March 19, 2019

HARMS MEASUREMENT

HOW DO WE MEASURE POPULATION HARM?

POPULATION HEALTH AND HARM – TWO SIDES OF THE SAME COIN

Health and harm are interrelated. Being healthy is more than simply not being unhealthy; it means thriving physically, mentally, and socially.[1] Vibrant, healthy populations are built on equitable policies and natural and built environments that ensure the best health possible for the entire population.[2] Measuring population health allows governments to describe, explain, predict, and control the factors that improve health and health-related consequences.[3] Understanding a population's current health status and being able to predict its future status improves decision makers' ability to effectively allocate resources to public policies and initiatives.[3]

Population health is multi-faceted and dynamic. Population health measurement should measure the function and well-being of the population itself, not individual members.[2] Measuring population health outcomes requires the development of metrics that capture a population's dynamic state of physical, mental, and social well-being.[2] Positive health outcomes enhance the likelihood of achieving a high state of health, such as physical health and sense of well-being.[2]

Population harm is more than the sum of its parts. Negative health outcomes are those that prevent experiencing overall good health and include loss of function and decreased well-being.[2] Gambling harms can extend well beyond financial harm to include: relationship disruption, conflict, or breakdown; emotional or psychological distress; decrements to health; cultural harm; reduced performance at work or study; and criminal activity.[4] These harms can occur over an individual's life course and can also create generational and intergenerational harms.[4]

KEY MESSAGES

- Population health measurement should measure the function and well-being of the population itself, not individual members
- Measuring population health outcomes requires the development of metrics that capture a population's dynamic state of physical, mental, and social well-being
- Measurements of population level gambling harm should include the prevalence and impact of negative consequences to overall health and well-being across a spectrum of gambling harms that extends beyond primarily financial or economic harms, as well as include indicators of supportive environments
- There are many limitations in using clinical diagnostic tools to assess population level harm from gambling, however behavioural symptoms can serve as an appropriate proxy when measuring gambling harms because these behaviours frequently occur before and contribute to harm
- Burden of disease methodologies can be used to measure population level harm from gambling

Aggregate-level measurements of harm seek to identify population-level risk factors rather than individual risk factors. They may reflect the effects of policies or regulations on preventing or facilitating harm.[5, 6] The harms being measured may not be experienced by a specific person but at a population level (e.g. decreased overall productivity).[5, 6] In the case of gambling, measuring population-level harm should include the prevalence and impact of negative consequences to overall health and well-being across a spectrum of gambling harms that extends beyond primarily financial or economic harms.[7] Previous efforts to assess the negative population health impact of gambling through economic costing models have been criticized for the following reasons: difficulty in costing intangibles such as impact on quality of life and well-being; variations in costing models make comparison to other social harm costings (such as alcohol) difficult; and an overemphasis on gambling expenditures that fails to adequately capture population-level harm.[7]

POPULATION HEALTH AND HARM: SUPPORTIVE ENVIRONMENTS

Population health is also focused on the degree to which societal conditions maintain and enhance the health of the entire population, such as through equitable distribution of power, opportunities, resources, and social connections.[2] These concepts are reflected in the World Health Organization (WHO)'s Ottawa Charter for Health Promotion, which emphasize the importance of healthy public policy, supportive environments, strengthening community action, and developing personal skills.[8]

For example, the WHO Global Status Report on Alcohol and Health includes several indicators of supportive public health environments[9]:

- Presence of a written national policy and commitment to reduce alcohol-related harm
- Extent and type of nationwide awareness-raising activities
- Indicators for the effectiveness of the treatment sector
- Support for community action
- Effective regulation of availability of alcohol
- Marketing restrictions
- Responsible beverage service training
- Activities to address informal and illicit production
- Policy support for monitoring and surveillance

Overview. The WHO uses Burden of Disease (BoD) methodologies to monitor the total mortality and morbidity (non-fatal health consequences that decrease overall well-being) costs for a wide range of health issues.[10] Interest in quantifying morbidity and quality of life, in addition to mortality, is related to longer life expectancies.[10] Longer life expectancies mean that those living with diseases or illness experience the harms longer and may use more health care services, requiring the development of effective and cost-efficient health programs and policies.[10]

Important concepts:

