–28): "In the past week, how many days did you do a total of 30 minutes or more of physical activity that was enough to raise your breathing

rate?" A single response was requested between '0 days' and '7 days'. For classification, the assessment form provided the participant with a note that "the health recommendation for an active lifestyle is 5 or more days per week," and then asked, "Do you meet this recommendation?" Responses were *yes* or *no*.

Fruit and vegetable intake was assessed with a single-item question (29): "How many total servings of fruit and/or vegetables did you eat yesterday?" Responses ranged from a single selection between '0' and '≥ 10'. For classification, the assessment form provided the participant with a note that "the health recommendation for healthy eating is 5 or more servings per day," and then asked, "Do you meet this recommendation?" Responses were *yes* or *no*.

Intention

An intention question was presented after each screening result and classification to assess the potential impact of each screening on intention to improve respective results. Specifically, the following statement was provided—"Based on this screening result, I intend to improve my [screening] in the near future." Responses were provided on a 5-point Likert scale (*Strongly Disagree, Disagree, Neither Disagree/Agree, Agree, Strongly Agree*).

Statistical Analysis

Means ± standard deviations were calculated for participant age, screening results, and behavior intention. Frequencies (*n*, %) were used to display screening self-selection, including sub-groups (i.e., those who screened only versus those who screened and classified risk). For behavioral intention, a repeated-measures analysis of variance (ANOVA) was conducted to determine any statistically significant differences in intention between the screening tests. To determine any significant differences between means in intention between risk classification groups for each screening, an ANOVA or independent t-test was used.

RESULTS

Screening Selection

A total of *N* = 170 adults (59.93 ± 16.15 years of age; 73% women) participated in at least one screening, with blood pressure (95%) being the most commonly selected and WC (35%) the least (see Table 1). Of the participants who completed the screening and risk classification, but *did not* complete the intention portion of the survey, handgrip strength (81%) was the most commonly selected and heart rate (52%) the least (see Table 1). Additionally, of the participants who *did* complete the intention portion, as well as the screening and risk classification, handgrip strength (95%) was the most commonly selected and fruit/vegetable intake (68%) the least (see Table 1).

Table 1

Frequency of total participation (N = 170), by screening type in those who screened only versus screened and classified their risk, and in those who completed the intention question.

Screening	N (%)	By Group (Overall), *n* (%)		By Group (with Intention),[a] *n* (%)	
	Overall	Screened[b]	Screened + Classified[c]	Screened	Screened + Classified
BP	162 (95%)	72 (44%)	90 (56%)	7 (10%)	63 (90%)
HR	135 (79%)	65 (48%)	70 (52%)	20 (32%)	43 (68%)
WC	59 (35%)	15 (25%)	44 (75%)	3 (9%)	29 (91%)
HS	141 (83%)	27 (19%)	114 (81%)	3 (5%)	60 (95%)
PA	116 (68%)	55 (47%)	61 (53%)	36 (41%)	52 (59%)
FV	122 (72%)	53 (43%)	69 (57%)	40 (42%)	55 (58%)

[a]Only examining participants who completed the intention statement.

[b]*Screened* = participants who participated in the screening, but did not classify their risk

[c]*Screened + Classified* = participants who participated in screening and classified their risk

BP blood pressure, *HR* heart rate, *WC* waist circumference, *HS* handgrip strength, *PA* physical activity, *FV* fruit and vegetable intake

Screening Results

Table 2 presents the mean score ± standard deviation of screening results for the participants who completed each respective screening, alongside the relative risk rating. To highlight, a majority of the screening risk categories were abnormal, meaning that most individuals screened did have some risk for developing a chronic disease based on their result—including: blood pressure, heart rate, female WC, physical activity, and fruit and vegetable intake (see Table 2).

Table 2
Means ± SD of screening score result, overall.

Screening Measure	Result (mean ± SD)	Rating
SBP (mmHg)	134.31 ± 17.08	Hypertension (Stage 1)
DBP (mmHg)	79.67 ± 11.48	Hypertension (Stage 1)
HR (bpm)	78.73 ± 14.15	Abnormal
WC (in)	37.04 ± 4.99	—
Male (*n* = 14)	38.57 ± 6.61	Low Risk for obesity-related disease
Female (*n* = 41)	36.68 ± 4.39	High Risk for obesity-related disease
HS (lbs)	58.10 ± 20.98	—
Male	74.69 ± 21.23	—
18–49 years (*n* = 8)	*90.53 ± 15.49*	Mid-Normal
≥ 50 years (*n* = 27)	*70.00 ± 20.61*	Low-Normal
Female	52.02 ± 17.65	—
18–49 years (*n* = 25)	*62.01 ± 18.45*	Mid-Normal
≥ 50 years (*n* = 71)	*48.50 ± 16.05*	Low-Normal
PA (days/week)	4.59 ± 2.19	Did not meet recommendation
FV (servings/day)	3.30 ± 2.15	Did not meet recommendation

Waist circumference and handgrip strength data and risk categories were divided into sex and sex and age, respectively due to the physiological differences and normal results related to sex and age with these screenings.