- Well-being: reflects individuals' perception that their life is going well and includes judgements of overall life satisfaction.[11] Population health measures of well-being complement measures of mortality, financial status, and morbidity by valuing an individual's perception of their health.[11] It has been associated with: self-perceived health; longevity; health promoting behaviours; mental illness; physical illness; social connectedness; productivity; and factors in the built and social environment.[11]

- Utility: The concept of utility is central to Health Related Quality of Life (HRQL) weights and indicates an individual's preference for different health outcomes on a scale between zero (health state equivalent to death) and one (health state equivalent to perfect health).[12]

- Disability weights: A metric used to measure health decrements on a scale ranging from zero (equivalent to death) to one (equivalent to optimal health).[13]

BoD methodologies are applicable to measuring gambling harm because of their emphasis on quality of life and comparability to other health issues that use the same approach.[7] The definitions of a few common BoD measures are outlined below.

Health Related Quality of Life (HRQL Weights). The HRQL weights are often used to measure patient preferences for treatments or programs (based on how much utility the outcomes of each offer).[14,15] Gambling-related harm can be measured as a reduction in an individual's utility (U) or *1-U*.[14] The HRQL weights often accompany incidence, duration, relapse, and mortality data in order to develop the quality-adjusted life years (QALYs) measure, described below.[14]

Quality Adjusted Life Years (QALY). The purpose of the QALY measure is to quantify the improvement in utility gained from different health interventions.[14] For example, if two treatment interventions extend an individual's life expectancy by five years, but the first

treatment allows the individual to experience full health (U=1) while the second treatment only returns the individual to partial health (U=0.5), the first treatment provides five QALYs while the second only yields two and a half (*5 years* × *0.5*).[14]

Years Lost to Disability (YLD). Annual years lost to disability for population is calculated using the following equation: *total population* × *annual prevalence for health state* × *utility weight*.[16] Clear and consistent definitions for health states is crucial for developing a meaningful definition of YLD and require the utility weight (and considerations such as severity, treatment status, and acuteness of condition) and population prevalence data to be aligned with that definition.[16]

Disability Adjusted Life Year Lost (DALY). The Disability Adjusted Life Year Lost (DALY) is a measure that has been used to assess alcohol harms and reflects the number of years of "healthy" life lost. [17] It is related to YLD as *DALY = Years of Life Lost (YLL) + YLD*.[17] Both the DALY and QALY measure assume there is an average burden for a disease state/health condition experienced by a population.[14] Harm from alcohol is reported by WHO using DALY and is further broken down into to its YLL and YLD components.[9]

BURDEN OF DISEASE MEASURES: APPLICATIONS TO GAMBLING HARM

The prevention paradox in gambling harm describes how the majority of gamblers experiencing harm are low- and moderate-risk gamblers. This emphasizes the need to measure quality of life and harm in those that experience harm at less intense levels than problem gamblers.[13] The use of BoD measures for gambling harm allow for summary measures of health to be created that go beyond prevalence and impact and allows for the comparison of gambling-related harms with other health states, such as depression.[13]

The QALY measure was used by Browne et al. to assess population gambling harm in New Zealand by quantifying the ongoing harm per year in terms of $QALY_1$ (total annual years of healthy life lost due to gambling).[14] The Problem Gambling Severity Index (PGSI), a common scale for assessing problem gambling severity in gambling research and treatment, was used to measure gambling severity. The PGSI categorizes individuals as either non-problem gamblers (score of 0), low-risk gamblers (score of 1-2), moderate-risk gamblers (score of 3-7), and problem gamblers (score of 8-27), was used as a substitute for gambling severity.[14] The researchers analyzed differences in $QALY_1$ based on PGSI categories, harms to self and others, health states comparable to gambling harm, and demographics.[14] The researchers found that there was a total of 161,928 years of healthy life lost due to harms from one's own or another person's gambling, with 58.5% of healthy years lost attributed to one's own gambling harms and 41.5% attributed to harms from someone else's gambling.[14] The

researchers suggested that the burden of harm is primarily due to damage to relationships, emotional/psychological distress, disruptions to work/study and financial impact.[14] The same authors replicated the study in Australia using the same methodology with slight adaptations to ensure cultural sensitivity, allowing the researchers to compare disability weights across the two countries.[13] They found that the disability weight estimates for low-risk, moderate-risk, and problem gamblers in New Zealand were consistently higher than the Australian weights for low risk (0.18 vs. 0.13), moderate risk (0.37 vs. 0.29), and problem gamblers (0.54 vs. 0.44) respectively.[13]

In another study, Browne et al. recommended that population-level measurement should include both prevalence severity of harm across the spectrum of the disorder.[7] They proposed that using Years of Life Lost to Disability (YLD) is ideal for mapping the quality of life impact on a population level and allows for comparison to other conditions.[7] Using the YLD and disability weights calculated for each PSGI category, Browne and colleagues estimated that the total YLD in Victoria due to gambling for all PGSI categories was 101,675 years.[16] Approximately half of the total YLD due to an individuals' gambling harms were attributed to the low-risk PGSI category (50.2%), followed by the moderate-risk (34.5%) and problem gambler (15.2%) groups.[16]

APPROPRIATENESS OF TOOLS AND DATA COLLECTION STRATEGIES

Clinical screening and assessment tools. There are several limitations in using screening tools to assess population level gambling harm:

- Interpretation issues:
  - ❖ Gambling harms can occur to those that do not have problem gambling so using problem gambling scores will underestimate the magnitude of harms experienced [7]
  - ❖ Individuals can experience the traits/behaviours of problematic gambling but not experience harm [18]
  - ❖ Individuals can experience harms without exhibiting pathological gambling behaviours, beliefs, or attitudes [18]
- Tool content:
  - ❖ Most tools include both behavioural and motivational indicators, as well as the experiences of harmful consequences, which conceptualizes gambling-related harm as a subset of the problem gambling category [19]
  - ❖ There are currently no tools that include item content that solely measures the harmful consequences of gambling and current measures only contain a small number of items

that assess gambling harm which are insufficient to capturing the breadth and depth of harms [19]

- Wording of items measuring experience of harm often use the words 'often' or 'always' and miss lower-frequency potentially significant harms [19]
- Temporal or differential dimensions of harm and harm severity are typically not considered [19]
- Many tools use double-barrelled questions, in which two questions/ideas are combined within the same item which makes interpretation difficult [19]

Despite these limitations, Browne and colleagues proposed that behavioural symptoms can serve as an appropriate proxy when measuring gambling harms because these behaviours frequently precede and contribute to harm.[16] They pointed to work by Currie et al., who used longitudinal data to examine transitions from low to high risk behaviours and found that increased consumption was predictive of experiencing harm, although harm was not well defined.[20]

Harm measurement tool. Shannon et al. attempted to address tool limitations by designing a single composite harm measure for seven identified harms: financial, health, leisure activities (disengagement from), critical events, social and relationships, employment and education, and psychological harm.[19] They used a two-step method for measuring 48 identified harms that avoided double-barreled questions; the first step assessed the presence and severity of a harm and the second assessed the self-reported extent to which that harm was attributable to gambling.[19] These were then combined to create a single composite score for that harm.[19] All questions were framed over six months to reflect the persistence and severity of the 'current' experience of harms and to ensure reliability in relation to the attribution of harm to gambling.[19] A six-month time frame also allowed for capturing the harmful impact of events that may have occurred over a broad interval.[19] The researchers found a significant correlation between PGSI scores and their harm questionnaire scores.[19] For individuals scoring less than 8 on the PGSI, 22% reported some level of harm and 7% of those scoring zero also indicated some level of harm.[19]

The researchers found that the top 15 harms fell into the categories of financial, social and relationships, psychological, health, and leisure domains. Top harms were: reduced savings, doing without, worry, frustration, debt, decreased self-control, decreased happiness, loss of self-respect, decreased pride, decreased hopefulness, constraints, problems with partner, sleep problems, going out less, and reduced home maintenance.[19]

CONSIDERATIONS IN DEVELOPING AGGREGRATE-LEVEL INDICATORS

There are several factors to consider when selecting and developing aggregate-level indicators to measure health, including whether the indicators[2]:

- Further the goals of the organization
- Are valid and reliable
- Can be easily understood by people who use them
- Are measurable over time
- Are measurable for specific geographically or demographically defined populations
- Are measurable based on the available data sources
- Are sensitive to changes in factors that influence them, such as socioeconomic or environmental conditions or public policies
- Are well-defined
- Are worthwhile or important
- Are modifiable based on action
- Are culturally sensitive and acknowledge that language, education, question framing, and cultural attitudes towards gambling and shame effect the accuracy of data collection[16]

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