SBP systolic blood pressure, *DBP* diastolic blood pressure, *HR* heart rate, *WC* waist circumference, *HS* handgrip strength, *PA* physical activity, *FV* fruit and vegetable intake

Behavioral Intention

The overall mean intention to improve lifestyle screening results in the future (on a 5-point Likert Scale) ranged from the lowest intention score 3.92 ± 0.84 (handgrip strength) to the highest intention score 4.21 ± 0.59 (WC), with no statistically significant differences in mean intention between screening tests (*Wilks' Lambda* = 0.82, $F(4, 16) = 0.88$, $p = 0.50$) (see Table 3). For descriptive purposes, the frequency of intention results by screening test are also provided in Table 3. The only statistically significant mean difference in intention between risk classification groups ($t = -4.67$, $p < 0.001$) was in WC, with those classified as *very low/low risk* (3.79 ± 0.43, *n* = 14) being statistically significantly lower than those classified as *high/very high risk* (4.60 ± 0.51, *n* = 15) (see Table 4).

Table 3

Means ± standard deviation (SD) for self-reported intention (overall and by those who screened only versus screened and classified their risk), and of overall frequency of responses.

Screening	Intention Frequency					
	Intention	**Strongly Disagree**	**Disagree**	**Neither D/A**	**Agree**	**Strongly Agree**
BP/HR[a]	4.13 ± 0.82	1.4%	1.4%	14.3%	48.6%	34.3%
WC	4.21 ± 0.59	0.0%	0.0%	8.8%	61.8%	29.4%
HS	3.92 ± 0.84	1.6%	3.1%	20.3%	51.6%	23.4%
PA	4.04 ± 0.88	1.1%	6.4%	10.6%	51.1%	30.9%
FV	4.08 ± 0.69	0.0%	4.1%	7.2%	64.9%	23.7%

[a]While BP and HR were measured separately, there was only one intention question for both: “Based on these screening results, I intend to improve my blood pressure and/or heart rate in the near future.”

BP blood pressure, *HR* heart rate, *WC* waist circumference, *HS* handgrip strength, *PA* physical activity, *FV* fruit and vegetable intake

Table 4
Difference in self-reported intention [mean ± standard deviation (n)]to improve screening result(s) following each screening between risk classification groups.

Screening	**Group Means ± SD (n)**					
	Normal	**Elevated**	**HTN (Stage 1)**	**HTN (Stage 2)**	**F or t**	**p**
Blood Pressure	4.00 ± 0.82 (16)	3.91 ± 0.83 (11)	4.41 ± 0.51 (17)	4.16 ± 1.01 (19)	1.08	0.37
Heart Rate	**Normal**		**Abnormal**			
	4.15 ± 0.81 (39)		4.25 ± 0.96 (4)		-0.22	0.83
Waist Circumference	**Very Low/Low Risk**		**High/Very High Risk**			
	3.79 ± 0.43 (14)		4.60 ± 0.51 (15)		-4.67	**< 0.01**
Handgrip Strength	**Weak**	**Normal**	**Strong**			
	3.77 ± 0.73 (13)	3.95 ± 0.85 (40)	4.13 ± 0.84 (8)		0.49	0.62
Physical Activity	**Did Not Meet Recommendation**		**Met Recommendation**			
	4.17 ± 0.89 (29)		4.35 ± 0.69 (26)		-0.80	0.43
Fruit/Vegetable	**Did Not Meet Recommendation**		**Met Recommendation**			
	4.26 ± 0.50 (38)		4.24 ± 0.56 (17)		0.18	0.86

BP blood pressure, *HR* heart rate, *WC* waist circumference, *HS* handgrip strength, *PA* physical activity, *FV* fruit and vegetable intake

DISCUSSION

Provided the limited research in the effectiveness of community health screenings, the purpose of this exploratory investigation was to provide further understanding of common health screenings through examination of screening choices, results and risk classification, and behavioral intention to improve screening results.

Screening Selection and Results

The present findings from free, community health expos across rural Texas provide preliminary support that participants make individualized choices when provided the opportunity to self-select screening tests (see Table 1). Simply, participants preferred and chose different screenings. For example, while 95% of participants chose blood pressure, only 35% chose WC—the latter considered at least as strong, if not a stronger predictor of chronic disease and premature death (30). In addition, there appears to be

individualized differences in choices to classify oneself, based on the screening result. Interestingly, some participants recorded their screening result, did not classify their risk, but still completed their intention to change. While these results could be explained by people simply skipping questions, it would be interesting for future research to investigate why people might purposely skip classifying their risk. For example, studies have found that people will avoid risk-related information about themselves (13), which could have implications to health screenings. Future research could examine why people choose different screenings, which could elucidate methods to increase willingness to participate—especially in screenings that might traditionally have low participation (e.g., WC).

For descriptive purposes, the mean result and risk classification were presented (see Table 2). In summary, this table highlighted that a majority of individuals who participated in the screening and risk classification of that screening did not meet normal, healthy recommendations; thus, placing most within risk for related chronic diseases. In theory, this should spark some intention towards positive behavioral change to improve health results. However, it is known that the behavior-intention gap is large, thus, discussing diverse contributors provides a better understanding of reasons for discrepancies or patterns that influence the frequency of completing preventative health screenings and the subsequent behavioral and change of intention from those screenings (31). Future research is needed to further comprehend the behavioral aspect of non-participation of individuals in health screenings, to decrease the behavior-intention gap and increase motivational uptake and adherence of health screenings through innovative approaches.

Behavioral Intention

The data provided showed the impact that health screening results had on one's intention to change their behavior (see Table 3). Overall intention was high, ranging from 3.92 to 4.21 on a 5-point scale, with WC having the highest intention to improve results. This finding challenges assumptions that community health screenings might not be powerful enough to influence behavioral intention. However, it should be noted that only intention was assessed, and not behavior change. We hypothesized that intention would differ between screenings—for example, that the WC screening might result in higher intention than handgrip. However, this was not the case, as there were no significant differences in intention between screening tests. With the known intention-behavior gap, future research could consider assessing both intention and behavior change following screenings.

Additionally, intention was broken down and assessed between classification groups within each screening (see Table 4). It can be highlighted that intention between *very low/low risk* and *high/very high risk* within the WC screening was significantly different to one another, meaning that those who were at greater risk had a significantly higher intention than having a lower risk for obesity related diseases. Meanwhile, all other screening intentions were not significant between categories. This could potentially be explained by emotional triggers related to one's physical appearance related to WC, while other screenings did not directly portray an individual's outward image, but rather in-body physiological aspects (11–12). Further studies need to be conducted to look into the emotional impacts of WC measurements as a motivating factor to improve health.

Limitations

Potential limitations in the current evaluation include a small sample size and lack of pre- and post-assessments of intention.

CONCLUSIONS

In conclusion, self-selected, community health screenings can positively impact intention to improve upon the risk/results of those screenings, while highlighting variation in frequency of screenings chosen. On average, intention remained moderate-high following all screenings regardless of risk classification, with the exception of WC. It would be beneficial for future research to include the aforementioned items as well as examine why certain screenings are preferred and self-selected over others, the uniqueness of WC screenings, and the potential impact on health behavior change (i.e., the intention-behavior gap).

It was predicted that the rural communities would have a different response in intention for behavior change to the health screening results due to a variety of contributing factors (32–33). Similar to previous findings, the rural communities had a low response rate to health screenings. One potential contributing factor to a low response rate includes the level of education individuals have on health topics prior to completing a screening. If a person has a greater understanding of the severity and effects of a condition, then they are more likely to alter their intention and behavior based on their results. In opposition, if an individual has no previous knowledge on a topic, a patient may not know the serious health risks associated with the condition, and not have any intent on changing their behavior to improve that area of health (34).

Additionally, socioeconomic and demographic factors can contribute to the access that one has to healthcare resources, including health screenings. Quality socioeconomic components could sway one to have a positive behavioral change due to the access to assets needed, such as financial, transportation, education, available physicians, etc. to improve health factors; while the opposite is true as well (35–36). Future research needs to be conducted to further evaluate the impact of contributing factors towards the intention to change in response to health screenings.

Abbreviations

BMI
Body Mass Index
DBP
Diastolic blood pressure
FV
Fruit/Vegetable
HR
Heart Rate

HS
Handgrip Strength
HTN
Hypertension
LBS
Pounds
PA
Physical Activity
SD
Standard Deviation
SBP
Systolic Blood Pressure
WC
Waist Circumference

Declarations

Ethics approval and consent to participate

As secondary analysis of de-identified participant data, this project was reviewed by the Texas A&M University Human Research Protection Program and determined to be **Not Human Research** (IRB ID: STUDY2024-0338), and thus informed consent was not required.

Consent for publication

Not applicable.

Competing interests

There are no conflicts of interest.

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Author Contribution

KNK: Contributed to the writing and editing of the manuscript.MC: Contributed to the writing of the manuscript.CCB: Contributed to the writing and editing of the manuscript. MS: Contributed edits to the manuscript.MDF: Contributed edits as well as oversight of the data analysis and overview of the project.

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Data Availability

All data generated or analysed during this study are included in this published article [and its supplementary information files].

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